East San Joaquin
WATER QUALITY COALITION
1201 L Street Modesto, CA 95354
www.esjcoalition.org

March 1, 2011

Pamela Creedon
Dania Huggins
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 2011 Annual Monitoring Report (AMR) and Quarterly Monitoring Data Report (fourth quarter) for review by the Central Valley Regional Water Quality Control Board (CVRWQCB) as required by the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands Resolution Order No. R5-2006-0053, Monitoring and Reporting Program Order No. R5-2008-0005 (MRP).

The attached documents report on the Coalition's monitoring program for the period of January 1, 2010 through December 31, 2010 and covers monitoring, reporting, outreach and education activities that occurred during this time. Accompanying this letter are the following:

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

In every aspect, the Coalition seeks the best quality in its monitoring program by using the most scientifically reliable field and laboratory protocols, ensuring complete quality control and quality assurance of the data received from laboratories, and reporting on 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 three storm events and two sediment events) and all data generated are an accurate reflection of conditions in the Coalition region. Overall, there was compliance with completeness, accuracy, and precision requirements for data collected January 2010 through December 2010. Each of the five MRP programmatic questions is addressed in the Conclusions and Recommendations section of the AMR.

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

This letter will be mailed to the CVRWQCB with an original signature.

Submitted respectfully,

Parry Klassen
Executive Director
East San Joaquin Water Quality Coalition

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

Annual Monitoring Report

East San Joaquin Water Quality Coalition

January 2010 – December 2010

March 1, 2011

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LIST OF ACRONYMS

A	Assessment
AI	Active Ingredient
AMR	Annual Monitoring Report
AWEP	Agricultural Water Enhancement Program
BMP	Best Management Practice
BU	Beneficial Use
C	Core
CDEC	California Data Exchange Center
CEDEN	California Environmental Data Exchange Network
COC	Chain of Custody
CURES	Coalition for Urban and Rural Environmental Stewardship
CVRWQCB	Central Valley Regional Water Quality Control Board
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
DPR	(California) Department of Pesticide Regulation
DQO	Data Quality Objective
DWR	(California) Department of Water Resources
EC_{50}	Effective Concentration of 50% of the measured endpoint
EDD	Electronic Data Deliverable
EPA	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 (beneficial use)
NA	Not Applicable
ND	Not Detected
NM	Normal Monitoring
NRCS	Natural Resources Conservation Service
OP	Organophosphate pesticides
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
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
USEPA	United States Environmental Protection Agency
VOA	Volatile Organic Analyte
WQTL	Water Quality Trigger Limit
YSI	Yellow Springs Instruments

LIST OF UNITS

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

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.

Regional Board – Central Valley Regional Water Quality Control Board

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

Special study – A study conducted outside of normal monitoring activities that involves monitoring specific constituents in an effort to determine the mechanism responsible for the exceedances; also includes Total Maximum Daily Load (TMDL) monitoring.

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

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

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

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

ANNUAL MONITORING REPORT (AMR) REQUIREMENTS – SECTION KEY

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

REQUIRED SECTION - MRP	SECTION NAME/LOCATION - AMR
19. Summary of Exceedance Reports submitted during the reporting period and related pesticide use information;	Discussion of Results, Appendix IV (Pesticide Use Reports), Appendix V (Exceedance Reports) PUR Access Database (attached CD)
20. Actions taken to address water quality exceedances that have occurred, including but not limited to, revised or additional management practices implemented;	Actions Taken To Address Water Quality Exceedances, Appendix VII (Meetings, Agendas and Handouts)
21. Status update on preparation and implementation of all management plans and other special projects; and	Management Plan Status and Special Projects
22. Conclusions and recommendations.	Conclusions and Recommendations

Table 1. ESJWQC MRPP and QAPP amendments summary.

Item Number	Amendments Descriptions	Date Submitted	MRP Plan Page Number	Date Approved
	Original ESJWQC MRP Plan	**August 25, 2008**		**September 15, 2008**
1	Request to exchange sites: Exchanged Mootz Drain @ Langworth Rd for Mootz Drain downstream of Langworth Pond.	September 8, 2009	Table 4, page 30 Figure 11, page 32 Table 5, page 37 Figure 12, page 40 Verbiage,page44-45 Table 7, page 47 Table 10, page 52 Table 11, page 55 Table 13, page 61 Attachment II	November 18, 2009
3	Request to submit quarterly monitoring results in electronic format	May 6, 2010	Table 16, page 73[1] Verbiage, page 72	May 17, 2010
4	Request to stop monitoring at South Slough @ Quinley Rd.	September 21, 2009	Table 4, page 30 Figure 11, page 32 Table 5, page 37 Figure 12, page 40 Verbiage,page44-45 Table 7, page 47 Table 10, page 52 Table 11, page 55 Table 13, page 61 Attachment II	June 3, 2010
6	Updated previously misspelled spelling of "demeton-s."	October 20, 2010	Table 12, page 58 Table 14, page 66	February 23, 2011
7	Added paragraph explaining the dropped constituents from May 2009 to July 2010.	October 20, 2010	Verbiage, page 59	February 23, 2011

Item Number	Amendments Descriptions	Date Submitted	MRP Plan Page Number	Date Approved
	Original ESJWQC MRP Plan	**August 25, 2008**		**September 15, 2008**
8	Added deltamethrin:tralomethrin to sediment pyrethroids analysis list. Deltamethrin is listed in the MRP but was not previously added to the MRPP or QAPP tables.	October 20, 2010	Table 12, page 58 Table 14, page 66	February 23, 2011
9	Added organochlorine analysis to Merced River @ Santa Fe, sediment to Cottonwood Creek @ Rd 20, Carbofuran to Duck Slough @ Gurr Rd and removed *Ceriodaphnia* from Cottonwood Creek @ Rd 20 due to typos in original table.	October 20, 2010	Table 13, page 61	February 23, 2011
10	Updated sediment toxicity method to EPA 600/R-99-064 from EPA 100.1.	October 20, 2010	Table 14, page 66	February 23, 2011
11	Updated methamidophos method to EPA 8321 from EPA 8141A due to lab analysis change in July 2010.	October 20, 2010	Table 14, page 66	February 23, 2011
12	Updated sediment pyrethroid analytical method from EPA 8270 to a modified 8270 method, GCMS-NCI-SIM ,due to lab analysis change for sediment pyrethroids in April 2010.	October 20, 2010	Table 14, page 66	February 23, 2011
13	Updated trifluralin RL to 0.05 µg/L from 0.01 µg/L.	October 20, 2010	Table 14, page 66	February 23, 2011
14	Updated sediment pyrethroid MDL and RL values to match those recommended by lab.	October 20, 2010	Table 14, page 66	February 23, 2011
15	Updated glyphosate, cadmium, lead, molybdenum, TKN and ammonia MDL values to match those achieved by lab.	October 20, 2010	Table 14, page 66	February 23, 2011
16	Updated turbidity, hardness, molybdenum and TKN RL values to match labs.	October 20, 2010	Table 14, page 66	February 23, 2011
17	Updated dichlorvos and demeton-s RL values from 0.2 µg/L to 0.1 µg/L.	October 20, 2010	Table 14, page 66	February 23, 2011
18	Updated California Department of Pesticide Regulation (DPR) and California Department of Water Resources (DWR) reference links.	October 20, 2010	Verbiage, page 8	February 23, 2011
19	Switched Mustang Creek to 2008-2010 monitoring and Peaslee Creek to 2013-2014 monitoring to agree with Table 13 page 63.	October 20, 2010	Table 10, page 52	February 23, 2011

Item Number	Amendments Descriptions	Date Submitted	MRP Plan Page Number	Date Approved
Original ESJWQC MRP Plan		**August 25, 2008**		**September 15, 2008**
20	QAPP: Updated Caltest QA Officer. Sonya Babcock replaced Carmelita Oliveros as the Caltest QA Officer and assumed all the associated responsibilities.	October 20, 2010	QAPP Verbiage, page 2 Figure 1, page 11 Table 17, page 51 Table 18, page 53	February 23, 2011
21	QAPP: Updated MLJ Sampling Coordinator. Frank Wulff replaced Jonathon Katz as MLJ Sampling Coordinator and assumed all the associated responsibilities.	October 20, 2010	QAPP Verbiage, page 26 Table 8, page 26 Table 17, page 51 Table 18, page 53 Table 19, page 55	February 23, 2011
22	QAPP: Updated Regional Board Irrigated Lands Regulatory Program (ILRP) Monitoring Assessment Supervisor. Susan Fregien replaced Margie Read as the ILRP Monitoring Assessment Supervisor and assumed all the associated responsibilities.	October 20, 2010	QAPP Verbiage, page 2, 8 Figure 1, page 11	February 23, 2011
23	QAPP: Separated Matrix Spike/Lab Control Spike Frequency into two columns. Updated sediment TOC MS/LCS frequency to MS=N/A, LCS=1 per batch; grain size updated to N/A for both LCS and MS.	October 20, 2010	QAPP Table 5, page 22	February 23, 2011
24	QAPP: Updated sediment grain size Accuracy/Recovery from 90-110% to N/A.	October 20, 2010	QAPP Table 5, page 22	February 23, 2011
25	QAPP: Updated glyphosate Accuracy/Recovery acceptability range from 72-131% to 85.7-121% to match the range recommended by the lab.	October 20, 2010	QAPP Table 5, page 22	February 23, 2011
26	QAPP: Updated metals Accuracy/Recovery acceptability range from 75-125% to 85-115% and nutrients Accuracy/Recovery range from 80-120% to 90-110% to match the range recommended by the lab; updated lab precision RPDs from 25 to 20 for nutrients, metals and physical parameters to match the acceptability criteria used by the lab.	October 20, 2010	QAPP Table 5, page 22	February 23, 2011
27	QAPP: Removed requirement for Lab Control Spike/CRM/SRM from sediment grain size section of the Analytical QC table. This QC level is not required by SWAMP.	October 20. 2010	QAPP Table 16, page 45	February 23, 2011
28	QAPP: Removed requirements for internal standards performed for Organic Parameters: OPs, OCHs, carbamates, and additional herbicides.	October 20, 2010	QAPP Table 16, page 45	February 23, 2011

Item Number	Amendments Descriptions	Date Submitted	MRP Plan Page Number	Date Approved
Original ESJWQC MRP Plan		**August 25, 2008**		**September 15, 2008**
29	QAPP: Updated organic and inorganic Field Blank Acceptable Limits from "<MDL" to "<RL or <sample/5" to agree with Table 7, Element 7, page 24.	October 20, 2010	QAPP Table 15, page 44	February 23, 2011
30	QAPP: Added precision calculation for sediment grain size.	October 20, 2010	QAPP Verbiage, page 49	February 23, 2011
31	QAPP: Updated location of Regional Data Center from UCD-AEAL to Central Valley RDC.	October 20, 2010	QAPP Verbiage, page 56 Figure 4, page 59	February 23, 2011
32	QAPP: Updated chemistry and toxicity data verification, validation and loading Standard Operating Procedures (SOPs); updated sample detail excel file creation SOP.	October 20, 2010	QAPP Appendices XXXV-XXXVII	February 23, 2011
33	QAPP: Updated laboratory inorganic chemistry SOPs for EPA 619, EPA 8081A, EPA 8141A, EPA 549, EPA 8321A; updated laboratory toxicity SOPs for Acute *Ceriodaphnia*, Acute *Pimephales*, and Chronic *Selenastrum* toxicity tests; updated inorganic chemistry SOPs as needed.	October 20, 2010	QAPP Appendices XI-XXXII	February 23, 2011

[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) region includes the portions or all of the counties of Stanislaus, Merced, Madera, Tuolumne, and Mariposa and the portion of Calaveras County that drains into the Stanislaus River. In addition to the San Joaquin River which forms the south and east boundary of the Coalition, there are five major rivers in the watershed: the Fresno River, Chowchilla River, Merced River, Tuolumne River and Stanislaus River. In addition, the Eastside Bypass is considered a major water body. These east side tributaries of the San Joaquin River drain the Sierra Nevada range from east to west. Irrigated agriculture is the predominant land use in the Coalition area although the growing urban areas in the Central Valley are also a significant land use. Other non-irrigated land uses include dairies with minor acreage in feedlots.

The Coalition area was divided into six zones based on hydrology, crop types, land use, soil types, and rainfall. The zone names are: 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 Monitoring and Reporting Plan (submitted August 25, 2008).

MONITORING PROGRAM OBJECTIVES

Water quality monitoring was conducted during every month from January 2010 through December 2010 as described in the ESJWQC Monitoring and Reporting Program Plan (MRPP). The MRPP was originally submitted on August 25, 2008 and approved on September 15, 2008. On October 20, 2010 an amended MRPP was submitted to the Regional Board which includes documentation of all previous modifications and updates; the amendment was approved on February 23, 2011. The primary objectives of the monitoring program are to characterize discharge from agriculture and to determine if implementation of management practices is effective in reducing or eliminating discharge. The ESJWQC monitored water quality at 18 sites in the Coalition region between January 2010 and December 2010. Of these 18 sites, 14 were monitored under management plans as outlined in the ESJWQC MRPP. Of the sites monitored for management plan constituents, six sites (Cottonwood Creek @ Rd 20, Dry Creek @ Wellsford Rd, Duck Slough @ Gurr Rd, Highline Canal @ Hwy 99, Merced River @ Santa Fe and Prairie Flower Drain @ Crows Landing Rd) were also monitored monthly for Core Monitoring constituents, and two sites (Deadman Creek @ Gurr Rd and Mustang Creek @ East Ave) were also monitored monthly for Assessment Monitoring constituents. The Coalition sampled for numerous water quality parameters and constituents including 45 pesticides, *E. coli*, physical parameters (total dissolved solids (TDS), total suspended solids (TSS) and turbidity), nine metals, total organic carbon (TOC), five nutrients, field parameters (dissolved oxygen (DO), Power of Hydrogen (pH), specific conductivity (SC)), water column toxicity to three test species (*Ceriodaphnia dubia*, *Pimephales promelas* and *Selenastrum capricornutum*) and sediment toxicity to *Hyalella azteca*. In May 2009 the Coalition omitted the following constituents from its monitoring program: metals not applied by agriculture (arsenic, cadmium, lead and molybdenum), sediment bound pesticides (glyphosate, paraquat dichloride), organochlorine pesticides no longer applied by agriculture (including Group A pesticides) along with a subset of nutrients (Total Kjeldahl Nitrogen (TKN) and orthophosphate) as described in the ESJWQC MRPP. These constituents were sampled once a year during events with high total suspended solids except for Total Kjeldahl

Nitrogen and orthophosphate which were omitted completely starting April 2009 due to redundancy in monitoring data. However, monitoring for the omitted constituents was reinstated starting with the July 2010 sampling event as requested by the Regional Board. Monitoring constituents are established by the Irrigated Lands Regulatory Program (ILRP) Monitoring and Reporting Program (MRP) Order No. R5-2008-0005 (Table 12, page 59).

The monitoring program from January 2010 through December 2010 under the new ILRP MRP was substantially different relative to previous years of monitoring. Within each zone, a Core Monitoring site and an Assessment Monitoring site were established. Core sites are meant to establish trends in water quality over a longer period of time and will be monitored continuously over several years. There are fewer constituents monitored at core sites, primarily physical parameters and nutrients. Assessment monitoring sites are meant to characterize discharge in the zone in which they are located. Assessment Monitoring includes the full suite of constituents. Assessment sites are rotated every third year to a new site. Core sites receive assessment monitoring every third year as well.

MONITORING PROGRAM COMPLIANCE

For the period of January 2010 through December 2010, the Coalition was able to meet its monitoring program objectives by determining the concentration and load of waste in discharges to surface waters, evaluating compliance with existing narrative and numeric water quality limit triggers to determine if implementation of additional management practices is necessary to improve and/or protect water quality and assessing the impact of storm water discharges from irrigated agriculture to surface water. The Coalition used the results from surveys of management practices to determine the implementation of management practices to reduce discharge of specific wastes that impact water quality in receiving waters of the Coalition region.

Coalition monitoring between January 1, 2010 and December 31, 2010 resulted in exceedances of Water Quality Trigger Limits (WQTLs) for dissolved oxygen, pH, specific conductance, *E. coli*, total dissolved solids, ammonia, nitrate, arsenic, copper and chlorpyrifos. Water column toxicity to *Ceriodaphnia dubia, Pimephales promelas, Selenastrum capricornutum,* and sediment toxicity to *Hyalella azteca* occurred between January 2010 and December 2010.

The most common exceedances were for *E. coli* (48), dissolved oxygen (29), total dissolved solids (15), specific conductance (15), and pH (6). Exceedances of the nitrate WQTL were common (12) and of the metals analyzed; only copper (8) and arsenic (1) exceeded WQTLs. The arsenic exceedance was from samples collected at Deadman Creek @ Gurr Rd. There were nine pesticide exceedances of the chlorpyrifos WQTL, of those nine; three were from sites currently under Management Plan Monitoring (MPM). Diuron was the only other pesticide to exceed its WQTL. Overall, exceedances of physical parameters and *E. coli* were more common than exceedances of pesticides or metals.

Of the samples collected, water column toxicity to *Ceriodaphnia dubia* occurred twice, toxicity to *Pimephales promelas* occurred twice, and toxicity to *Selenastrum capricornutum* was experienced once. Of the five samples that tested toxic to one or more water column species, four had endpoints less than 50% compared to the control. Toxicity Identification Evaluations (TIEs) were initiated on four of the samples to determine the cause of toxicity. A TIE was not conducted on samples collected on March 23, 2010 due to unstable dissolved oxygen levels and extremely high amounts of ammonia. That water could not be brought up to the required test conditions to analyze for algae (sample was toxic to both

Ceriodaphnia and *Pimephales*). However, based on the concentration of ammonia in the sample, the presumed cause of the toxicity was ammonia. A Phase I TIE was conducted on toxic water samples collected on November 16, 2010 indicating ammonia to be the cause for all of the toxicity detected in the sample. Of the five toxic samples, one was collected specifically for Management Plan Monitoring.

A single sediment sample was toxic to *Hyalella azteca.* The survival in the sample was 70% and is considered ecologically significant therefore, additional chemistry analysis was conducted.

The 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, 2) an analysis of monitoring data and toxicity results to better understand the potential sources and toxicity of detected constituents, and 3) special studies where appropriate and cost effective to determine the sources of constituents such as *E. coli* or the potential causes of exceedances such as low dissolved oxygen.

Grower notification, management practice outreach and education, and tracking of management practice implementation are additional actions taken by the Coalition to ensure that growers are aware of downstream water and sediment quality issues as well as the importance of implementing various management practices within their farm operations. The Coalition provides growers with information on management practices to reduce storm water runoff, discharge of irrigation water, and mobilization of sediments into receiving waters.

The Coalition developed a strategy to prioritize subwatersheds in order to conduct focused outreach with individual members. The purpose of the outreach is to review current farm management practices, determine if additional management practices are applicable, and document implementation of any new practices. From 2008 through 2010 the Coalition conducted focused outreach in: Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99, and Prairie Flower Drain @ Crows Landing Rd. Growers were contacted during the spring and summer of 2009, a review of management practices was conducted and documented including any recommended practices. Follow up with growers was conducted in spring of 2010 to document implementation of new practices. Beginning in early 2010 focused outreach was initiated in the following second priority site subwatersheds: Bear Creek @ Kibby Rd, Cottonwood Creek @ Rd 20, Duck Slough @ Gurr Rd and Highline Canal @ Hwy 99. Growers were contacted in the spring and summer of 2010 and asked to complete surveys documenting current practices and indicate which recommended practices they anticipated implementing in the upcoming year. In early 2011 follow up contacts with growers from the second priority site subwatersheds began to document implementation of new practices. Results from follow up with growers from both the first and second sets of priority watersheds will be included in an analysis in the Management Plan Update Report (MPUR) to be submitted on April 1, 2011.

CONCLUSIONS

The results of the monitoring from January 2010 through December 2010 indicate that although there has been substantial improvement in water quality in many areas, water quality is still not protective of beneficial uses across most of the Coalition region. The most common exceedances of WQTLs involve physical parameters such as dissolved oxygen, total dissolved solids, and specific conductance which resulted in impaired Agricultural and Aquatic Life Beneficial Uses. Other parameters such as *E. coli* and total dissolved solids also experienced numerous exceedances which resulted in impaired Recreational and Aquatic Life Beneficial Uses. The most common causes of impairment of the Municipal Beneficial Use were elevated concentrations of arsenic. Discharges from irrigated lands are but one of many possible sources of impairments to beneficial uses.

For many parameters, it is not clear to what extent WQTL exceedances are the results of current agricultural activities. Source identification is difficult especially for non-conserved constituents. There are numerous non-conserved constituents that cannot be traced upstream, e.g. dissolved oxygen. Many pesticides are the result of agricultural applications and enter surface waters as a result of drift or runoff in either storm water or irrigation return flows. The Coalition is continuing to identify sources of WQTL exceedances through PURs, assessment of water quality data and evaluation of current management practices. The Coalition's sourcing strategy is further described in the Coalition's MPUR.

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

The conclusions from these data are that 1) individual grower visits are an effective method of communicating with members, and 2) implementation of management practices is improving water quality in the Coalition region.

ESJWQC GEOGRAPHICAL AREA

The ESJWQC area includes Stanislaus, Merced, 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 and the San Joaquin River on the west, the Stanislaus River on the north to the San Joaquin River on the south. The southern portion of the Coalition area has been expanded since the inception of the Coalition and now includes the area that was formerly the Root Creek Coalition area. Landholdings in the vicinity of the Lone Willow Slough drainage area (west of the Eastside Bypass) have joined the Westside Coalition.

IRRIGATED LAND

Although exact acreage is difficult to estimate due to rapidly changing land use, the Coalition area contains approximately 5,500,314 acres of which 919, 846 acres (17%) are considered irrigated (Table 2).

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

For Madera, Tuolumne and Mariposa Counties, the Coalition utilized the DWR data for Agricultural Land and Water Use for irrigated agriculture to determine irrigated land area (see footnote 1 in Table 2 for source information). Irrigated crop acreage for Stanislaus, Merced and Calaveras Counties were obtained from DWR land use survey data since the Coalition boundary does not correspond to the county boundary (Table 2). In Table 2, the column labeled Data Source Year (agricultural land and water use) represents the county acreage only, and the column for Data Source Year (land use survey) represents zone acreage information. For specific zone acreage details refer to Table 3.

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	880	2000 – Not Used	2000
Madera	295,000	2001	2001*
Mariposa	1,300	2001	1998
Merced	342,200	2002 – Not Used	2002
Stanislaus	279,050	2004 – Not Used	2004
Tuolumne	1,416	2001	1997
Total	**919,846**		

[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 506,200 acres, 37% of the county.

GEOGRAPHICAL CHARACTERISTICS AND LAND USE

The Coalition area has been divided into six zones to create a comprehensive monitoring program (Figure 1). These zones were designated based on hydrology, crop types, land use, soil types, and rainfall (Table 3). The zone names are for the Core Monitoring location within that area and are: 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 (pages 9-27). Land use maps for each zone are Figures 2 through 7.

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

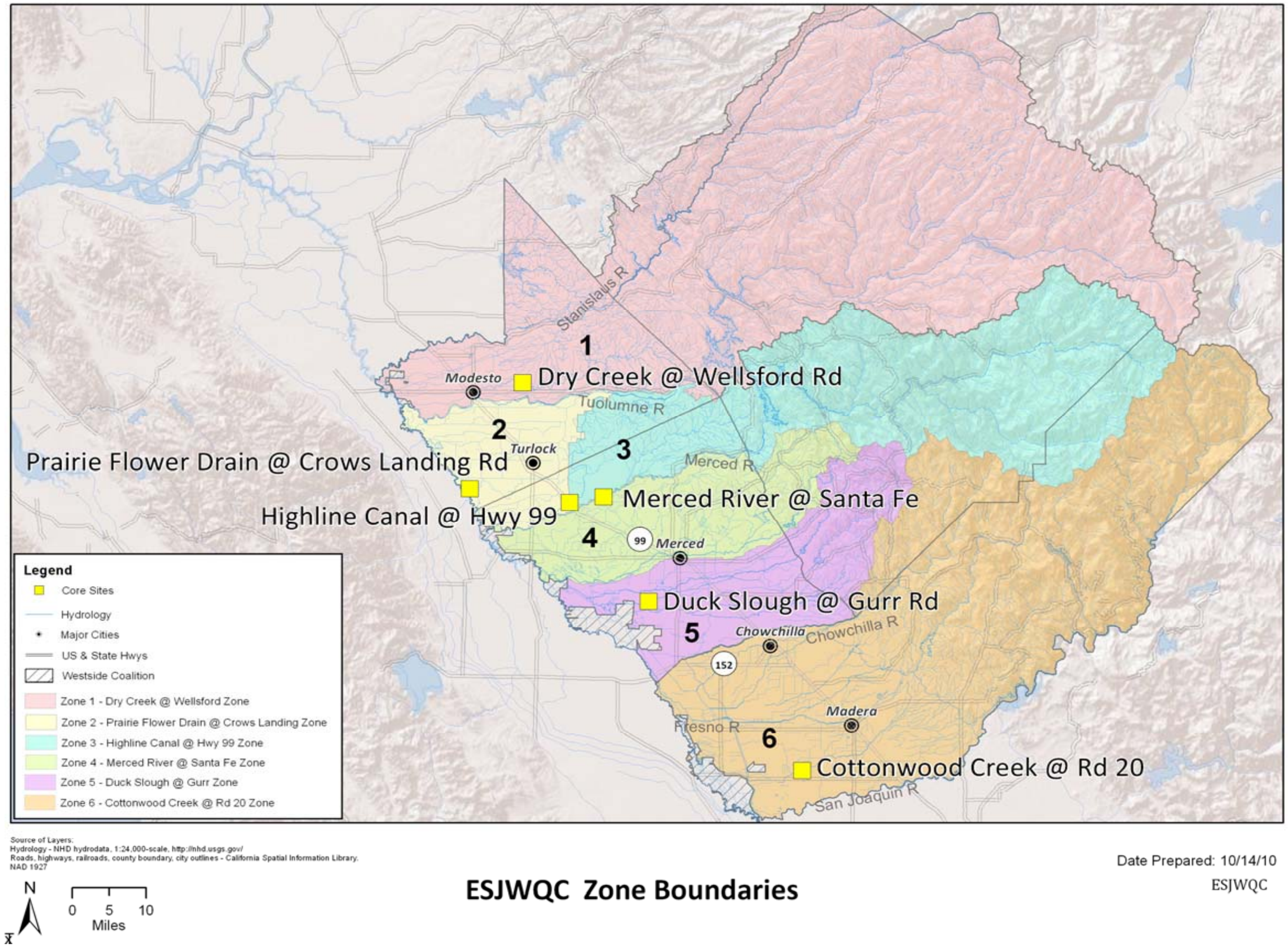


Table 3. Land use and soil percentages for ESJWQC zones.

	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	2,739,267.53	757,501.78	1,213,340.09	608,351.75	637,819.21	1,268,513.09
Irrigated Acres	134,306.48	164,632.91	88,616.45	121,746.40	142,686.29	335,069.21
Soil (average %):						
Sand	56.26	71.42	62.03	58.77	39.56	63.66
Silt	25.34	18.83	23.45	25.39	36.05	22.26
Clay	18.40	9.75	14.52	15.83	24.38	14.08
Land Use (% of irrigated acres):						
Deciduous Fruits/Nuts	39.21	37.83	60.73	37.55	18.82	31.63
Field Crops	16.27	22.73	15.84	22.25	32.85	15.29
Grains/Hay	0.89	0.81	1.57	3.87	5.54	4.28
Pasture	35.04	30.88	11.13	19.58	31.42	13.17
Vineyard	3.76	3.27	8.63	5.69	1.69	31.37
Dairies/Feedlots:						
% of total acres	0.34	1.59	0.20	0.80	0.66	0.53
Number of operations	1,903	2,302	273	473	460	1,725
Urban (% of total acres)	2.70	5.77	0.93	3.84	2.01	3.02
Depth to groundwater:						
Weighted average	49.18	30.12	138.17	46.43	68.52	119.98
% area of groundwater	5.7	71.9	7.1	39	43.3	25.1

DWR land use survey geo-coded data was used for zone irrigated acreage information
Land use for Madera County is only described for 506,200 acres, 37% of the county.

Figure 2. Land use for Dry Creek @ Wellsford Rd Zone (Zone 1).

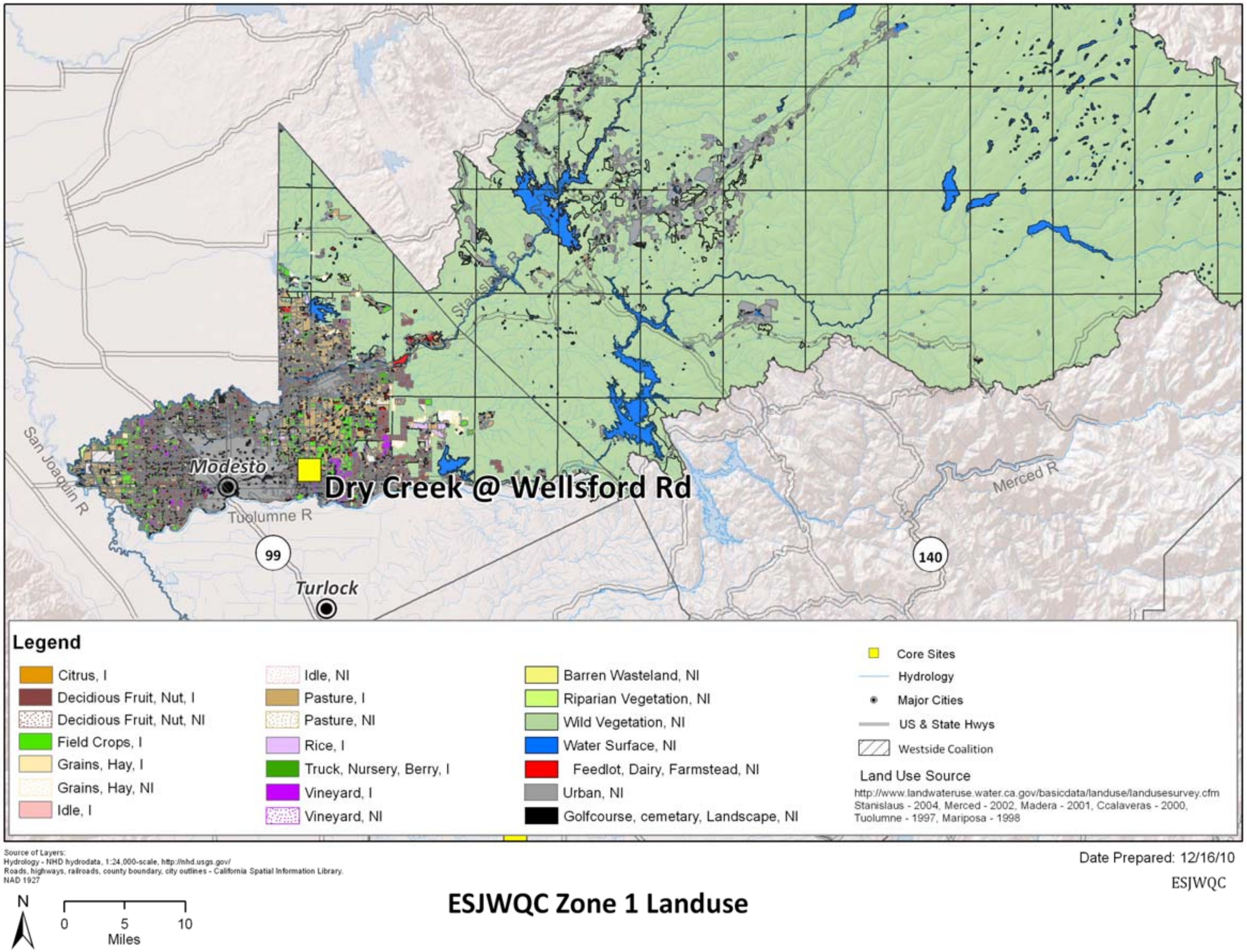


Figure 3. Land use for Prairie Flower Drain @ Crows Landing Zone (Zone 2).

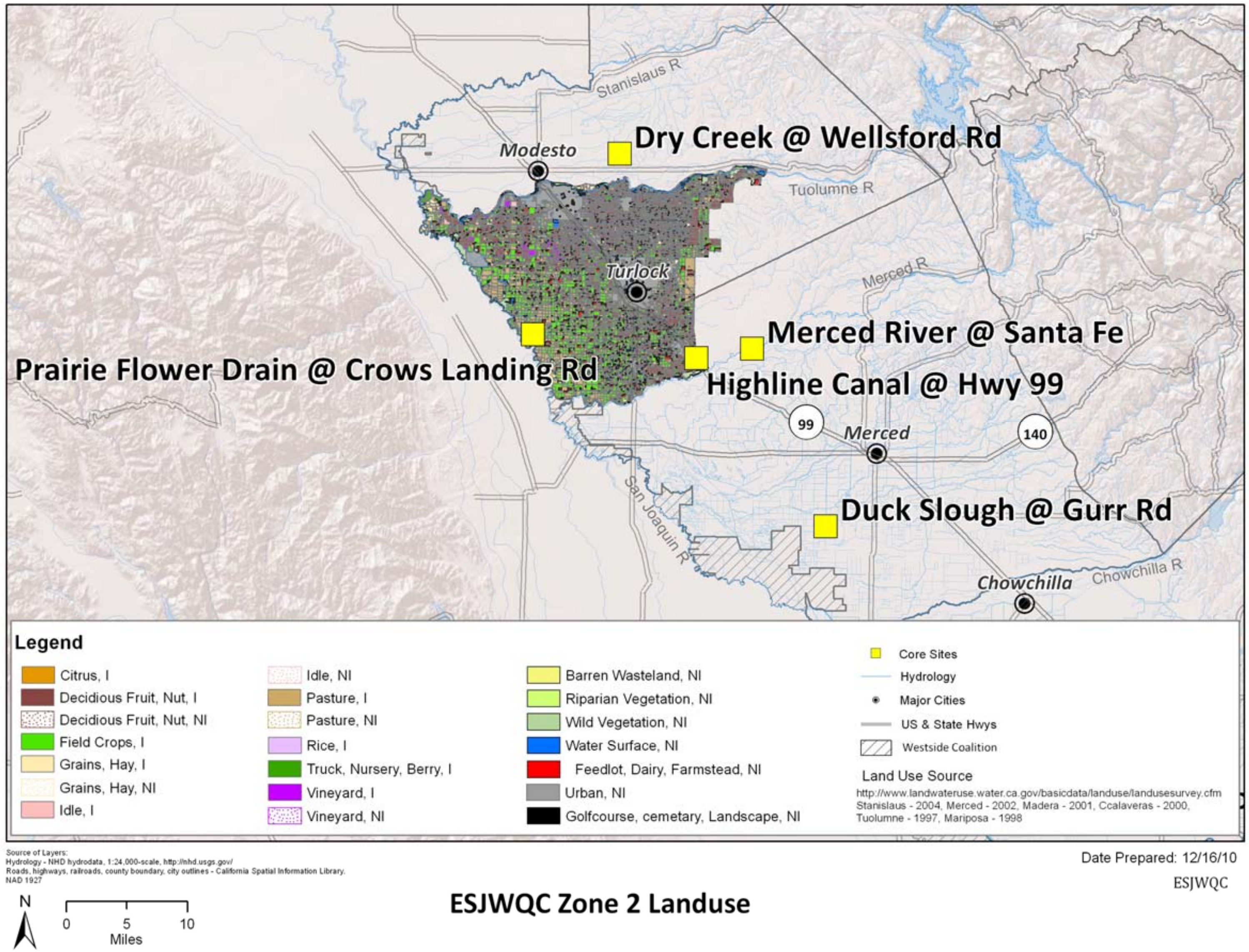


Figure 4. Land use for Highline Canal @ Hwy 99 Zone (Zone 3).

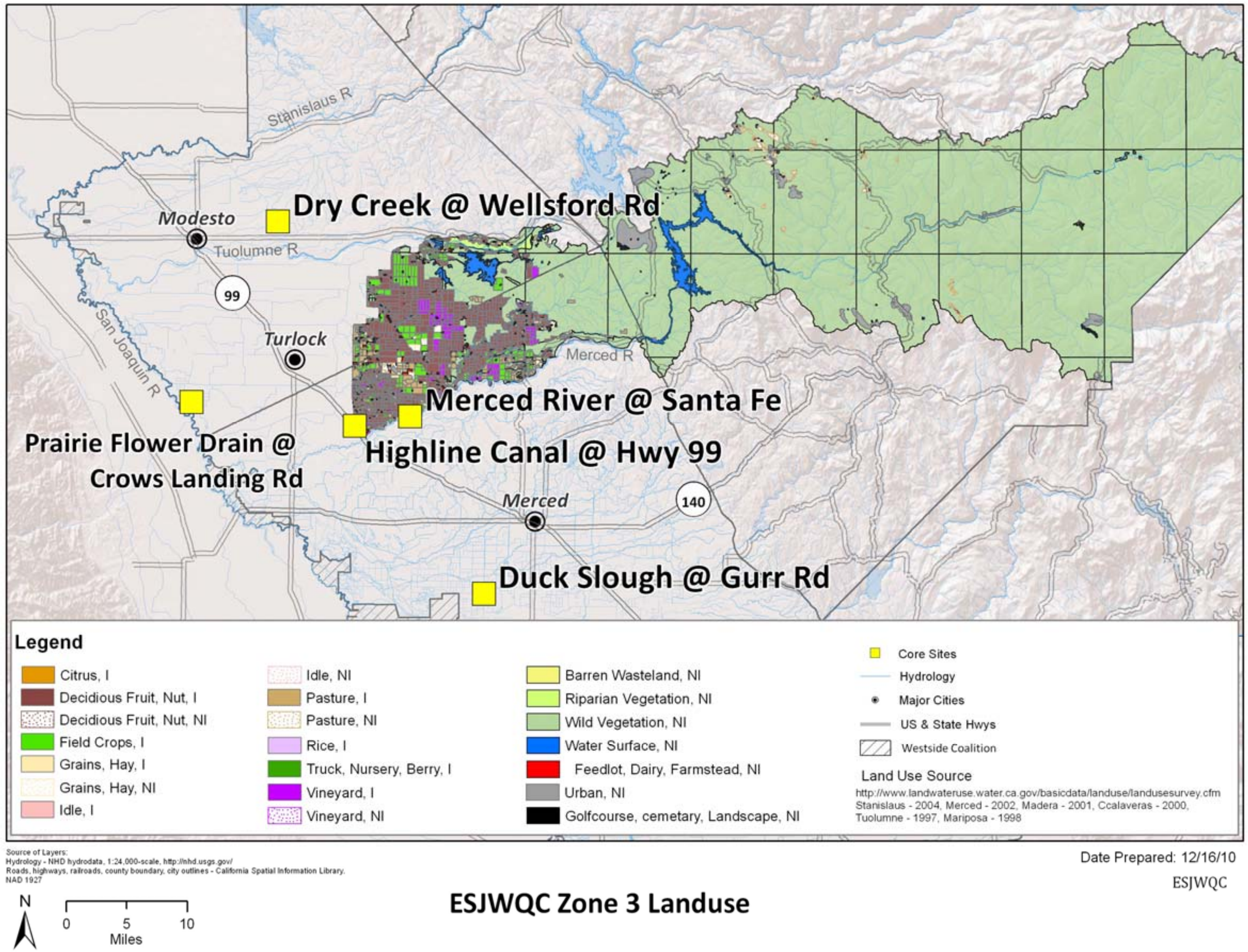


Figure 5. Land use for Merced River @ Santa Fe Zone (Zone 4).

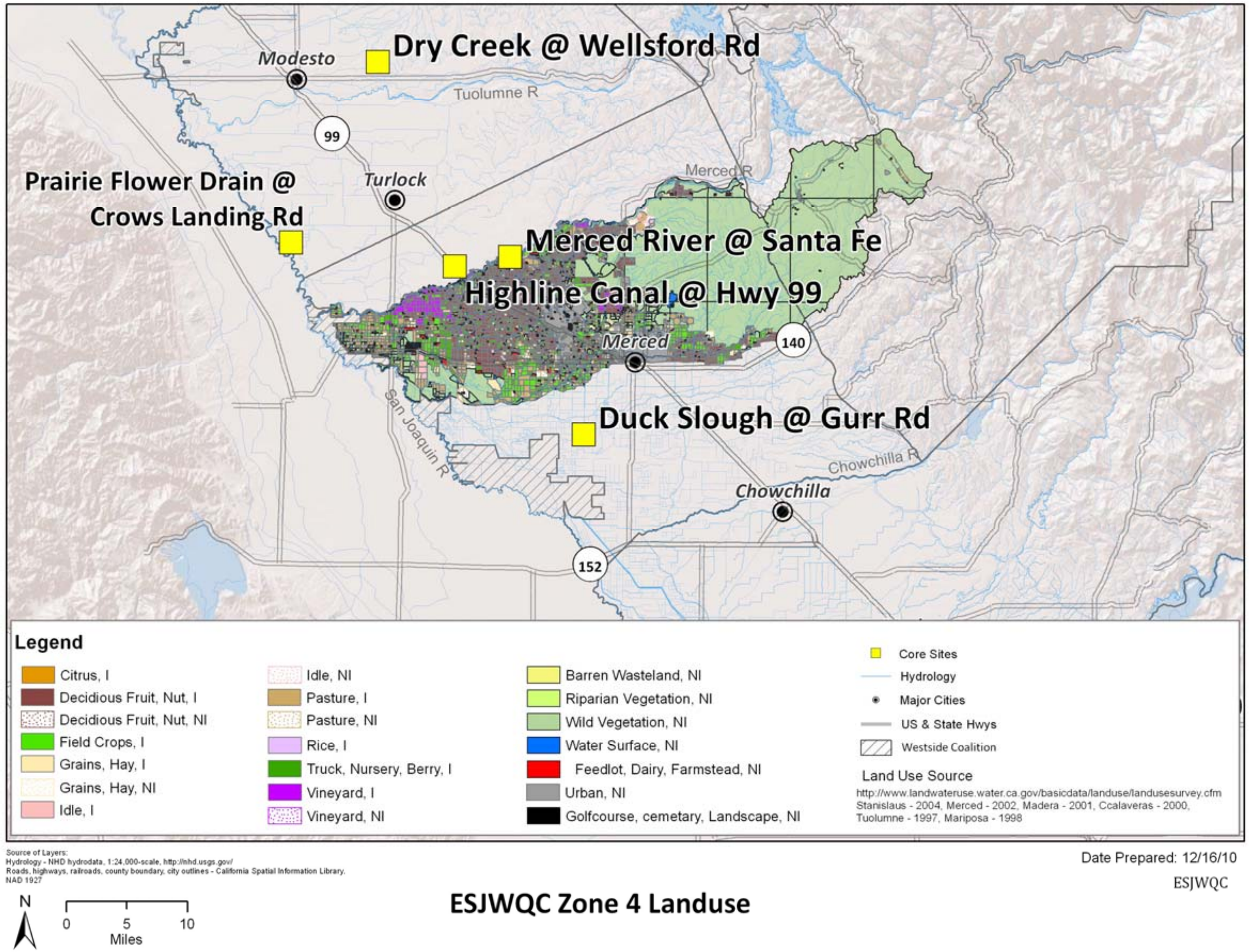


Figure 6. Land use for Duck Slough @ Gurr Rd Zone (Zone 5).

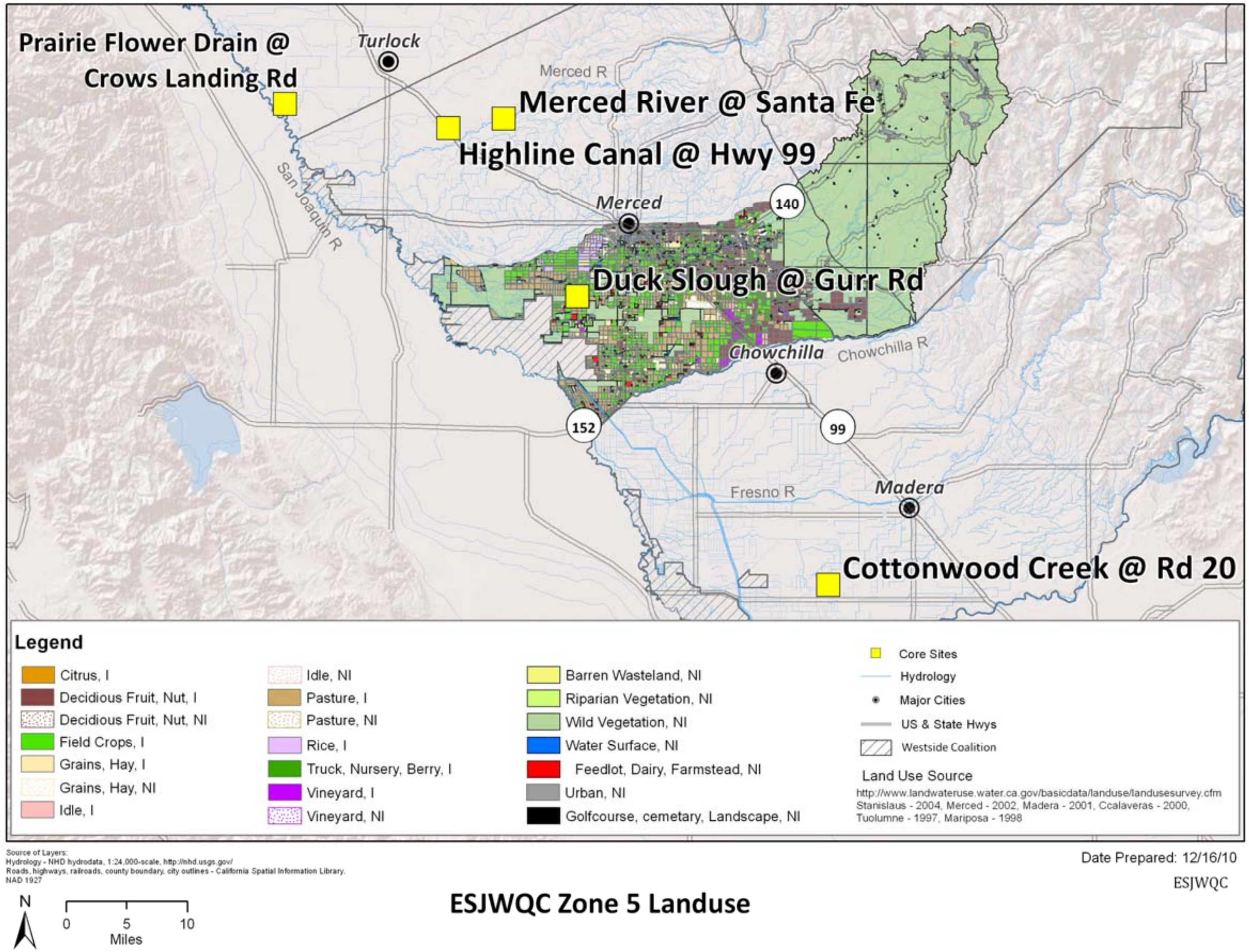
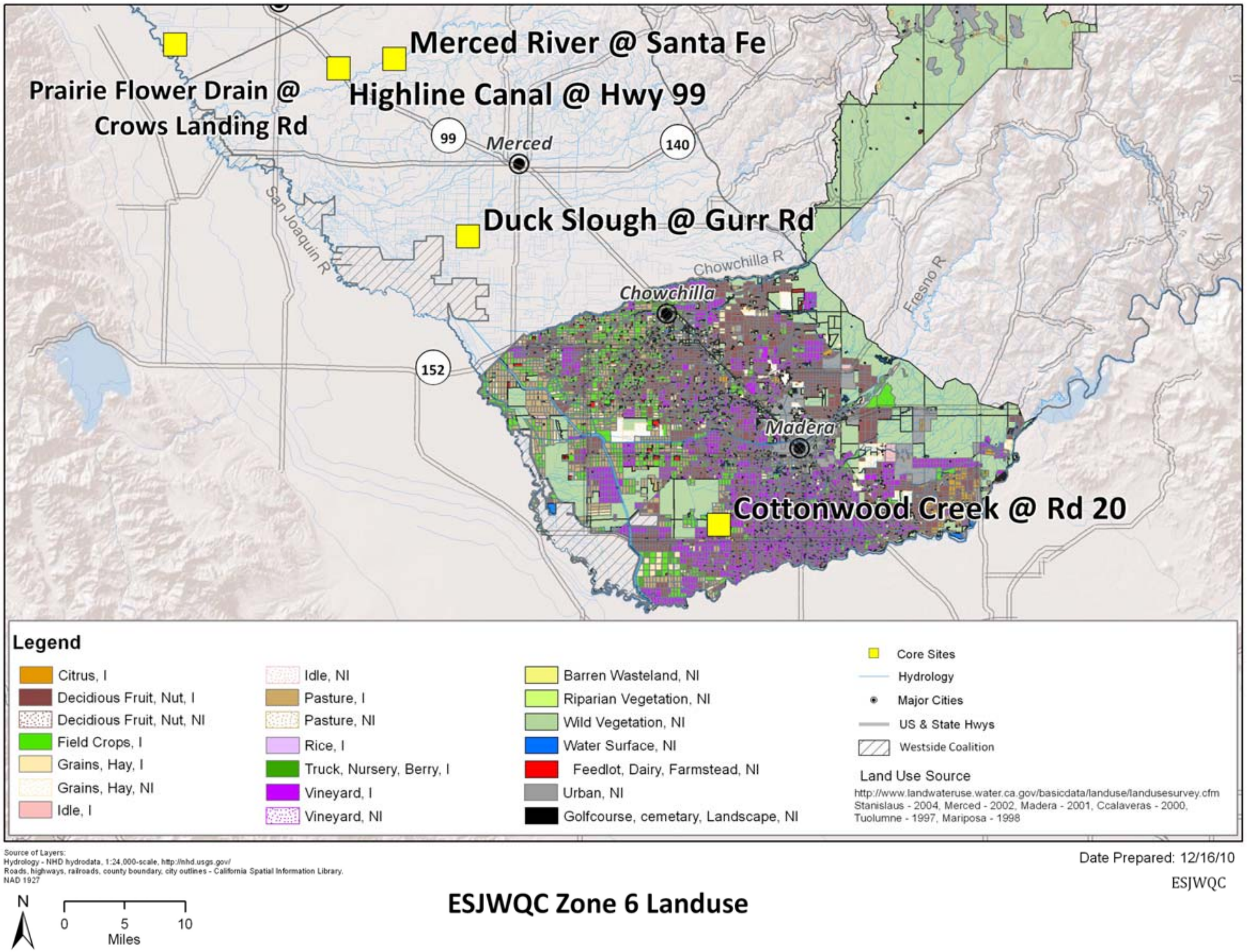


Figure 7. Land use for Cottonwood Creek @ Rd 20 Zone (Zone 6).



MONITORING OBJECTIVES AND DESIGN

MONITORING JANUARY – DECEMBER 2010

From January 2010 through December 2010 the Coalition conducted both Normal Monitoring (NM) and MPM based on the approved MRPP (pages 33-35) and Management Plan submitted on September 30, 2008 (annual updates are submitted on April 1 of each year).

As part of Normal Monitoring during the 2010 monitoring year, the Coalition sampled both Core and Assessment Monitoring locations once a month including at least one storm event and two sediment events. The following section briefly describes the objectives of Normal Monitoring (Core (C), Assessment (A) and Sediment Monitoring) and MPM as well as the overall Coalition sampling design including sampling seasons and storm triggers.

MONITORING OBJECTIVES

The objectives of the ESJWQC monitoring program are to:

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

In order to achieve the objectives listed above, the ESJWQC monitored water quality at 18 sites in the Coalition region between January 2010 and December 2010. Of these 18 sites, 14 were monitored under management plans as outlined in the ESJWQC Management Plan. Of the sites monitored for management plan constituents, six sites (Cottonwood Creek @ Rd 20, Dry Creek @ Wellsford Rd, Duck Slough @ Gurr Rd, Highline Canal @ Hwy 99, Merced River @ Santa Fe and Prairie Flower Drain @ Crows Landing Rd) were also monitored monthly for Core Monitoring constituents, and two sites (Deadman Creek @ Gurr Rd and Mustang Creek @ East Ave) were also monitored monthly for Assessment Monitoring constituents.

The Coalition sampled for numerous water quality parameters and constituents including 45 pesticides, *E. coli*, physical parameters (total dissolved solids, total suspended solids and turbidity), nine metals, total organic carbon, five nutrients, field parameters (dissolved oxygen, pH, specific conductivity), water column toxicity to three test species (*Ceriodaphnia dubia*, *Pimephales promelas* and *Selenastrum capricornutum*) and sediment toxicity to *Hyalella azteca* (Tables 4, 5 and 6). In May 2009 the Coalition removed the following constituents from its monitoring program: metals not applied by agriculture (arsenic, cadmium, lead and molybdenum), sediment bound pesticides (glyphosate, paraquat dichloride), organochlorine pesticides no longer applied by agriculture (including Group A pesticides) along with a subset of nutrients (Total Kjeldahl Nitrogen and orthophosphate) (MRPP, page 57). These constituents were sampled once a year during events with high total suspended solids except for Total Kjeldahl Nitrogen and orthophosphate which were omitted completely starting April 2009 due to redundancy in monitoring data. Monitoring resumed in July 2010 for removed constituents as requested by the Regional Board (Tables 4, 5 and 6). Monitoring constituents are established by the ILRP MRP Order No. R5-2008-0005 (Appendix A).

Table 4. Monitoring Parameters.

CONSTITUENTS, PARAMETERS, AND TESTS	MONITORING TYPE
Photo Monitoring	
Photograph of monitoring location	With every monitoring event
WATER COLUMN SAMPLING	
Physical Parameters and General Chemistry	
Flow (field measure)	Assessment and Core
pH (field measure)	Assessment and Core
Electrical Conductivity (field measure)	Assessment and Core
Dissolved Oxygen (field measure)	Assessment and Core
Temperature (field measure)	Assessment and Core
Turbidity	Assessment and Core
Total Dissolved Solids	Assessment and Core
Total Suspended Solids	Assessment and Core
Hardness	Assessment and Core
Total Organic Carbon (TOC)	Assessment and Core
Pathogens	
E. coli	Assessment and Core
Water Column Toxicity Test	
Algae -*Selenastrum capricornutum*	Assessment
Water Flea – *Ceriodaphnia dubia*	Assessment
Fathead Minnow - *Pimephales promelas*	Assessment
Toxicity Identification Evaluation**	As needed based on criteria described in MRP Part II.E
Pesticides	
Carbamates	
Aldicarb	Assessment
Carbaryl	Assessment
Carbofuran	Assessment
Methiocarb	Assessment
Methomyl	Assessment
Oxamyl	Assessment
Organochlorines*	
Dichlorodiphenyldichloroethane (DDD)	Assessment
Dichlorodiphenyldichloroethylene (DDE)	Assessment
Dichlorodiphenyltrichloroethane (DDT)	Assessment
Dicofol	Assessment

CONSTITUENTS, PARAMETERS, AND TESTS	MONITORING TYPE
Dieldrin	Assessment
Endrin	Assessment
Methoxychlor	Assessment
Additional Group A*	
Aldrin	As needed to characterize 303d listed waterbodies
Chlordane	As needed to characterize 303d listed waterbodies
Heptachlor	As needed to characterize 303d listed waterbodies
Heptachlor epoxide	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (including Lindane) (gamma-HCH)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (alpha-HCH)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (beta-HCH)	As needed to characterize 303d listed waterbodies
Hexachlorocyclohexane (delta-HCH)	As needed to characterize 303d listed waterbodies
Endosulfan I	As needed to characterize 303d listed waterbodies
Endosulfan II	As needed to characterize 303d listed waterbodies
Toxaphene	As needed to characterize 303d listed waterbodies
Organophosphates	
Azinphos-methyl	Assessment
Chlorpyrifos	Assessment
Diazinon	Assessment
Dichlorvos	Assessment
Dimethoate	Assessment
Demeton-s	Assessment
Disulfoton (Disyton)	Assessment
Malathion	Assessment
Methamidophos	Assessment
Methidathion	Assessment
Parathion-methyl	Assessment
Phorate	Assessment
Phosmet	Assessment
Herbicides	
Atrazine	Assessment
Cyanazine	Assessment
Diuron	Assessment
Glyphosate*	Assessment
Linuron	Assessment
Paraquat dichloride*	Assessment
Simazine	Assessment
Trifluralin	Assessment
Metals	
Arsenic (total)*	Assessment
Boron (total)	Assessment
Cadmium (total and dissolved)*	Assessment
Copper (total and dissolved)	Assessment
Lead (total and dissolved)*	Assessment
Nickel (total and dissolved)	Assessment
Molybdenum (total)*	Assessment

CONSTITUENTS, PARAMETERS, AND TESTS	MONITORING TYPE
Selenium (total)	Assessment
Zinc (total and dissolved)	Assessment
Nutrients	
Total Kjeldahl Nitrogen†	Assessment and Core
Nitrate plus Nitrite as Nitrogen	Assessment and Core
Total Ammonia	Assessment and Core
Unionized Ammonia (calculated value)	Assessment and Core
Total Phosphorous (as P)	Assessment and Core
Soluble Orthophosphate†	Assessment and Core
SEDIMENT SAMPLING	
Sediment Toxicity	
Hyalella azteca	Assessment
Pesticides (as needed based on criteria described in MRP Part II.E.2)	
Bifenthrin	As needed based on criteria described in MRP Part II.E
Cyfluthrin	As needed based on criteria described in MRP Part II.E
Cypermethrin	As needed based on criteria described in MRP Part II.E
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

*Starting May 2009, the Coalition only monitored for these constituents during a single high Total Suspended Solids (TSS) event. Sampling resumed for these constituents in July 2010 as requested by the Central Valley Regional Water Quality Control Board (CVRWQCB).

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

†Constituents were omitted from the ESJWQC MRPP on May 15, 2009.

Table 5. ESJWQC January-June 2010 Monitoring Schedule including site name, ID, zone and constituent groups.

ESJWQC January-June 2010 Monitoring Schedule-part 1		Nutrients					Path-ogen	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				M	C																		
	Mootz Drain downstream of Langworth Pond	A	A			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
2	Lateral 2 1/2 near Keyes Rd	A	A			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Prairie Flower Drain @ Crows Landing Rd	C	C			C	C	C	C	C	C	C	C	C	C																							
3	Dry Creek @ Oakdale Ave							F	F	F	F																M											
	Highline Canal @ Hwy 99	C	C			C	C	C	C	C	C	C	C	C	C				M								M											
	Highline Canal @ Lombardy Ave							F	F	F	F								M								M											
	Mustang Creek @ East Ave	A	A			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A,M	A	A	A	A	A	A	A	A	A	A	A
4	Bear Creek @ Kibby Rd							F	F	F	F																M											
	Howard Lateral @ Hwy 140	A	A			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Merced River @ Santa Fe	C	C			C	C	C	C	C	C	C	C	C	C				C	C							M											
5	Deadman Creek @ Gurr Rd	A	A			A	A	A	A	A	A	A	A	A	A	A	A	A	A,M	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Deadman Creek @ Hwy 59							F	F	F	F																											
	Duck Slough @ Gurr Rd	C	C			C	C	C	C	C	C	C	C	C	C				M								M											
	Duck Slough @ Hwy 99							F	F	F	F								M								M											
	Miles Creek @ Reilly Rd							F	F	F	F								M																			
6	Ash Slough @ Ave 21	A	A			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Cottonwood Creek @ Rd 20	C	C			C	C	C	C	C	C	C	C	C	C				M								M	M										

A - Assessment monitoring constituent C - Core monitoring constituent M - Management Plan Monitoring for Priority A-D constituents during months of past exceedances

F-Sites with M collect field parameters but this does not indicate that sites with (F) are under a management plan.

Red (A) - Assessment monitoring constituent that was only monitored once during January 2010 (high TSS event)

Red (C) - Core monitoring constituent that was only monitored once during January 2010 (high TSS event)

Grey Shaded-Dropped (not sampled from May 2009 through June 2010)

Table 5 continued.

ESJWQC January-June 2010 Monitoring Schedule-Part 2		Pesticides																																Water Column Toxicity			Sediment		
		Organochlorines							Carbamates						Herbicides								Group A														Toxi-city	Physical Parameter	
Zone	Site Name	DDD	DDE	DDT	Dicofol	Dieldrin	Endrin	Methoxychlor	Aldicarb	Carbaryl	Carbofuran	Methiocarb	Methomyl	Oxamyl	Atrazine	Cyanazine	Diuron	Linuron	Simazine	Trifluralin	Paraquat	Glyphosate	Aldrin	Chlordane	Heptachlor	Heptachlor Epoxide	HCH, alpha	HCH, beta	HCH, delta	HCH, gamma	Endosulfan I	Endosulfan II	Toxaphene	*Ceriodaphnia dubia*	*Pimephales promelas*	*Selenastrum capricornutum*	*Hyalella azteca*[1]	TOC	Grain Size
1	Dry Creek @ Wellsford Rd																M																			M			
	Mootz Drain downstream of Langworth Pond	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
2	Lateral 2 1/2 near Keyes Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Prairie Flower Drain @ Crows Landing Rd																																			M			
3	Dry Creek @ Oakdale Ave																																	M					
	Highline Canal @ Hwy 99																M																			M			
	Highline Canal @ Lombardy Ave																																	M		M			
	Mustang Creek @ East Ave	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A,M	A	A	A												A	A	A	A	A	A
4	Bear Creek @ Kibby Rd																																	M					
	Howard Lateral @ Hwy 140	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A												A	A	A	A	A	A
	Merced River @ Santa Fe																						C	C	C	C	C	C	C	C	C	C	C	M					
5	Deadman Creek @ Gurr Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A												A	A	A,M	A	A	A
	Deadman Creek @ Hwy 59																																			M			

Table 5 continued.

ESJWQC January-June 2010 Monitoring Schedule-Part 2		Pesticides																																Water Column Toxicity			Sediment		
		Organochlorines							Carbamates						Herbicides								Group A														Toxi-city	Physical Parameter	
Zone	Site Name	DDD	DDE	DDT	Dicofol	Dieldrin	Endrin	Methoxychlor	Aldicarb	Carbaryl	Carbofuran	Methiocarb	Methomyl	Oxamyl	Atrazine	Cyanazine	Diuron	Linuron	Simazine	Trifluralin	Paraquat	Glyphosate	Aldrin	Chlordane	Heptachlor	Heptachlor epoxide	HCH, alpha	HCH, beta	HCH, delta	HCH, gamma	Endosulfan I	Endosulfan II	Toxaphene	*Ceriodaphnia dubia*	*Pimephales promales*	*Selenastrum capricornutum*	*Hyalella azteca*[1]	TOC	Grain size
	Duck Slough @ Gurr Rd										C																												
	Duck Slough @ Hwy 99																																			M			
	Miles Creek @ Reilly Rd																																	M					
6	Ash Slough @ Ave 21	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A												A	A	A	A	A	A
6	Cottonwood Creek @ Rd 20															C	M		C																C	C	C	C	C

A - Assessment monitoring constituent

C - Core monitoring constituent

M - Management Plan Monitoring for Priority A-D constituents during months of past exceedances

F-Sites with M collect field parameters but this does not indicate that sites with (F) are under a management plan.

Red (A) - Assessment monitoring constituent that was only monitored once during January 2010 (high TSS event)

Red (C) - Core monitoring constituent that was only monitored once during January 2010 (high TSS event)

Grey Shaded-Dropped (not sampled from May 2009 through June 2010)

[1]If *Hyalella* survival is less than 80% compared to the control, the following pesticides will be analyzed for: bifenthrin, cyfluthrin, cypermethrin, deltamethrin/trilomethrin, esfenvalerate, lambda-cyhalothrin, permethrin, fenpropathrin and chlorpyrifos

Table 6. ESJWQC July-December 2010 Monitoring Schedule including site name, ID, zone and constituent groups.

ESJWQC July-December 2010 Monitoring Schedule-Part 1		Nutrients					Path-ogen	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					C							M											
	Mootz Drain downstream of Langworth Pond	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
2	Lateral 2 1/2 near Keyes Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Prairie Flower Drain @ Crows Landing Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C												M											
3	Highline Canal @ Hwy 99	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M								M											
	Mustang Creek @ East Ave	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4	Bear Creek @ Kibby Rd							F	F	F	F								M								M											
	Howard Lateral @ Hwy 140	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Merced River @ Santa Fe	C	C	C	C	C	C	C	C	C	C	C	C	C	C				C	C																		
5	Deadman Creek @ Gurr Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Duck Slough @ Gurr Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M								M											
	Duck Slough @ Hwy 99							F	F	F	F								M								M											
6	Ash Slough @ Ave 21	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Cottonwood Creek @ Rd 20	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M																			

A - Assessment monitoring constituent
C - Core monitoring constituent
M - Management Plan Monitoring for Priority A-D constituents during months of past exceedances
F-Sites with M collect field parameters but this does not indicate that sites with (F) are under a management plan.

Table 6 continued.

ESJWQC July-December 2010 Monitoring Schedule-Part 2		Pesticides																																Water Column Toxicity			Sediment		
		Organochlorines							Carbamates						Herbicides								Group A														Tox-icity	Physical Parameters	
Zone	Site Name	DDD	DDE	DDT	Dicofol	Dieldrin	Endrin	Methoxychlor	Aldicarb	Carbaryl	Carbofuran	Methiocarb	Methomyl	Oxamyl	Atrazine	Cyanazine	Diuron	Linuron	Simazine	Trifluralin	Paraquat	Glyphosate	Aldrin	Chlordane	Heptachlor	Heptachlor epoxide	HCH, alpha	HCH, beta	HCH, delta	HCH, gamma	Endosulfan I	Endosulfan II	Toxaphene	*Ceriodaphnia dubia*	*Pimephales promelas*	*Selenastrum capricornutum*	*Hyalella azteca*[1]	TOC	Grain Size
1	Dry Creek @ Wellsford Rd																																				M	M	M
	Mootz Drain downstream of Langworth Pond	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
2	Lateral 2 1/2 near Keyes Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Prairie Flower Drain @ Crows Landing Rd																																	M			M	M	M
3	Highline Canal @ Hwy 99																																				M	M	M
	Mustang Creek @ East Ave	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A												A	A	A	A	A	A
	Bear Creek @ Kibby Rd																																	M					
4	Howard Lateral @ Hwy 140	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A												A	A	A	A	A	A
	Merced River @ Santa Fe																						C	C	C	C	C	C	C	C	C	C	C						
	Deadman Creek @ Gurr Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A												A	A	A	A	A	A
5	Duck Slough @ Gurr Rd										C																									M	M	M	M
	Duck Slough @ Hwy 99																																			M			
6	Ash Slough @ Ave 21	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A												A	A	A	A	A	A
	Cottonwood Creek @ Rd 20															C			C																C	C	C	C	C

A - Assessment monitoring constituent

C - Core monitoring constituent

M - Management Plan Monitoring for Priority A-D constituents during months of past exceedances

F-Sites with M collect field parameters but this does not indicate that sites with (F) are under a management plan.

[1]If *Hyalella* survival is less than 80% compared to the control, the following pesticides will be analyzed for: bifenthrin, cyfluthrin, cypermethrin, deltamethrin/trilomethrin, esfenvalerate, lambda-cyhalothrin, permethrin, fenpropathrin and chlorpyrifos

MONITORING DESIGN

Normal Monitoring

Starting October 2008 the Coalition initiated monitoring under a new MRPP that includes a schedule of Core and Assessment Monitoring locations to be monitored on a monthly basis (MRPP Table 10, pages 52-53). Previous to the August 2008 MRPP the Coalition monitored only during the irrigation season (April – September) and twice during the storm season (December – March) as determined by a 24 hour rainfall trigger of 0.25 inches. The Coalition monitored from October to December (fall season) for the first time in 2008. For reference, Table 7 provides the locations and seasons that the Coalition monitored from 2004 - 2010.

Sampling occurred at six Core and six Assessment sites once per month per site throughout the year. In the case of a storm event, monthly monitoring occurred within three days following a rainfall that exceeded 0.25 inches within 24 hours. Storm samples were collected on January 19, February 23, and April 20, 2010.

Core Monitoring

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

Assessment Monitoring

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

Sediment Monitoring

Sediment samples are collected twice each year. Storm season sediment samples are collected after the major rainfall events and before the height of the irrigation season when water flows and levels are low (between March 1 and April 30). Irrigation season sediment samples are collected at the end of the irrigation season, when irrigation is mostly over, and water levels are low and safe enough to sample sediment (between August 15 and October 15). Storm season sediment samples were collected on March 23, 2010 and irrigation season sediment samples were collected on September 14, 2010.

Table 7. Sample sites and years monitored.

Station Name	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	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	
Bear Creek @ North Alpine Rd								x		x	x							
Berenda Slough along Ave 18 1/2					x	Dry	x	x	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
Cottonwood Creek @ Hwy 145[1]									x									
Deadman Creek @ Hwy 59					x	x	x	x	x				Dry			Dry		
Deadman Creek (Dutchman) @ Gurr Rd	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									
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
Duck Slough @ Gurr Rd	x	x	x	x	x	x	x	x	x	Dry	x	x	x	x	x	x	x	x
Duck Slough @ Hwy 59[1]									x									
Duck Slough @ Hwy 99		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
Highline Canal @ Lombardy Ave		x	x	x	x	x	x	x	x				x		x	x		
Hilmar Drain @ Central Ave		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
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
Livingston Drain @ Robin Ave							x	x	x									
Lone Willow Slough @ Madera Ave		x	x															

Station Name	2004	2005		2006		2007		2008			2009				2010			
	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall	Winter	Storm	Irrigation	Fall
Merced River @ Santa Fe	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				
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
Prairie Flower Drain @ Morgan Rd[1]									x									
Reclamation Drain @ Williams Ave[1]									x									
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									

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.

[1]Upstream sampling of normal monitoring locations conducted for source identification.

Management Plan Monitoring

Management Plan Monitoring occurred at fourteen sites during 2010: Bear Creek @ Kibby Rd, Cottonwood Creek @ Rd 20, Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59, Dry Creek @ Oakdale Rd, Dry Creek @ Wellsford Rd, Duck Slough @ Gurr Rd, Duck Slough @ Hwy 99, Highline Canal @ Hwy 99, Highline Canal @ Lombardy Rd, Merced River @ Santa Fe, Miles Creek @ Reilly Rd, Mustang Creek @ East Ave, and Prairie Flower Drain @ Crows Landing Rd. The Coalition conducted the additional monitoring as part of the ESJWQC Management Plan's strategy to identify contaminant sources and evaluate effectiveness of newly implemented management practices at sites where exceedances had previously occurred more than once. Additional monitoring included water column toxicity testing for *Ceriodaphnia* and *Selenastrum,* sediment toxicity testing for *Hyalella* and water chemistry analysis for copper, chlorpyrifos, diazinon, diuron and simazine (Table 8). Details on the process and the schedule of MPM are available in the ESJWQC MPUR to be submitted April 1, 2011 to the Regional Board.

Table 8. 2010 MPM sites and constituents.

Site Name	Year	Month	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	Copper	Chlorpyrifos	Diazinon	Diuron	Simazine	*Hyalella azteca*
Cottonwood Creek @ Rd 20	2010	January				X	X	X		
Deadman Creek @ Gurr Rd	2010	January		X	X					
Deadman Creek @ Hwy 59	2010	January		X						
Dry Creek @ Oakdale Ave	2010	January	X			X				
Duck Slough @ Gurr Rd	2010	January			X					
Highline Canal @ Hwy 99	2010	January		X	X	X		X		
Highline Canal @ Lombardy Rd	2010	January	X		X	X				
Merced River @ Santa Fe Dr	2010	January	X			X				
Miles Creek @ Reilly Rd	2010	January	X		X					
Mustang Creek @ East Ave	2010	January				X			X	
Prairie Flower Drain @ Crows Landing Rd	2010	January		X						
Cottonwood Creek @ Rd 20	2010	February				X	X	X		
Deadman Creek @ Gurr Rd	2010	February		X	X					
Dry Creek @ Wellsford Rd	2010	February		X	X			X		
Duck Slough @ Gurr Rd	2010	February			X					
Highline Canal @ Hwy 99	2010	February		X	X	X		X		
Highline Canal @ Lombardy Rd	2010	February	X	X	X	X				
Miles Creek @ Reilly Rd	2010	February	X		X					
Mustang Creek @ East Ave	2010	February				X			X	
Prairie Flower Drain @ Crows Landing Rd	2010	February		X						
Highline Canal @ Lombardy Rd	2010	March		X						
Dry Creek @ Wellsford Rd	2010	April			X					
Duck Slough @ Hwy 99	2010	April		X	X					

Site Name	Year	Month	*Ceriodaphnia dubia*	*Selenastrum capricornutum*	Copper	Chlorpyrifos	Diazinon	Diuron	Simazine	*Hyalella azteca*
Highline Canal @ Hwy 99	2010	April		X	X					
Prairie Flower Drain @ Crows Landing Rd	2010	April		X						
Cottonwood Creek @ Rd 20	2010	April			X					
Duck Slough @ Gurr Rd	2010	April				X				
Duck Slough @ Hwy 99	2010	May				X				
Highline Canal @ Hwy 99	2010	May		X						
Prairie Flower Drain @ Crows Landing Rd	2010	May		X						
Cottonwood Creek @ Rd 20	2010	May			X					
Bear Creek @ Kibby Rd	2010	May	X			X				
Duck Slough @ Hwy 99	2010	June			X					
Highline Canal @ Hwy 99	2010	June			X					
Cottonwood Creek @ Rd 20	2010	June			X					
Duck Slough @ Gurr Rd	2010	June			X					
Duck Slough @ Hwy 99	2010	July		X	X	X				
Dry Creek @ Wellsford Rd	2010	July				X				
Highline Canal @ Hwy 99	2010	July			X	X				
Cottonwood Creek @ Rd 20	2010	July			X					
Duck Slough @ Gurr Rd	2010	July		X	X	X				
Bear Creek @ Kibby Rd	2010	July	X			X				
Duck Slough @ Hwy 99	2010	August			X					
Dry Creek @ Wellsford Rd	2010	August				X				
Highline Canal @ Hwy 99	2010	August			X					
Prairie Flower Drain @ Crows Landing Rd	2010	August				X				
Cottonwood Creek @ Rd 20	2010	August			X					
Bear Creek @ Kibby Rd	2010	August			X					
Duck Slough @ Hwy 99	2010	September			X	X				
Dry Creek @ Wellsford Rd	2010	September				X				X
Prairie Flower Drain @ Crows Landing Rd	2010	September	X			X				X
Cottonwood Creek @ Rd 20	2010	September			X					
Duck Slough @ Gurr Rd	2010	September		X						X
Highline Canal @ Hwy 99	2010	September								X

MONITORING SEASONS

The Coalition organizes its monitoring by four "seasons": fall, winter, irrigation, and storm (Table 9). 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 between January and March when dormant sprays and significant rainfalls are expected. Irrigation season (April – September) sampling characterizes the discharge from irrigated agriculture and irrigation return flows. A storm event can occur at anytime 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 section "Sample Site Descriptions and Rainfall Records".

Table 9. Description of Monitoring Seasons.

Season	Month Range	Description
Fall	October-December	No irrigation.
Winter	January-March	No irrigation, possible dormant spray runoff.
Storm	Anytime	Storm is triggered by > 0.25 inches within 24 hours; may occur during any month but generally occurs between January and March.
Irrigation	April-September	Summer months with possible irrigation.

MONITORING CONSTITUENTS

All monitoring constituents are listed in Tables 4, 5 and 6. The following section describes agricultural sources of the constituent groups analyzed for by the coalition.

Pesticides and Toxicity

Pesticides can be found in the water column or sediment of surface waters as a result of applications to fields that are subsequently irrigated and the irrigation return flow is discharged to nearby surface waters, or drift from fields to surface waters during spraying. The concentrations of chemicals in surface waters can be compared to numeric and narrative water quality triggers to determine if concentrations in the water exceed the trigger limit (termed an exceedance). Toxicity testing is complementary to chemical analyses and can provide an independent and more direct assessment of the level of impairment in the water body. The objective of the Coalition is to use the results of toxicity testing along with water chemistry analysis to assess the impact of discharges from irrigated agriculture.

The ESJWQC omitted sediment bound pesticides (glyphosate and paraquat dichloride) and pesticides no longer applied by agriculture (organochlorines and Group A pesticides) from their sampling schedule in May 2009. These pesticides 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 Total Suspended Solids event such as a large rain event). These constituents were sampled once a year during events with high total suspended solids from January through June 2010. Sampling for these constituents resumed in July, at the request of the Regional Board, and continued through December 2010.

Nutrients and Physical Parameters

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

Field Parameters

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

E. coli

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

Metals

Nine metals were included in Coalition monitoring until May 2009: arsenic, boron, cadmium, copper, lead, molybdenum, nickel, selenium and zinc. Five of these metals are analyzed for both dissolved and total concentrations, and three metals are analyzed only for total recoverable metal. Dissolved metals were added to the Coalition monitoring plan in 2008 as a result of a new provision in MRP Order R5-2008-0005. The Environmental Protection Agency (EPA) recommends "the use of dissolved metal to set and measure compliance with aquatic life water quality standards." The EPA states that dissolved metal "more closely approximates the bioavailable fraction of the metal in the water column than total recoverable metal." In order to assess compliance with water quality standards the Coalition analyzes for dissolved fractions of cadmium, copper, lead, nickel and zinc. The remaining metals are analyzed for total concentrations only. The ESJWQC omitted sampling for metals that are not currently applied by agriculture including arsenic, cadmium, lead and molybdenum except for a single event of high total suspended solids; this went into effect in May 2009 (ESJWQC MRPP amended on May 15, 2009), however sampling for these metals resumed July 2010 and continued through December 2010.

Of the nine metals there are four general classes: 1) those that are naturally present because of underlying geologic materials but generally not applied by agriculture (boron, selenium), 2) those that are naturally present because of underlying geologic materials but are applied by agriculture (copper, zinc, nickel), 3) those that may be legacy pesticides but also have numerous nonagricultural sources (lead, arsenic), and 4) those that are found solely as a result of nonagricultural anthropogenic sources (cadmium). These categories are not 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 zinc would be expected to primarily be a result of natural weathering of soils.

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

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

SAMPLE SITE DESCRIPTIONS AND RAINFALL RECORDS

The site names, zones, sample types, station codes and locations of all sites monitored between January 2010 and December 2010 are provided in Table 10. Land use per each subwatershed is listed in Table 11.

A narrative description of each site subwatershed with respect to hydrology and agricultural production is included in the section “Site Subwatershed Descriptions”. Location maps of sampling sites, crops and land uses are provided in the Land Use Maps and 2010 Annual Site Photos Appendix VIII. Due to a camera malfunction site photos were not taken from the Dry Creek @ Wellsford Rd site subwatershed during the March 23, 2010 monitoring event.

ESJWQC region rainfall data for the months January through December 2010 are described in the section “Rainfall Records”.

Table 10. ESJWQC sample locations – January through December 2010.

Zone	Site Type[1]	2010 Monitoring	Site Name	Station Code	Latitude	Longitude
1	Core	C,MPM	Dry Creek @ Wellsford Rd	535XDCAWR	37.6602	-120.8743
1	Assessment	A	Mootz Drain Downstream of Langworth Pond	535XMDDLP	37.70551	-120.89438
2	Assessment	A	Lateral 2 1/2 near Keyes Rd	535LTHNKR	37.54780	-121.09274
2	Core	C,MPM	Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	37.4422	-121.0024
3	Assessment	MPM	Dry Creek @ Oakdale	535DCAORD	37.46047	-120.61530
3	Core	C,MPM	Highline Canal @ Hwy 99	535XHCHNN	37.4153	-120.7557
3	Assessment	MPM	Highline Canal @ Lombardy Ave	535XHCALR	37.45560	-120.72070
3	Assessment	A,MPM	Mustang Creek @ East Ave	535XMCAEA	37.49180	-120.68390
4	Assessment	MPM	Bear Creek @ Kibby Rd	535XBCAKR	37.31280	-120.41380
4	Assessment	A	Howard Lateral @ Hwy 140	535XHLAHO	37.30790	-120.78200
4	Core	C,MPM	Merced River @ Santa Fe	535XMRSFD	37.4271	-120.6721
5	Assessment	A,MPM	Deadman Creek @ Gurr Rd	535XDCAGR	37.19360	-120.56120
5	Assessment	MPM	Deadman Creek @ Hwy 59	535DMCAHF	37.19810	-120.48690
5	Core	C,MPM	Duck Slough @ Gurr Rd	535XDSAGR	37.2142	-120.5596
5	Assessment	MPM	Duck Slough @ Hwy 99	535XDSAHN	37.25010	-120.41000
5	Assessment	MPM	Miles Creek @ Reilly Rd	535XMCARR	37.25820	-120.47550
6	Assessment	A	Ash Slough @ Ave 21	545XASAAT	37.05450	-120.41580
6	Core	C,MPM	Cottonwood Creek @ Rd 20	545XCCART	36.8686	-120.1818

C – Core Monitoring
A – Assessment Monitoring
MPM – Management Plan Monitoring
[1] Site types are either Assessment or Core based on the ESJWQC MRPP (pages 33-35). The yearly monitoring conducted at each sample site depends on the rotation schedule outlined in the ESJWQC MRPP (Table 10, pages 52-53) where Core site locations rotate into Assessment Monitoring locations every third year.

Table 11. ESJWQC Land Use Acreage of Site Subwatersheds January through December 2010. The land uses are designated as irrigated/non-irrigated (I/NI). Sites are listed alphabetically from Ash Slough @ Ave 21 to Prairie Flower Drain @ Crows Landing Rd. Numbers are rounded to the nearest whole number.

Land Use	I/NI	Ash Slough @ Ave 21	Bear Creek @ Kibby Rd	Cottonwood Creek @ Rd 20	Deadman Creek @ Gurr Rd	Deadman Creek @ Hwy 59	Dry Creek @ Oakdale	Dry Creek @ Wellsford Rd	Duck Slough @ Gurr Rd	Duck Slough @ Hwy 99	Highline Canal @ Hwy 99	Highline Canal @ Lombardy Ave	Howard Lateral @ Hwy 140	Lateral 2 1/2 near Keyes Rd	Merced River @ Santa Fe	Miles Creek @ Reilly Rd	Mootz Drain downstream of Langworth Pond	Mustang Creek @ East Ave	Prairie Flower Drain @ Crows Landing Rd
Citrus	I		48	586	7	7	45							25	45	3			
Citrus	NI													7					
Deciduous nut and fruit	I	7,755	2,935	9,170	10,638	10,628	11,864	8,064	6,867	5,491	8,040	4,081	1,260	22,174	19,582	1,584		4,127	
Field crop	I	9,490	1,581	3,188	11,562	10,177	630	4,516	5,344	1,754	1,053	795	261	3,810	5,479	4,032	113	2,409	2,607
Field crop	NI			314											140				
Grain and hay	I	792	223	802	2,540	2,335		216	628	349	597	597	167	100	700	527		142	
Grain and hay	NI	80	242	2,009	1,165	1,153		2,179	284	212				3	226	476		701	
Idle	I	23		1,125	607	607	104	239	749	239	221	80	114	421	141	132	3		
Idle	NI														276				
Raparian Vegetation	NI	322		22				706						70					
Wild vegetation	NI	3,926	238	11,395	10,914	7,318	6,029	240,506	3,117	303	185	142	159	2,378	9,518	646		377	
Water surface	NI	444		701	314	298	18	204	129	57	19	16	5	206	256	82		8	30
Pasture	I	5,092	1,414	909	9,702	8,115	607	7,346	5,721	1,922	791	735	377	2,370	4,580	2,466	2,824	235	1,004
Pasture	NI				24	24		1,310	91	73	336	336		20	101				
Rice	I							1,188	270										
Feedlot, dairy, farmstead	NI	755	67	563	729	609	236	1,414	723	207	362	193	76	1,230	1,208	542	138	97	455
Truck, nursery, berry	I	652	539	85	3,256	3,256	51		1,503	940	261		1,602	674	278	1,095			
Urban	NI	1,920	10	10,548	160	93		486	426	506	473	199	41	7,031	343	805	70		
Golfcourse, cemetery, landscape	NI	245		25							4	1		219	14	15			
Vineyard	I	5,809			1,476	1,418	264	1,762			608	217	105	679	2,616			2,730	
Total acres		**116,777**	**7,297**	**62,937**	**53,095**	**46,038**	**19,847**	**270,144**	**25,852**	**12,054**	**12,949**	**7,391**	**4,158**	**41,417**	**45,504**	**12,405**	**3,147**	**10,826**	**4,097**
Irrigated acres		**29,613**	**6,740**	**37,360**	**39,789**	**36,544**	**13,564**	**23,331**	**21,083**	**10,695**	**11,571**	**6,505**	**3,876**	**30,254**	**33,421**	**9,840**	**2,939**	**9,643**	**3,611**

* Land use information was obtained from data provided by California Department of Water Resources, http://www.landwateruse.water.ca.gov/annualdata/landuse/2001/landuselevels.cfm. Data was compiled in 2001.

SITE SUBWATERSHED DESCRIPTIONS

The Coalition sampled a total of 18 site subwatersheds as part of Normal Monitoring and MPM between January and December 2010. Water was not present all sites in every monitoring event and some sites were not able to be sampled every month. Descriptions of the site subwatersheds for all sample sites are provided below alphabetically. Land use maps of each site subwatershed are included in Appendix VIII (Land Use Maps and 2010 Annual Site Photos).

- Ash Slough @ Avenue 21 (29,613 irrigated acres) – Agriculture upstream includes vineyards, field crops, and deciduous nuts. Ash Slough flows just north of Chowchilla but there appears to be a buffer of agricultural land between Ash Slough and Chowchilla. Dairies are located in the upstream portion of the watershed.

- Bear Creek @ Kibby Rd (6,740 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 towns of Planada, through Merced and eventually to the San Joaquin River. The primary irrigated agriculture in the site subwatershed includes deciduous nuts, field crops, truck crops, and irrigated pasture.

- Cottonwood Creek @ Rd 20 (37,360 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 and there are deciduous nuts farther to the east. There are only a few dairies in the Cottonwood Creek site subwatershed.

- Deadman Creek @ Gurr Rd (39,789 irrigated acres) - This site subwatershed is a downstream site from Deadman Creek @ Hwy 59. The primary agriculture in the site subwatershed is orchards and row crops with some upstream irrigated pasture.

- Deadman Creek @ Highway 59 (36,544 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 is orchards and row crops with some upstream irrigated pasture.

- Dry Creek @ Oakdale Ave (13,564 irrigated acres) – Dry Creek flows into Merced River at Oakdale Ave. The agriculture draining into Dry Creek consists primarily of deciduous trees.

- Dry Creek @ Wellsford Rd (23,331 irrigated acres) – This site subwatershed is in the northern part of the Coalition region and drains a combination of field crops, deciduous nuts, and vineyards. Dry Creek originates to the east of Modesto, flows through Modesto and eventually confluences with the Tuolumne River. This site subwatershed samples 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.

- Duck Slough @ Gurr Rd (21,083 irrigated acres) – This site subwatershed is a monitoring location downstream from Duck Slough @ Hwy 99. Located to the south and west of Merced, this site drains field crops immediately upstream and deciduous nuts further upstream as well as some irrigated pasture. The city of Merced delivers treated wastewater to Duck Slough a few miles upstream of the Gurr Road site. Duck Slough flows west eventually becoming 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.

- Duck Slough @ Hwy 99 (10,695 irrigated acres) – This site subwatershed is located upstream of the Duck Slough @ Gurr Road site and was selected to determine relative contribution of water quality impairments in the upstream portion of the Duck Slough subwatershed. Duck Slough originates in the Sierra foothills and flows west (becoming the Duck Slough @ Gurr Road 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, south of Planada and Merced. Irrigated agriculture in this site subwatershed is primarily deciduous nuts, with truck crops and irrigated pasture the next most common land uses.

- Highline Canal @ Highway 99 (11,571 irrigated acres) – The Highline Canal is a conveyance of the Turlock Irrigation District (TID) and carries both clean irrigation water and irrigation return flow during the summer, and storm water runoff during the winter. This site was selected as a downstream companion site to the Highline Canal @ Lombardy Road 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. The irrigated agriculture is primarily deciduous nuts, and these are located at the lower end of the site subwatershed. A small number of vineyards are also present.

- Highline Canal @ Lombardy Rd (6,505 irrigated acres) – The Highline Canal is a conveyance of the Turlock Irrigation District (TID) and carries both clean irrigation water and irrigation return flow during the summer, and storm water runoff during the winter. The main upstream tributary of the Highline Canal is Mustang Creek. The Highline Canal flows west and eventually drains into the Merced River. Dairies are present upstream and Mustang Creek (described below), a major tributary during the dormant season, passes immediately to the southeast of the Turlock Airport. The main crop upstream is deciduous nuts.

- Howard Lateral @ Hwy 140 (3,876 irrigated acres) – The lateral is located just south and west of Livingston Drain, in the central portion of the Coalition region in Merced County and is managed by Merced Irrigation District. Flows are intermittent in this lateral. Agricultural land use is predominantly truck/nursery/berry crops and deciduous fruit, but also includes field crops, pasture, grains/hay, vineyard and dairy.

- Lateral 2 1/2 near Keyes Rd (30,254 Irrigated acres) – This site subwatershed is located in the western portion of the Coalition region just south of the Tuolumne River and East of the San Joaquin River. The site subwatershed extends east past the City of Modesto to Turlock Lake. The primary agriculture in this site subwatershed is deciduous fruits and nuts but also includes almost all other crops types and land use found in the Coalition Region.

- Merced River @ Santa Fe Drive (33,421 irrigated acres) – This water body is designated as a major water body 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. The Merced River eventually drains into the San Joaquin River near Hatfield State Park. Upstream agriculture includes some field crops in the immediate vicinity of the river and deciduous nuts, primarily almonds.

- Miles Creek @ Reilly Rd (9,840 irrigated acres) – Miles Creek is located just north of Duck Slough and drains into Owen's Creek. The primary agriculture includes field crops, deciduous nuts and fruit, pasture and truck/nursery/berry. Within the subwatershed are also urban drainages, dairies and hay, and pasture lands.

- Mootz Drain downstream of Langworth Pond (2,939 irrigated acres) – This site subwatershed is just downstream of Mootz Drain @ Langworth and represents the same acreage upstream but the sample is taken downstream of the retention pond rather than upstream.

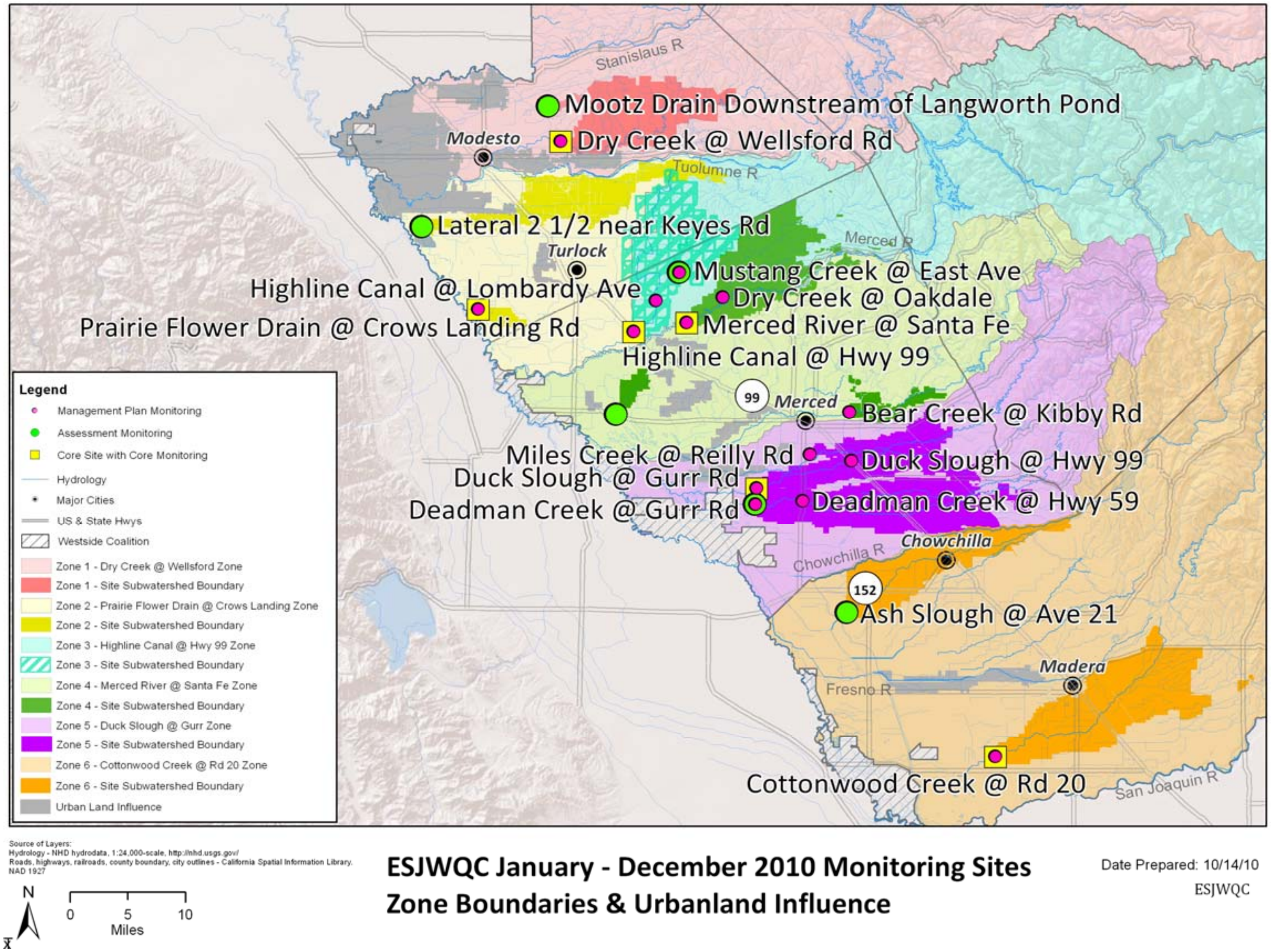
- Mustang Creek @ East Ave (9,643 irrigated acres) – Mustang Creek originates in the foothills of the Sierra Nevada and flows into the upper portion of the Highline Canal. Mustang Creek is ephemeral with flow found primarily during winter runoff events. Summer flows are intermittent as the upstream orchards utilize microspray irrigation. Citrus and deciduous nut crops are the main agriculture with smaller amounts of field crops and grains and hay.

- Prairie Flower Drain @ Crows Landing Rd (3,611 irrigated acres) – Relative to other drains in the western portion of the Coalition region, Prairie Flower Drain is longer and appears to drain mostly irrigated agriculture. Dairies and feedlots are common in this part of the Coalition region and this drain receives runoff from several dairies immediately upstream. Upstream agriculture is field crops. Groundwater in this site subwatershed is very shallow and Prairie Flower Drain intercepts the salty groundwater and moves it to the Harding Drain.

SAMPLE SITE LOCATIONS

Figure 8 maps all site subwatersheds sampled from January through December 2010. Zone boundaries are also mapped for reference.

Figure 8. Site subwatershed locations relative to zone boundaries.



RAINFALL RECORDS

The ESJWQC considers a sampling event a "storm sampling event" when there has been at least 0.25 inches of rain recorded in the Coalition region within a 24 hour period. Monthly sampling is pre-scheduled, and if a storm is forecasted within a week before a scheduled sampling event or within two days after the scheduled sampling event, the Coalition moves its sampling date to capture the storm. The Coalition sampled three storms between January 2010 and December 2010. A description of all the storms that occurred during that time period is provided below, including whether or not they were sampled. Daily rainfall records are provided for the three major cities in the Coalition region: Modesto, Merced, and Madera (Figure 9, January – March 2010; Figure 10, April – June 2010; Figure 11, October – December 2010).

January 2010 through March 2010

Two storm events were monitored from January through March 2010.

The first sizable storm event of 2010 lasted two days over January 12-13, 2010. During this time Merced received 0.34 inches of precipitation, 0.57 inches in Modesto, and 0.05 inches in Madera (Figure 9). This storm did not meet the trigger limit in all three cities and precipitation forecasts for the area prior to the storm were too unpredictable; therefore monitoring did not occur immediately after this rain. The largest storm of January started four days later on January 17, 2010 and lasted until January 26, 2010. The trigger limit of 0.25 inches in 24 hours was met in Merced and Modesto on January 17, 2010 and was met in Madera on the first sample day of the year, January 19, 2010, after heavy overnight and early morning showers. Because all three cities met the trigger limit within 24 hours of the sample date, monitoring was conducted to capture any storm runoff. Over the ten days Merced reported 2.38 inches of precipitation, Madera reported 2.4 inches, and Madera reported 1.79 inches. The most precipitation was recorded on the sample collection day when Merced received 0.65 inches, Madera received 0.68 inches, and Madera recorded 0.83 inches (Figure 9).

February's first storm lasted six days from February 4-9, 2010. Merced received 1.0 inches of precipitation while Modesto recorded 0.66 inches and 1.37 inches was reported in Madera (Figure 9). This system was not predicted to bring much rain on any given day, and since one substantial storm had already been sampled for 2010, no sampling took place to try and catch any runoff.

A small system was predicted to come through the Valley starting on February 20, 2010, but little precipitation was expected. On February 20, 2010 Merced only reported 0.02 inches of precipitation and 0.01 inches in Madera while no precipitation was measured in Modesto (Figure 9). The next day, February 21, 2010, more precipitation fell but the trigger was still not met with 0.22 inches in Merced, 0.18 inches in Modesto, and 0.22 inches in Madera (Figure 9). The day before sampling, February 22, 2010, Madera only reported 0.02 inches and zero inches were recorded in Merced and Modesto (Figure 9). The precipitation pattern of the early part of the storm did not appear conducive to a good storm/runoff event but on the early morning of February 23, 2010 the East San Joaquin region received heavy downpours that soaked the already wet soil. By the time sampling took place on February 23, 2010 the region had received enough precipitation to consider this sampling event a storm event. The sampling area had large puddles and most sites had increased flows indicating significant amounts of runoff. On February 23, 2010, Merced received 0.82 inches of precipitation while Modesto recorded 0.36 inches and Madera recorded 0.47 inches (Figure 9).

A smaller storm went through the East San Joaquin region on February 26-27, 2010. Merced received another 0.69 inches of precipitation, Modesto received 0.11 inches and Madera received 0.53 inches (Figure 9). This storm did not meet the trigger limit in all three cities and since a storm runoff event had already been captured during the month no additional sampling was conducted.

March had above average rainfall for the region with most of the precipitation falling in the beginning of the month. The first system brought precipitation to the region on March 2, 2010 and lasted three days until March 4, 2010 with the majority falling on March 3, 2010. For all three days, Merced recorded 0.65 inches, Modesto had 0.48 inches, and Madera reported 0.52 inches (Figure 9). While the trigger limit of 0.25 inches in 24 hours was met, the next sampling event was scheduled for March 23, 2010, storm sampling was not conducted. March 12-13, 2010, deposited 0.27 inches of precipitation in Merced, 0.11 inches in Modesto, and Madera received 0.35 inches (Figure 9). When sampling occurred on March 23, 2010 the region had been dry for nine days.

April 2010 through June 2010

One storm event was monitored from April through June 2010.

The first storm between April and June occurred on April 4-5, 2010. While this storm only lasted two days it did bring considerable precipitation totaling 0.7 inches in Merced, 0.19 inches in Modesto, and 0.68 inches in Madera (Figure 10). The trigger limit was not met in all three cities for this storm event. On April 11, 2010, Merced received 1.04 inches of precipitation, while 0.52 inches were reported in Modesto and 0.5 inches were recorded in Madera from April 11-12, 2010 (Figure 10). This storm was not predicted to bring as much precipitation as it did and since two substantial storms had already been sampled prior to this event no sampling occurred to catch any subsequent runoff.

The next storm occurred on April 20, 2010, which was scheduled to be the sample day for Irrigation1 sampling. By the time sampling started at 8 o'clock in the morning, heavy rains were ending and the trigger limit had already been exceeded. It was decided to designate the sampling event on April 20, 2010, as another storm/runoff event, Storm3. That day Merced received 0.66 inches of precipitation, Modesto received 0.72 inches and Madera received 0.48 inches (Figure 10). This rain event increased discharge at many of the sample locations and the region had standing water in the roadsides and agricultural lands. The storm continued to produce some lighter showers through April 22, 2010 amounting to 0.31 inches in Merced, 0.23 inches in Modesto and 0.47 inches of precipitation in Madera (Figure 10).

May was much dryer as is typical of the warm Mediterranean summer climate in the East San Joaquin region. May had several rainy days, but all were isolated showers that did not cover the entire region and only deposited minimal precipitation.

June was a very dry month in the East San Joaquin region with only one day of measurable precipitation. In Modesto on June 25, 2010, 0.02 inches of precipitation was reported (Figure 10). The rest of the month was dry as is typical of summer in the San Joaquin valley.

July 2010 through September 2010

There was no measurable precipitation in the ESJWQC for July through September.

October 2010 through December 2010

No storm events were monitored from October through December 2010.

Figure 11 presents the daily rainfall for October through December 2010. The first part of October had little measurable precipitation. No storm in the first part of the month had enough precipitation to meet the trigger limit. The first substantial storm was October 22, 2010 through October 24, 2010 when Merced reported 0.35 inches of precipitation while Modesto reported 0.52 inches and Madera reported 0.26 inches (Figure 11). This did make the trigger limit for the Coalition but since samples had already been collected the week prior a second sample event did not take place. No more rain events occurred in October that met the trigger limit.

The first storm to exceed the trigger limit in November was on November 7, 2010 (Figure 11). Merced received 0.38 inches of precipitation, while 0.41 inches were recorded in Modesto, and 0.58 inches were recorded in Madera (Figure 11). This storm was not predicted and was too early for there to have been any dormant sprays. Sampling occurred the next week on November 16, 2010 and the next storm to deposit more than a quarter of an inch of precipitation was not until four days after sampling occurred. From November 20, 2010 through November 21, 2010, Merced received 0.67 inches of precipitation, Modesto received 0.38 inches, and Madera received 0.88 inches (Figure 11). The Coalition had already sampled in November and lacks the resources to sample twice in the same month so no sampling took place after this storm. On November 27, 2010 a storm came through another portion of the ESJWQC that met the trigger limit in Modesto only, with 0.31 inches of precipitation (Figure 11).

December had many small storms that did not drop enough precipitation at one time to make the trigger limits until the end of the month, after sampling had already occurred. Eighteen out of 31 days had precipitation in at least one of the three cities. The weather reports for this time period all predicted rainfall totals of much less than the trigger limit, making it impossible to move sampling to coincide with a large storm. Sampling took place on December 14, 2010 and the rainfall totals did not make the trigger limit in all three cities until December 27, 2010 (Figure 11). Thus, the coalition was unable to monitor a storm sample event in the fall of 2010.

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

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

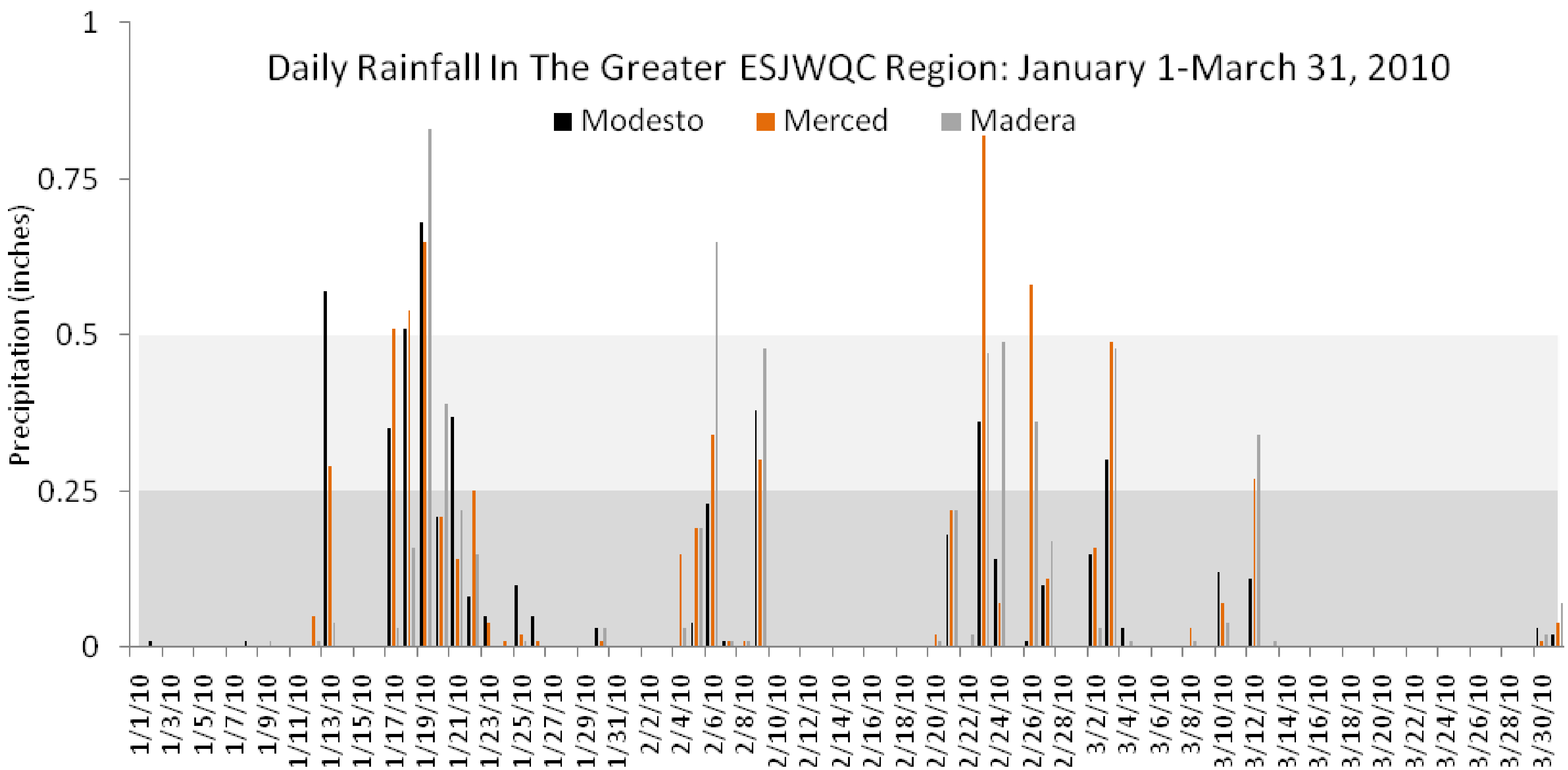


Figure 10. Precipitation history for Modesto, Merced, and Madera, April 1, 2010 – June 30, 2010.
The shaded gray area represents the trigger to initiate sampling: 0.25" - 0.5" rain in 24 hours. The first ESJWQC storm sampling event on took place on 1/19/10. The storm dropped 1.19" of rain in Merced and Modesto and 0.99 inches in Madera from 1/18/10-1/19/10. The second storm sampling event took place on 2/23/10 and dropped 0.82" of rain in Merced, 0.36" in Modesto, and 0.47" in Madera in 1 day. All data reported on weatherunderground.com.

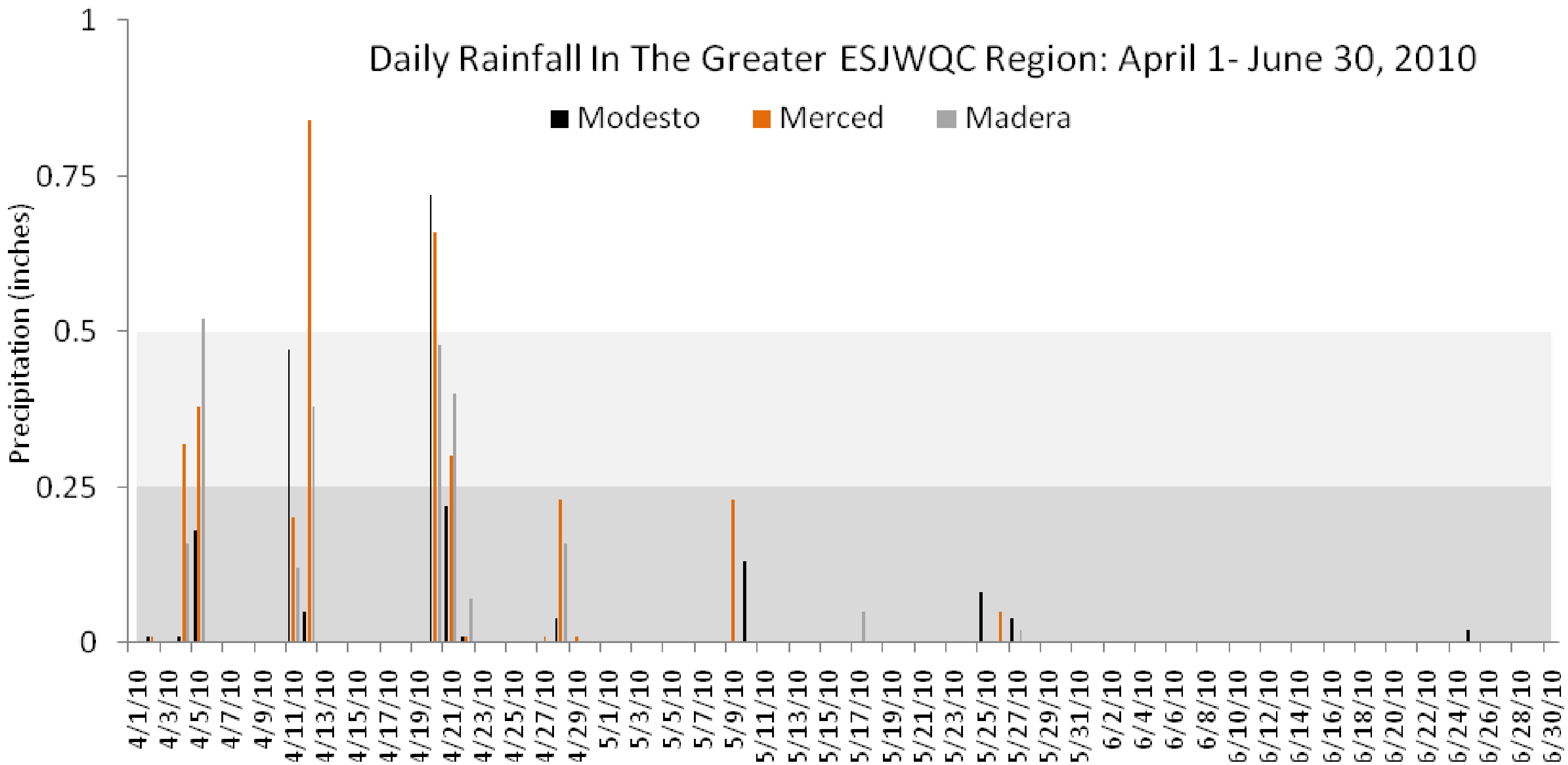
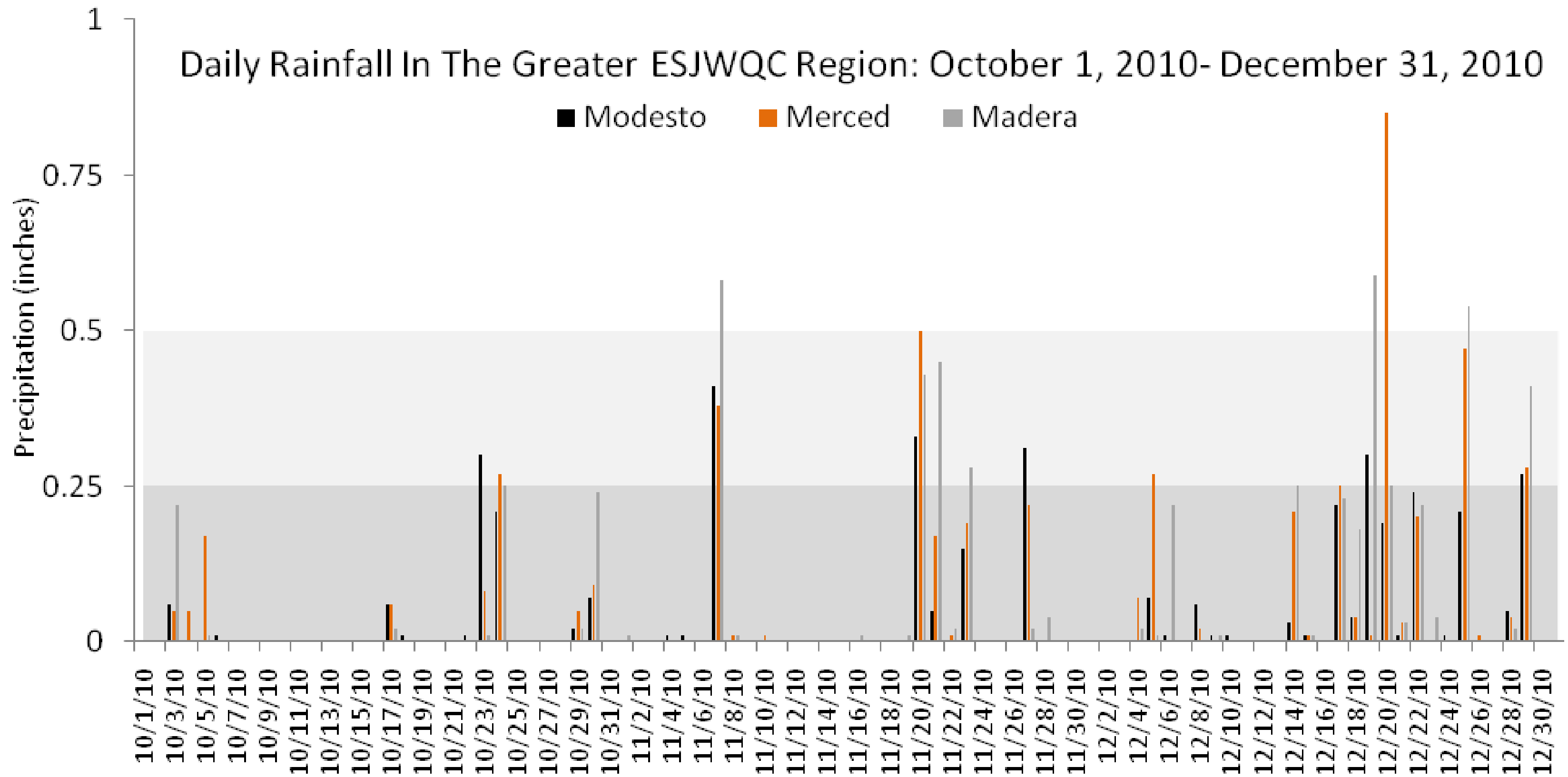


Figure 11. Precipitation history for Modesto, Merced, and Madera, October 1, 2010 – December 31, 2010.
The shaded gray area represents the trigger to initiate sampling: 0.25” - 0.5” rain in 24 hours. All data reported on weatherunderground.com.



MONITORING RESULTS

SAMPLE DETAILS

Original Chain of Custody (COC) forms were scanned and converted to pdf. Pdf copies of the COCs are provided in 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.

Complete monitoring results from sampling that occurred from January through December 2010 are included in Appendix II and III. The results include field parameters, organic (pesticides), inorganics including metals and *E. coli*, toxicity (water and sediment), sediment chemistry, and loads for any detectable analyte with corresponding site flow.

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

Instantaneous Load (µg/sec) = Discharge (cfs) X 28.317L x Concentration (milligram/L x 1,000 or µg/L).

The load values calculated and presented for pesticides or other constituents in this report represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal or annual). The primary purpose for reporting instantaneous loads is to provide the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected.

Monitoring data include results from samples taken for Normal Monitoring, MPM and sediment monitoring events. Each sampling location, sampling date, sampling time and type of monitoring is listed in Table 12.

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

Table 12. Sample details for January through December 2010 (sorted by station name, sample date and monitoring event). Non contiguous water bodies are noted in the Season/Group column.

Station Name	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Ash Slough @ Ave 21	545XASAAT	NM	Storm1	01/19/10	11:24	Dry	
Ash Slough @ Ave 21	545XASAAT	NM	Storm2	02/23/10	10:13	Dry	
Ash Slough @ Ave 21	545XASAAT	NM	Winter1	03/23/10	10:20	Dry	
Ash Slough @ Ave 21	545XASAAT	NM	Storm3	04/20/10	12:30	None	
Ash Slough @ Ave 21	545XASAAT	NM	Irrigation1	05/18/10	13:05	Dry	
Ash Slough @ Ave 21	545XASAAT	NM	Irrigation2	06/15/10	11:23	Dry	
Ash Slough @ Ave 21	545XASAAT	NM	Irrigation3	07/20/10	12:49	Dry	
Ash Slough @ Ave 21	545XASAAT	NM	Irrigation4	08/17/10	12:18	Dry	
Ash Slough @ Ave 21	545XASAAT	NM	Irrigation5	09/14/10	12:07	Dry	
Ash Slough @ Ave 21	545XASAAT	NM	Fall1	10/19/10	10:43	Dry	
Ash Slough @ Ave 21	545XASAAT	NM	Fall2	11/16/10	10:17	Dry	
Ash Slough @ Ave 21	545XASAAT	NM	Fall3	12/14/10	10:00	Dry	
Bear Creek @ Kibby Rd	535XBCAKR	MPM	Irrigation1, Management Plan Monitoring	05/18/10	09:10	None	May MPM for *Ceriodaphnia* toxicity and chlorpyrifos; Too deep to measure discharge.
Bear Creek @ Kibby Rd	535XBCAKR	MPM	Irrigation3, Management Plan Monitoring	07/20/10	09:10	None	July MPM for *Ceriodaphnia* toxicity chlorpyrifos; Too deep to measure discharge.
Bear Creek @ Kibby Rd	535XBCAKR	MPM	Irrigation4, Management Plan Monitoring	08/17/10	09:00	None	August MPM for copper; Too deep to measure discharge.
Cottonwood Creek @ Rd 20	545XCCART	NM	Storm1, Management Plan Monitoring, Non Contiguous	01/19/10	10:30	None	Non contiguous water body, discharge recorded as zero.
Cottonwood Creek @ Rd 20	545XCCART	MPM	Storm1, Management Plan Monitoring, Non Contiguous	01/19/10	10:30	None	January MPM for chlorpyrifos, diazinon, and diuron; Non contiguous water body, discharge recorded as zero.
Cottonwood Creek @ Rd 20	545XCCART	NM	Storm2, Management Plan Monitoring	02/23/10	09:31	Dry	
Cottonwood Creek @ Rd 20	545XCCART	MPM	Storm2, Management Plan Monitoring	02/23/10	09:31	Dry	February MPM for chlorpyrifos, diazinon and diuron.
Cottonwood Creek @ Rd 20	545XCCART	NM	Winter1	03/23/10	09:35	Dry	
Cottonwood Creek @ Rd 20	545XCCART	NM	Storm3, Management Plan Monitoring	04/20/10	10:40	None	
Cottonwood Creek @ Rd 20	545XCCART	MPM	Storm3, Management Plan Monitoring	04/20/10	10:40	None	April MPM for copper.
Cottonwood Creek @ Rd 20	545XCCART	NM	Irrigation1, Management Plan Monitoring	05/18/10	11:10	None	
Cottonwood Creek @ Rd 20	545XCCART	MPM	Irrigation1, Management Plan Monitoring	05/18/10	11:10	None	May MPM for copper.
Cottonwood Creek @ Rd 20	545XCCART	NM	Irrigation2, Management Plan Monitoring, Non Contiguous	06/15/10	10:20	None	Non contiguous water body, discharge recorded as zero.
Cottonwood Creek @ Rd 20	545XCCART	MPM	Irrigation2, Management Plan Monitoring, Non Contiguous	06/15/10	10:20	None	June MPM for copper; Non contiguous water body, discharge recorded as zero.

Station Name	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Cottonwood Creek @ Rd 20	545XCCART	NM	Irrigation3, Management Plan Monitoring	07/20/10	11:40	None	
Cottonwood Creek @ Rd 20	545XCCART	MPM	Irrigation3, Management Plan Monitoring	07/20/10	11:40	None	July MPM for copper.
Cottonwood Creek @ Rd 20	545XCCART	NM	Irrigation4, Management Plan Monitoring	08/17/10	11:10	None	
Cottonwood Creek @ Rd 20	545XCCART	MPM	Irrigation4, Management Plan Monitoring	08/17/10	11:10	None	August MPM for copper.
Cottonwood Creek @ Rd 20	545XCCART	NM	Irrigation5, Management Plan Monitoring	09/14/10	10:40	None	
Cottonwood Creek @ Rd 20	545XCCART	MPM	Irrigation5, Management Plan Monitoring	09/14/10	10:40	None	September MPM for copper.
Cottonwood Creek @ Rd 20	545XCCART	Sediment	Irrigation5, Management Plan Monitoring	09/14/10	10:40	None	Pesticides analyzed in toxic sediment only.
Cottonwood Creek @ Rd 20	545XCCART	NM	Fall1	10/19/10	09:40	None	
Cottonwood Creek @ Rd 20	545XCCART	NM	Fall2	11/16/10	09:24	Dry	
Cottonwood Creek @ Rd 20	545XCCART	NM	Fall3	12/14/10	09:19	Dry	
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Storm1, Management Plan Monitoring	01/19/10	13:40	None	
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	MPM	Storm1, Management Plan Monitoring	01/19/10	13:40	None	January MPM for *Selenastrum* toxicity and copper.
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Storm2, Management Plan Monitoring, Non Contiguous	02/23/10	11:40	None	Non contiguous water body, discharge recorded as zero.
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	MPM	Storm2, Management Plan Monitoring, Non Contiguous	02/23/10	11:40	None	February MPM for *Selenastrum* toxicity and copper; Non contiguous water body, discharge recorded as zero.
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Winter1, Non Contiguous	03/23/10	12:00	None	Non contiguous water body, discharge recorded as zero.
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	Sediment	Winter1, Non Contiguous	03/23/10	12:00	None	Pesticides analyzed in toxic sediment only; Non contiguous water body, discharge recorded as zero.
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Storm3	04/20/10	14:30	None	
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Irrigation1	05/18/10	15:00	None	
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Irrigation2	06/15/10	13:00	None	Discharge recorded as zero due to flow moving in upstream direction, from west to east.
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Irrigation3	07/20/10	14:00	None	
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Irrigation4	08/17/10	13:20	None	
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Irrigation5	09/14/10	12:50	None	
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	Sediment	Irrigation5	09/14/10	12:50	None	Pesticides analyzed in toxic sediment only.
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Fall1	10/19/10	11:20	None	
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Fall2	11/16/10	12:00	None	Discharge recorded as zero due to flow moving in upstream direction, from west to east.
Deadman Creek (Dutchman) @ Gurr Rd	535XDCAGR	NM	Fall3, Non Contiguous	12/14/10	11:00	None	Non contiguous water body, discharge recorded as zero.
Deadman Creek @ Hwy 59	535DMCAHF	MPM	Storm1, Management Plan Monitoring	01/19/10	12:47	Dry	January MPM for *Selenastrum* toxicity.

Station Name	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Dry Creek @ Oakdale Rd	535DCAORD	MPM	Storm1, Management Plan Monitoring	01/19/10	14:40	None	January MPM for *Ceriodaphnia* toxicity and chlorpyrifos; Too deep to measure discharge.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Storm1	01/19/10	09:50	None	
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Storm2, Management Plan Monitoring	02/23/10	10:10	None	
Dry Creek @ Wellsford Rd	535XDCAWR	MPM	Storm2, Management Plan Monitoring	02/23/10	10:10	None	February MPM for copper, diuron, and *Selenastrum* toxicity.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Winter1	03/23/10	10:30	None	
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Storm3, Management Plan Monitoring	04/20/10	10:00	None	
Dry Creek @ Wellsford Rd	535XDCAWR	MPM	Storm3, Management Plan Monitoring	04/20/10	10:00	None	April MPM for copper.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Irrigation1	05/18/10	10:00	None	
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Irrigation2	06/15/10	09:40	None	
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Irrigation3, Management Plan Monitoring	07/20/10	11:30	None	
Dry Creek @ Wellsford Rd	535XDCAWR	MPM	Irrigation3, Management Plan Monitoring	07/20/10	11:30	None	July MPM for chlorpyrifos.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Irrigation4, Management Plan Monitoring	08/17/10	10:50	None	
Dry Creek @ Wellsford Rd	535XDCAWR	MPM	Irrigation4, Management Plan Monitoring	08/17/10	10:50	None	August MPM for chlorpyrifos.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Irrigation5, Management Plan Monitoring	09/14/10	11:30	None	
Dry Creek @ Wellsford Rd	535XDCAWR	MPM	Irrigation5, Management Plan Monitoring	09/14/10	11:30	None	September MPM for *Hyalella* toxicity and chlorpyrifos; Pesticides analyzed in toxic sediment only.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Fall1	10/19/10	09:00	None	
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Fall2	11/16/10	08:40	None	Discharge recorded as zero due to no measurable flow.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Fall3	12/14/10	11:10	None	
Duck Slough @ Gurr Rd	535XDSAGR	NM	Storm1, Management Plan Monitoring, Non Contiguous	01/19/10	15:30	None	Non contiguous water body, discharge recorded as zero.
Duck Slough @ Gurr Rd	535XDSAGR	MPM	Storm1, Management Plan Monitoring, Non Contiguous	01/19/10	15:30	None	January MPM for copper; Non contiguous water body, discharge recorded as zero.
Duck Slough @ Gurr Rd	535XDSAGR	NM	Storm2, Management Plan Monitoring	02/23/10	13:10	None	
Duck Slough @ Gurr Rd	535XDSAGR	MPM	Storm2, Management Plan Monitoring	02/23/10	13:10	None	February MPM for copper.
Duck Slough @ Gurr Rd	535XDSAGR	NM	Winter1	03/23/10	14:40	None	
Duck Slough @ Gurr Rd	535XDSAGR	NM	Storm3, Management Plan Monitoring	04/20/10	16:00	None	
Duck Slough @ Gurr Rd	535XDSAGR	MPM	Storm3, Management Plan Monitoring	04/20/10	16:00	None	April MPM for chlorpyrifos.

Station Name	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Duck Slough @ Gurr Rd	535XDSAGR	NM	Irrigation1	05/18/10	16:30	None	
Duck Slough @ Gurr Rd	535XDSAGR	NM	Irrigation2, Management Plan Monitoring	06/15/10	14:20	None	
Duck Slough @ Gurr Rd	535XDSAGR	MPM	Irrigation2, Management Plan Monitoring	06/15/10	14:20	None	June MPM for copper.
Duck Slough @ Gurr Rd	535XDSAGR	NM	Irrigation3, Management Plan Monitoring	07/20/10	15:00	None	
Duck Slough @ Gurr Rd	535XDSAGR	MPM	Irrigation3, Management Plan Monitoring	07/20/10	15:00	None	July MPM for *Selenastrum* toxicity, copper and chlorpyrifos.
Duck Slough @ Gurr Rd	535XDSAGR	NM	Irrigation4	08/17/10	13:50	None	Too deep to measure discharge.
Duck Slough @ Gurr Rd	535XDSAGR	NM	Irrigation5, Management Plan Monitoring	09/14/10	14:40	None	Too deep to measure discharge.
Duck Slough @ Gurr Rd	535XDSAGR	MPM	Irrigation5, Management Plan Monitoring	09/14/10	14:40	None	September MPM for *Selenastrum* and *Hyalella* toxicity; Too deep to measure discharge; Pesticides analyzed in toxic sediment only.
Duck Slough @ Gurr Rd	535XDSAGR	NM	Fall1	10/19/10	12:20	None	
Duck Slough @ Gurr Rd	535XDSAGR	NM	Fall2	11/17/10	12:30	None	
Duck Slough @ Gurr Rd	535XDSAGR	NM	Fall3	12/14/10	11:40	Dry	
Duck Slough @ Hwy 99	535XDSAHN	MPM	Storm3, Management Plan Monitoring	04/20/10	09:00	None	April MPM for *Selenastrum* toxicity and copper ; Too deep to measure discharge.
Duck Slough @ Hwy 99	535XDSAHN	MPM	Irrigation1, Management Plan Monitoring	05/18/10	09:50	None	May MPM for chlorpyrifos; Too deep to measure discharge.
Duck Slough @ Hwy 99	535XDSAHN	MPM	Irrigation2, Management Plan Monitoring	06/15/10	09:00	None	June MPM for copper; Too deep to measure discharge.
Duck Slough @ Hwy 99	535XDSAHN	MPM	Irrigation3, Management Plan Monitoring	07/20/10	10:00	None	July MPM for *Selenastrum* toxicity, copper and chlorpyrifos; Too deep to measure discharge.
Duck Slough @ Hwy 99	535XDSAHN	MPM	Irrigation4, Management Plan Monitoring	08/17/10	09:40	None	August MPM for copper; Too deep to measure discharge.
Duck Slough @ Hwy 99	535XDSAHN	MPM	Irrigation5, Management Plan Monitoring	09/14/10	09:00	None	September MPM for copper and chlorpyrifos; Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	NM	Storm1, Management Plan Monitoring, Non Contiguous	01/19/10	17:00	None	Non contiguous water body, discharge recorded as zero.
Highline Canal @ Hwy 99	535XHCHNN	MPM	Storm1, Management Plan Monitoring, Non Contiguous	01/19/10	17:00	None	January MPM for copper, *Selenastrum* toxicity, chlorpyrifos and diuron; Non contiguous water body, discharge recorded as zero.
Highline Canal @ Hwy 99	535XHCHNN	NM	Storm2, Management Plan Monitoring	02/23/10	14:40	None	Discharge recorded as zero due to no measurable flow.
Highline Canal @ Hwy 99	535XHCHNN	MPM	Storm2, Management Plan Monitoring	02/23/10	14:40	None	February MPM for copper, chlorpyrifos, diuron and *Selenastrum* toxicity; Discharge recorded as zero due to no measurable flow.
Highline Canal @ Hwy 99	535XHCHNN	NM	Winter1	03/23/10	16:10	None	Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	NM	Storm3, Management Plan	04/20/10	16:50	None	Too deep to measure discharge.

Station Name	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
			Monitoring				
Highline Canal @ Hwy 99	535XHCHNN	MPM	Storm3, Management Plan Monitoring	04/20/10	16:50	None	April MPM for *Selenastrum* toxicity and copper; Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	NM	Irrigation1, Management Plan Monitoring	05/18/10	14:40	None	Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	MPM	Irrigation1, Management Plan Monitoring	05/18/10	14:40	None	May MPM for *Selenastrum* toxicity; Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	NM	Irrigation2, Management Plan Monitoring	06/15/10	14:50	None	Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	MPM	Irrigation2, Management Plan Monitoring	06/15/10	14:50	None	June MPM for copper; Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	NM	Irrigation3, Management Plan Monitoring	07/20/10	17:00	None	Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	MPM	Irrigation3, Management Plan Monitoring	07/20/10	17:00	None	July MPM for copper and chlorpyrifos; Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	NM	Irrigation4, Management Plan Monitoring	08/17/10	15:50	None	Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	MPM	Irrigation4, Management Plan Monitoring	08/17/10	15:50	None	August MPM for copper; Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	NM	Irrigation5, Management Plan Monitoring	09/14/10	17:20	None	Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	MPM	Irrigation5, Management Plan Monitoring	09/14/10	17:20	None	September MPM for *Hyalella* toxicity; Too deep to measure discharge; Pesticides analyzed in toxic sediment only.
Highline Canal @ Hwy 99	535XHCHNN	NM	Fall1	10/19/10	15:00	None	Too deep to measure discharge.
Highline Canal @ Hwy 99	535XHCHNN	NM	Fall2, Non Contiguous	11/16/10	14:20	None	Non contiguous water body, discharge recorded as zero.
Highline Canal @ Hwy 99	535XHCHNN	NM	Fall3	12/14/10	12:35	Dry	
Highline Canal @ Lombardy Rd	535XHCALR	MPM	Storm1, Management Plan Monitoring	01/19/10	16:30	None	January MPM for *Ceriodaphnia* toxicity, copper and chlorpyrifos; Discharge recorded as zero due to no measurable flow.
Highline Canal @ Lombardy Rd	535XHCALR	MPM	Storm2, Management Plan Monitoring	02/23/10	15:30	None	February MPM for chlorpyrifos, copper, *Ceriodaphnia* and *Selenastrum* toxicity; Discharge recorded as zero due to no measurable flow..
Highline Canal @ Lombardy Rd	535XHCALR	MPM	Winter1, Management Plan Monitoring	03/23/10	16:30	None	March MPM for *Selenastrum* toxicity; Discharge not measured due to toxicity monitoring only.
Howard Lateral @ Hwy 140	535XHLAHO	NM	Storm1	01/19/10	16:08	Dry	
Howard Lateral @ Hwy 140	535XHLAHO	NM	Storm2	02/23/10	13:59	Dry	
Howard Lateral @ Hwy 140	535XHLAHO	NM	Winter1	03/23/10	15:25	Dry	
Howard Lateral @ Hwy 140	535XHLAHO	NM	Storm3	04/20/10	16:50	None	
Howard Lateral @ Hwy 140	535XHLAHO	NM	Irrigation1	05/18/10	16:10	None	
Howard Lateral @ Hwy 140	535XHLAHO	NM	Irrigation2	06/15/10	15:20	None	Discharge recorded as zero due to no measurable flow.
Howard Lateral @ Hwy 140	535XHLAHO	NM	Irrigation3	07/20/10	16:00	None	

Station Name	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Howard Lateral @ Hwy 140	535XHLAHO	NM	Irrigation4	08/17/10	14:50	None	
Howard Lateral @ Hwy 140	535XHLAHO	NM	Irrigation5	09/14/10	15:50	None	Used back-up YSI meter to measure field parameters.
Howard Lateral @ Hwy 140	535XHLAHO	Sediment	Irrigation5	09/14/10	15:50	None	Pesticides analyzed in toxic sediment only; Used back-up YSI meter to measure field parameters.
Howard Lateral @ Hwy 140	535XHLAHO	NM	Fall1	10/19/10	13:40	None	
Howard Lateral @ Hwy 140	535XHLAHO	NM	Fall2	11/16/10	11:11	Dry	
Howard Lateral @ Hwy 140	535XHLAHO	NM	Fall3	12/14/10	12:10	Dry	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Irrigation3	07/20/10	13:20	None	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Irrigation4	08/17/10	12:10	None	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Irrigation5	09/14/10	13:20	None	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	Sediment	Irrigation5	09/14/10	13:20	None	Pesticides analyzed in toxic sediment only.
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Fall1	10/19/10	11:30	None	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Fall2	11/16/10	09:48	Dry	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Fall3	12/14/10	12:34	Dry	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Storm1	01/19/10	11:05	Dry	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Storm2	02/23/10	11:50	Dry	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Winter1	03/23/10	12:10	None	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	Sediment	Winter1	03/23/10	12:10	None	Pesticides analyzed in toxic sediment only.
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Storm3	04/20/10	11:40	None	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Irrigation1	05/18/10	11:00	None	
Lateral 2 1/2 near Keyes Rd	535LTHNKR	NM	Irrigation2	06/15/10	11:10	None	
Merced River @ Santa Fe	535XMRSFD	NM	Storm1, Management Plan Monitoring	01/19/10	15:20	None	
Merced River @ Santa Fe	535XMRSFD	MPM	Storm1, Management Plan Monitoring	01/19/10	15:20	None	January MPM for *Ceriodaphnia* toxicity and chlorpyrifos.
Merced River @ Santa Fe	535XMRSFD	NM	Storm2	02/23/10	16:00	None	
Merced River @ Santa Fe	535XMRSFD	NM	Winter1	03/23/10	16:50	None	
Merced River @ Santa Fe	535XMRSFD	NM	Storm3	04/20/10	15:40	None	
Merced River @ Santa Fe	535XMRSFD	NM	Irrigation1	05/18/10	14:00	None	
Merced River @ Santa Fe	535XMRSFD	NM	Irrigation2	06/15/10	13:50	None	
Merced River @ Santa Fe	535XMRSFD	NM	Irrigation3	07/20/10	15:50	None	
Merced River @ Santa Fe	535XMRSFD	NM	Irrigation4	08/17/10	15:00	None	
Merced River @ Santa Fe	535XMRSFD	NM	Irrigation5	09/14/10	16:30	None	
Merced River @ Santa Fe	535XMRSFD	NM	Fall1	10/19/10	15:10	None	
Merced River @ Santa Fe	535XMRSFD	NM	Fall2	11/16/10	13:20	None	
Merced River @ Santa Fe	535XMRSFD	NM	Fall3	12/14/10	13:10	None	California Data Exchange Center (CDEC) discharge data not available as of 12/15/10.
Miles Creek @ Reilly Rd	535XMCARR	MPM	Storm1, Management Plan Monitoring	01/19/10	12:20	None	January MPM for *Ceriodaphnia* toxicity and copper.
Miles Creek @ Reilly Rd	535XMCARR	MPM	Storm2, Management Plan Monitoring	02/23/10	16:40	None	February MPM for copper and *Ceriodaphnia* toxicity.

Station Name	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Storm1	01/19/10	09:00	None	Discharge recorded as zero due to no measurable flow.
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Storm2	02/23/10	08:50	None	
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Winter1, Non Contiguous	03/23/10	09:00	None	Non contiguous water body, discharge recorded as zero.
Mootz Drain Downstream of Langworth Pond	535XMDDLP	Sediment	Winter1, Non Contiguous	03/23/10	09:00	None	Pesticides analyzed in toxic sediment only; Non contiguous water body, discharge recorded as zero.
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Storm3	04/20/10	08:40	None	
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Irrigation1	05/18/10	08:40	None	
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Irrigation2	06/15/10	08:40	None	
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Irrigation3	07/20/10	09:40	None	
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Irrigation4	08/17/10	09:30	None	
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Irrigation5	09/14/10	09:30	None	
Mootz Drain Downstream of Langworth Pond	535XMDDLP	Sediment	Irrigation5	09/14/10	09:30	None	Pesticides analyzed in toxic sediment only.
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Fall1	10/19/10	08:25	Dry	
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Fall2	11/16/10	08:18	Dry	
Mootz Drain Downstream of Langworth Pond	535XMDDLP	NM	Fall3	12/14/10	09:20	None	
Mustang Creek @ East Ave	535XMCAEA	NM	Storm1, Management Plan Monitoring	01/19/10	13:30	None	Discharge recorded as zero due to no measurable flow.
Mustang Creek @ East Ave	535XMCAEA	MPM	Storm1, Management Plan Monitoring	01/19/10	13:30	None	January MPM for simazine and chlorpyrifos.
Mustang Creek @ East Ave	535XMCAEA	NM	Storm2, Management Plan Monitoring	02/23/10	14:20	None	
Mustang Creek @ East Ave	535XMCAEA	MPM	Storm2, Management Plan Monitoring	02/23/10	14:20	None	February MPM for simazine and chlorpyrifos.
Mustang Creek @ East Ave	535XMCAEA	NM	Winter1	03/23/10	15:10	None	
Mustang Creek @ East Ave	535XMCAEA	Sediment	Winter1	03/23/10	15:10	None	Pesticides analyzed in toxic sediment only.
Mustang Creek @ East Ave	535XMCAEA	NM	Storm3	04/20/10	14:30	None	
Mustang Creek @ East Ave	535XMCAEA	NM	Irrigation1	05/18/10	13:25	Dry	
Mustang Creek @ East Ave	535XMCAEA	NM	Irrigation2	06/15/10	13:15	Dry	
Mustang Creek @ East Ave	535XMCAEA	NM	Irrigation3	07/20/10	15:20	Dry	
Mustang Creek @ East Ave	535XMCAEA	NM	Irrigation4	08/17/10	14:28	Dry	
Mustang Creek @ East Ave	535XMCAEA	NM	Irrigation5	09/14/10	16:01	Dry	
Mustang Creek @ East Ave	535XMCAEA	NM	Fall1	10/19/10	14:40	Dry	
Mustang Creek @ East Ave	535XMCAEA	NM	Fall2	11/16/10	12:45	Dry	
Mustang Creek @ East Ave	535XMCAEA	NM	Fall3	12/14/10	13:48	Dry	
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Storm1, Management Plan Monitoring	01/19/10	11:50	None	Discharge recorded as zero due to no measurable flow.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM	Storm1, Management Plan Monitoring	01/19/10	11:50	None	January MPM for *Selenastrum* toxicity; Discharge recorded as zero due to no measurable flow.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Storm2, Management Plan Monitoring	02/23/10	12:40	None	
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM	Storm2, Management Plan	02/23/10	12:40	None	February MPM for *Selenastrum* toxicity.

Station Name	Station Code	Monitoring Event	Season, Group	Sample Date	Sample Time	Failure Reason	Sample Comments
			Monitoring				
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Winter1	03/23/10	13:50	None	
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Storm3, Management Plan Monitoring	04/20/10	12:50	None	
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM	Storm3, Management Plan Monitoring	04/20/10	12:50	None	April MPM for *Selenastrum* toxicity.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Irrigation1, Management Plan Monitoring	05/18/10	12:10	None	
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM	Irrigation1, Management Plan Monitoring	05/18/10	12:10	None	May MPM for *Selenastrum* toxicity.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Irrigation2	06/15/10	12:20	None	Stagnant water; Discharge recorded as zero due to no measurable flow.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Irrigation3	07/20/10	14:30	None	Discharge recorded as zero due to no measurable flow.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Irrigation4, Management Plan Monitoring	08/17/10	13:20	None	
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM	Irrigation4, Management Plan Monitoring	08/17/10	13:20	None	August MPM for chlorpyrifos.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Irrigation5, Management Plan Monitoring	09/14/10	15:00	None	Discharge recorded as zero due to no measurable flow.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM	Irrigation5, Management Plan Monitoring	09/14/10	15:00	None	September MPM for *Ceriodaphnia* toxicity, *Hyalella* toxicity, and chlorpyrifos; Discharge recorded as zero due to no measurable flow; Pesticides analyzed in toxic sediment only.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Fall1	10/19/10	13:50	None	
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Fall2	11/16/10	10:20	None	
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Fall3	12/14/10	13:10	None	

MPM-Management Plan Monitoring
NM-Normal Monitoring
SED-Sediment Monitoring Event
COC-Chain of Custody form

SAMPLING AND ANALYTICAL METHODS

On October 20, 2010, the ESJWQC submitted an amended copy of its Monitoring Reporting and Program Plan (MRPP) to the Regional Board which included changes and updates that had occurred over the two year period since the original MRPP approval in September 2008. Revisions to the MRPP consisted of updates to sample sites, monitoring strategy and constituents, laboratory methods, quality control limits, Standard Operating Procedures (SOPs), and corrections of previous typos. The revisions do not change the overall monitoring strategy of the ESJWQC MRPP and therefore the amended MRPP maintains compliance with MRP Order No. R5-2008-0005 and was approved by the Regional Board on February 23, 2011.

Sample collection procedures and field instruments are provided in Tables 13 and Table 14, respectively. Site-specific discharge methods are provided in Table 15, and analytical methods and reporting limits (RLs) are provided in Table 16. Beginning with the May 2009 sampling event, the Coalition omitted Total Kjeldahl Nitrogen and orthophosphate from its monitoring program. At the same time, the ESJWQC omitted metals not applied by agriculture (arsenic, cadmium, lead, and molybdenum), sediment bound pesticides (glyphosate, paraquat dichloride), and organochlorine pesticides no longer applied by agriculture (including Group A pesticides) except for sampling once a year during a high total suspended solids sampling event. The Coalition resumed sampling for the above mentioned constituents at the request of the Regional Board starting July 2010 and continuing through December 2010.

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

Table 13. Sampling procedures, containers, sample volumes, preservation and storage techniques, and holding times.

Analytical Parameter	Sample Volume[1]	Sample Container	Initial Preservation/Holding Requirements	Holding Time[2]
Physical Parameters[3]				
Total Dissolved Solids	500 mL	1x 2000 mL Polyethylene	Store at 4°C	7 Days
Total Suspended Solids	500 mL			7 Days
Turbidity	150 mL			48 Hours
Nutrients				
Soluble Orthophosphate[4]	1 L	1x 2000 mL Polyethylene	Store at 4°C	48 Hours
TKN[4], Ammonia, Total Phosphorus, Nitrate-Nitrite as N	500 mL	1x 500 mL Polyethylene	Preserve to ≤pH 2 with H_2SO_4, store at 4°C	28 Days
Metals/Trace Elements				
Metals/Trace Elements, Hardness[5]	500 mL	1x 500 mL Polyethylene	Filter as necessary; preserve to ≤pH 2 with HNO_3, store at 4°C	180 Days
Drinking Water				
E. coli (pathogens)	100 mL	1x 100 mL	Store at 4°C	24 Hours

Analytical Parameter	Sample Volume[1]	Sample Container	Initial Preservation/Holding Requirements	Holding Time[2]
		Polyethylene		
Total Organic Carbon	120 mL	3x 40 mL Amber glass VOA with PTFE-lined cap	Preserve with HCl, store at 4°C	28 Days
Pesticides				
Carbamates	1 L	1 L Amber Glass	Store at 4°C; extract within 7 days	40 Days
Organochlorines[6]	1 L	1 L Amber Glass	Store at 4°C; extract within 7 days	40 Days
Organophosphates	1 L	1 L Amber Glass	Store at 4°C; extract within 7 days	40 Days
Herbicides (general)	1 L	1 L Amber Glass	Store at 4°C; extract within 7 days	40 Days
Herbicides (paraquat dichloride)[6]	1 L	1x 1 L brown Polyethylene	Store at 4°C; extract within 7 days	21 days
Herbicides (glyphosate)[6]	80 mL	2x 40 mL Glass VOA	Store at 4°C; freeze (-20°C) within 2 weeks	6 Months
Water Column Toxicity				
Aquatic Toxicity	5 Gallons	5x 1 Gallon Amber Glass	Store at 4°C	36 Hours
Sediment				
Sediment Toxicity	2 L	2x 1 L Glass	Store at 4°C, do not freeze	14 Days
Sediment Grain Size	250 mL	1x 250 mL Glass	Store at 4°C, do not freeze	28 days
Sediment Total Organic Carbon	250 mL	1x 250 mL Glass	Store at 4°C, freeze (-20°C) within 48 hours	12 Months
Sediment Chemistry	1 L	4x 250 mL Amber Glass	Store at 4°C, freeze (-20°C) within 48 hours	12 Months
Sediment Total Solids	250 mL	1x 250 mL Glass	Store at 4°C	7 Days

[1] Additional volumes may be required for QC analyses.
[2] Holding time after initial preservation or extraction.
[3] Volume of water necessary to analyze the physical parameters is typically combined in multiple 1L polyethylene bottles.
[4] Constituents sampled through April 2009; after this date, no longer sampled until sampling was resumed July 2010.
[5] To include arsenic, boron, cadmium, copper, lead, nickel, molybdenum, selenium, and zinc; arsenic, cadmium, lead, and molybdenum were sampled through April 2009; after this date, only sampled for during storm events until sampling for these constituents resumed July 2010.
[6] Constituents sampled through April 2009; after this date, only sampled once per year during a high TSS event until sampling for these constituents resumed July 2010.

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

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

Table 15. Site specific discharge methods.

SITE	DISCHARGE METHOD	METER/ GAUGE
Ash Slough @ Ave 21	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Bear Creek @ Kibby Rd	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 @ Oakdale Ave	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 Ave	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Howard Lateral @ Hwy 140	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Lateral 2 1/2 near Keyes Rd	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)
Miles Creek @ Reilly Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Mootz Drain downstream of Langworth Pond	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Mustang Creek @ East Ave	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Prairie Flower Drain @ Crows Landing	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000

Table 16. Field and Laboratory Analytical Methods.

Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Physical Parameters					
Flow	Fresh Water	Field Measure	1 cfs	NA	USGS R2Cross Streamflow Method
pH	Fresh Water	Field Measure	0.1 pH units	NA	EPA 150.1
Electrical Conductivity	Fresh Water	Field Measure	100 µmhos/cm	NA	EPA 120.1
Dissolved oxygen	Fresh Water	Field Measure	0.1 mg/L	NA	SM 4500-O
Temperature	Fresh Water	Field Measure	0.1 °C	NA	SM 2550
Turbidity	Fresh Water	Caltest	0.05 NTU	0.030 NTU	EPA 180.1
Total Dissolved Solids	Fresh Water	Caltest	10 mg/L	4.0 mg/L	SM 2540C
Total Suspended Solids	Fresh Water	Caltest	3 mg/L	2.0 mg/L	SM 2540D
Hardness	Fresh Water	Caltest	5 mg/L	1.7 mg/L	SM2340C
Total Organic Carbon	Fresh Water	Caltest	0.5 mg/L	0.10 mg/L	EPA 415.1
Pathogens					
Escherichia coli	Fresh Water	Caltest	1 MPN/ 100 mL	1.0 MPN/ 100 mL	SM 9223
Toxicity					
Water Column Toxicity	Fresh Water	AQUA-Science	NA	NA	EPA 821-R-02-012
	Fresh Water	AQUA-Science	NA	NA	EPA 821-R-02-013
Sediment Toxicity	Sediment	AQUA-Science	NA	NA	EPA 600/R-99-064
Carbamates					
Aldicarb	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
Carbaryl	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A
Carbofuran	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A
Methiocarb	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
Methomyl	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A
Oxamyl	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
Organochlorines					
DDD[1]	Fresh Water	APPL Inc	0.01 µg/L	0.003 µg/L	EPA 8081A
DDE[1]	Fresh Water	APPL Inc	0.01 µg/L	0.004 µg/L	EPA 8081A
DDT[1]	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Dicofol[1]	Fresh Water	APPL Inc	0.1 µg/L	0.01 µg/L	EPA 8081A
Dieldrin[1]	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endrin[1]	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Methoxychlor[1]	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Group A Pesticides					
Aldrin[1]	Fresh Water	APPL Inc	0.01 µg/L	0.009 µg/L	EPA 8081A
Chlordane[1]	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Heptachlor[1]	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Heptachlor epoxide[1]	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
Hexachlorocyclohexane (alpha-BHC)	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Hexachlorocyclohexane (beta-BHC)[1]	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Hexachlorocyclohexane (gamma-BHC; Lindane)[1]	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Hexachlorocyclohexane (delta-BHC)[1]	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endosulfan I[1]	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
Endosulfan II[1]	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A

Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Toxaphene[1]	Fresh Water	APPL Inc	0.5 µg/L	0.380 µg/L	EPA 8081A
Organophosphates					
Azinphos-methyl	Fresh Water	APPL Inc	0.1 µg/L	0.02 µg/L	EPA 8141A
Chlorpyrifos	Fresh Water	APPL Inc	0.015 µg/L	0.0026 µg/L	EPA 8141A
Diazinon	Fresh Water	APPL Inc	0.02 µg/L	0.004 µg/L	EPA 8141A
Dichlorvos	Fresh Water	APPL Inc	0.1 µg/L	0.02 µg/L	EPA 8141A
Dimethoate	Fresh Water	APPL Inc	0.1 µg/L	0.08 µg/L	EPA 8141A
Demeton-s	Fresh Water	APPL Inc	0.1 µg/L	0.01 µg/L	EPA 8141A
Disulfoton	Fresh Water	APPL Inc	0.05 µg/L	0.02 µg/L	EPA 8141A
Malathion	Fresh Water	APPL Inc	0.1 µg/L	0.05 µg/L	EPA 8141A
Methamidiphos[4]	Fresh Water	APPL Inc	0.2 µg/L	0.08 µg/L	EPA 8321A
Methidathion	Fresh Water	APPL Inc	0.1 µg/L	0.04 µg/L	EPA 8141A
Parathion, methyl	Fresh Water	APPL Inc	0.1 µg/L	0.075 µg/L	EPA 8141A
Phorate	Fresh Water	APPL Inc	0.1 µg/L	0.07 µg/L	EPA 8141A
Phosmet	Fresh Water	APPL Inc	0.2 µg/L	0.06 µg/L	EPA 8141A
Herbicides					
Atrazine	Fresh Water	APPL Inc	0.5 µg/L	0.07 µg/L	EPA 619
Cyanazine	Fresh Water	APPL Inc	0.5 µg/L	0.09 µg/L	EPA 619
Diuron	Fresh Water	APPL Inc	0.4 µg/L	0.2 µg/L	EPA 8321A
Glyphosate[1]	Fresh Water	NCL Ltd	5 µg/L	2.77 µg/L	EPA 547M
Linuron	Fresh Water	APPL Inc	0.4 µg/L	0.2 µg/L	EPA 8321A
Paraquat dichloride[1]	Fresh Water	APPL Inc	0.5 µg/L	0.21 µg/L	EPA 549.2M
Simazine	Fresh Water	APPL Inc	0.5 µg/L	0.08 µg/L	EPA 619
Trifluralin	Fresh Water	APPL Inc	0.05 µg/L	0.036 µg/L	EPA 8141A
Metals					
Arsenic[1]	Fresh Water	Caltest	0.5 µg/L	0.008 µg/L	EPA 200.8 (ICPMS Collision Cell)
Boron	Fresh Water	Caltest	10 µg/L	0.47 µg/L	EPA 200.8 (ICPMS Collision Cell)
Cadmium[1]	Fresh Water	Caltest	0.1 µg/L	0.011 µg/L	EPA 200.8 (ICPMS Collision Cell)
Copper	Fresh Water	Caltest	0.5 µg/L	0.06 µg/L	EPA 200.8 (ICPMS Collision Cell)
Lead[1]	Fresh Water	Caltest	0.25 µg/L	0.071 µg/L	EPA 200.8 (ICPMS Collision Cell)
Molybdenum[1]	Fresh Water	Caltest	0.25 µg/L	0.016 µg/L	EPA 200.8 (ICPMS Collision Cell)
Nickel	Fresh Water	Caltest	0.5 µg/L	0.01 µg/L	EPA 200.8 (ICPMS Collision Cell)
Selenium	Fresh Water	Caltest	1 µg/L	0.06 µg/L	EPA 200.8 (ICPMS Reaction Cell)
Zinc	Fresh Water	Caltest	1 µg/L	0.8 µg/L	EPA 200.8 (ICPMS Collision Cell)
Nutrients					
Total Kjeldahl Nitrogen[1]	Fresh Water	Caltest	0.1mg/L	0.07 mg/L	EPA 351.3
Nitrate + Nitrite (as N)	Fresh Water	Caltest	0.05 mg/L	0.02 mg/L	EPA 353.2
Total Ammonia	Fresh Water	Caltest	0.1 mg/L	0.040 mg/L	EPA 350.2
Total Phosphorus	Fresh Water	Caltest	0.01 mg/L	0.01 mg/L	EPA 365.2
Soluble Orthophosphate[1]	Fresh Water	Caltest	0.01 mg/L	0.006 mg/L	EPA 365.2
Sediment					
Bifenthrin	Sediment	Caltest	0.33 µg/kg dw	0.1 µg/kg dw	GCIS/NCI/SIM[3]
Cyfluthrin	Sediment	Caltest	0.33 µg/kg dw	0.11 µg/kg dw	GCIS/NCI/SIM[3]
Cypermethrin	Sediment	Caltest	0.33 µg/kg dw	0.1 µg/kg dw	GCIS/NCI/SIM[3]
Deltamethrin: Tralomethrin	Sediment	Caltest	0.33 µg/kg dw	0.12 µg/kg dw	GCIS/NCI/SIM[3]
Esfenvalerate	Sediment	Caltest	0.33 µg/kg dw	0.13 µg/kg dw	GCIS/NCI/SIM[3]

Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Lambda-Cyhalothrin	Sediment	Caltest	0.33 µg/kg dw	0.06 µg/kg dw	GCIS/NCI/SIM[3]
Permethrin	Sediment	Caltest	0.33 µg/kg dw	0.11 µg/kg dw	GCIS/NCI/SIM[3]
Fenpropathrin	Sediment	Caltest	0.33 µg/kg dw	0.07 µg/kg dw	GCIS/NCI/SIM[3]
Chlorpyrifos	Sediment	Caltest	0.33 µg/kg dw	0.12 µg/kg dw	GCIS/NCI/SIM[3]
Total Solids	Sediment	Caltest	0.10%	0.10%	SM2540B
Total Organic Carbon	Sediment	Caltest[2]	200 mg/kg dw	100 mg/kg dw	Walkley Black
Grain Size	Sediment	Caltest[2]	1% sand, silt, clay, gravel	0.4 µm	ASTM D-422-63, ASTM D4464M-85

[1]Constituents dropped May 2009 were added back in starting July 2010.
[2] Subcontracted to PTS Laboratories.
[3] Method updated from EPA 8270 GCMS/SIM to a modified 8270 method, GCIS/NCI/SIM, starting April 2010.
[4] Method updated from 8141A to 8321A starting July 2010.
CFS-Cubic Feet per Second

PRECISION, ACCURACY AND COMPLETENESS

Normal surface water monitoring occurred twelve times from January 2010 through December 2010 for 12 sites with the following exceptions due to no water:

- Ash Slough @ Ave 21
  - Dry all sampling events except 4/20/10
- Cottonwood Creek @ Rd 20
  - Dry: 2/23/10, 3/23/10, 11/16/10, 12/14/10
- Duck Slough @ Gurr Rd
  - Dry: 12/14/10
- Highline Canal @ Hwy 99
  - Dry: 12/14/10
- Howard Lateral @ Hwy 140
  - Dry: 1/19/10, 2/23/10, 3/23/10, 11/16/10, 12/14/10
- Lateral 2 ½ near Keys Rd
  - Dry: 1/19/10, 2/23/10, 11/16/10, 12/14/10
- Mootz Drain @ Langworth Rd
  - Dry: 10/19/10, 11/16/10
- Mustang Creek @ East Ave
  - Dry: 5/18/10, 6/15/10, 7/20/10, 8/17/10, 9/14/10, 10/19/10, 11/16/10, 12/14/10

In May 2009, the ESJWQC dropped the following constituents from its monitoring program: metals not applied by agriculture (arsenic, cadmium, lead and molybdenum), sediment bound pesticides (glyphosate, paraquat dichloride), organochlorine pesticides no longer applied by agriculture (including Group A pesticides) along with a subset of nutrients (Total Kjeldahl Nitrogen and orthophosphate). In July 2010 the Regional Board requested the Coalition re-introduce the dropped constituents into the monitoring plan, pending the Regional Board's approval of the ESJWQC MRPP update request. All updates to the monitoring schedule are included in the ESJWQC MRPP and are referenced in the Monitoring Objectives and Design section of this report; approval of the requested changes to the MRPP is still pending.

Sediment sampling occurred twice during the 2010 sampling year: March 23, 2010 and September 14, 2010. No sites scheduled for sediment collection were dry.

During the 2010 winter and irrigation seasons, 13 MPM sites were sampled in addition to the normal monitoring sites as scheduled in the ESJWQC MPUR (submitted April 1, 2010). See Table 8 in the Monitoring Objectives and Design section for a list of all Management Plan sites. The following Management Plan sites were not sampled due to a lack of water:

- Cottonwood Creek @ Rd 20
  - Dry: 2/23/10
- Deadman Creek @ Hwy 59
  - Dry: 1/19/10

As required in the document “Irrigated Lands Regulatory Program General Procedures Sample Collection for Low Flow or No-Flow Conditions” the Coalition sampled both sediment and water under both no flow and low flow conditions. If a site had no flow, discharge was recorded as zero. If a water body had “puddle like conditions” the entire sample was flagged as “non contiguous”. All results including field parameters, chemistry and toxicity are therefore associated with the non contiguous flag and any water quality exceedances should be evaluated with the understanding that the water was not connected to a downstream water body.

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

- Cottonwood Creek @ Rd 20
    - 1/19/10, 6/15/10
- Deadman Creek @ Gurr Rd
    - 2/23/10, 3/23/10, 12/14/10
- Duck Slough @ Gurr Rd
    - 1/19/10
- Highline Canal @ Hwy 99
    - 1/19/10, 11/16/10
- Mootz Drain @ Langworth Rd
    - 3/23/10

CHEMISTRY

All results are tabulated in the Monitoring Results and Lab and Field Quality Control (QC) Results sections of this report (Appendix II and III). Each result is flagged if it does not meet data quality objectives (acceptability criteria) using Surface Water Ambient Monitoring Program (SWAMP) codes and can also be found in the SWAMP comparable database managed by the Coalition. The Coalition works with the Central Valley Regional Data Center (CVRDC) to ensure that all data remain SWAMP comparable and that all data are suitable to be uploaded to the California Environmental Data Exchange Network (CEDEN). A copy of the database has been submitted to the Regional Board with the hardcopy of this report. The database includes all data from 2010 sampling, except sediment pesticide analysis results, which has been submitted as an electronic data deliverable (EDD).

For some constituents the concentration of a constituent in the environmental sample may exceed the amount that the detector can detect and therefore requires a dilution. The result reported is the amount found in the diluted sample multiplied by the dilution factor to represent the amount of the analyte present in the original sample. The dilution factor is recorded and the reporting limit is generally 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 limit can be due to differing initial weights of the samples or varying dry weight (dw) results of the samples based on a calculated percent solids value.

Chemistry Completeness

The constituents sampled from January 2010 through December 2010 are listed by site in Tables 6 and 7. For normal and MPM, not including laboratory or field quality control samples, 42-53 carbamate, 16 organochlorine, 18-50 herbicide, 42-62 organophosphate, 14 Group A pesticides, 108 *E. coli*, 88-108 physical parameters, 50-108 nutrient, 18-82 dissolved and total metal samples, 10 sediment TOC samples, 10 sets of grain size samples, and one sediment sample for pesticide analysis were collected and analyzed during the 2010 sampling year (Table 17). There was 100% completeness for environmental samples collected for chemistry analyses except for organochlorines. Two sites sampled in July 2010 were scheduled to be analyzed for organochlorines but due to lab error this analysis did not take place resulting in an overall completeness of 99.6% for water chemistry and toxicity analysis.

There was 100% completeness for sediment toxicity and chemistry for normal monitoring samples and 100% completeness for sediment toxicity for MPM samples. Though not required, there was incomplete analysis of sediment chemistry for MPM samples for grain size and total organic carbon. Due to an internal miscommunication, MPM sites sampled in September due to past sediment toxicities were not originally scheduled for sediment total organic carbon, grain size or pesticide (pyrethroid and chlorpyrifos) analysis. One of the four MPM sites scheduled for *Hyalella* testing in September exhibited sediment toxicity and extra sediment was shipped from the toxicity laboratory to the chemistry laboratory to be analyzed for total organic carbon, grain size and pesticides. Since the remaining three sites had no sediment toxicity extra sediment was not shipped to the chemistry laboratory to be analyzed for grain size and total organic carbon.

For each sampling event, a field duplicate (FD) and field blank were collected. In addition, an equipment blank and travel blank were analyzed for dissolved metals and total metals, respectively, for each sampling event. Overall, field blanks and field duplicates comprised more than 5% of samples collected for each analyte. Field blanks and field duplicates each comprised 14-23% of organic samples, 9.1% of *E. coli* samples, 9.1-10.7% of physical parameter samples, 9.1-9.7% of nutrient samples, 9.4-17.1% of dissolved metals and 10.2-16.7% total metal samples. Equipment blanks comprised 10.3-17.1% of dissolved metal samples. Travel blanks comprised 10.2-16.7% of total metal samples (Table 17).

Batch Completeness

All chemistry batches were reviewed for quality assurance/control completeness. Six batches this sampling period were flagged as having incomplete quality control.

In July 2010, a single organophosphate batch was run without matrix spikes (MS) due to lab error. The batch duplicate was performed on the Laboratory Control Spike (LCS) meeting the requirements for precision.

Also in July 2010, a hardness batch was run without a lab duplicate. The MS and Matrix Spike Duplicate (MSD) were analyzed at different dilutions due to lab error; therefore the Relative Percent Difference (RPD) calculation for precision was not applicable. The MSD result was updated from a lab replicate of two to a sample replicate of two resulting in a sample duplicate rather than a laboratory duplicate.

Sediment total organic carbon batches analyzed in March 2010 and September 2010 were run without lab duplicates. In both cases the lab duplicate was missing due to laboratory error. A lab duplicate was also missing from the sediment grain size batch analyzed in September due to a laboratory error (this was the additional sediment shipped from the toxicity laboratory for a MPM sample).

In November 2010, a single *E. coli* environmental sample was submitted individually and due to the limited sample volume a lab duplicate was unable to be run in that batch.

Hold Time Compliance

Hold times for all chemistry analysis were met, except for two paraquat batches in October and November 2010, one methamidophos sample in October 2010, a single nitrate sample in December 2010, both sediment total organic carbon batches run in March and September 2010, one grain size batch in September and the single sediment pyrethroids batch run in September 2010. All samples have been flagged accordingly. Overall hold time compliance for all chemistry analysis was 99.3%.

Both paraquat batches were analyzed outside hold time due to laboratory analysis problems. Starting in October the chemistry laboratory noticed coelluting peaks during paraquat analysis and due to analytical instrument issues. The laboratory began working on replacing the columns and lines on the instrument as well as finding a new vendor for the SPE cartridges to better improve their extraction process in October. The October and November samples were extracted within hold time however the analysis hold time was missed by three days for the October samples and 13 days for the November samples. Quality control samples for both batches met acceptance criteria and November samples were re-injected to confirm original non-detects. December samples were extracted and analyzed within hold time however MS samples recovered low and samples were reinjected to confirm original non-detect results. The reported results are accurate and precise meeting method quality control criteria; it is likely that the analysis outside of hold time did not affect the amount of paraquat within the sample since the extraction hold times were met.

In October 2010, a methamidophos field blank was re-extracted and re-analyzed outside of hold time due to a failed surrogate; reanalysis confirmed the original results (non detect) with surrogate recoveries within acceptable criteria.

In December 2010 a single nitrite+nitrate sample was reanalyzed past hold time to confirm the original result (original sample analyzed within hold time).

The sediment total organic carbon batch analyzed in March 2010 was run one day past the 14 day hold time for un-frozen samples. The September 2010 sediment chemistry analyses (total organic carbon, grain size and sediment pesticides) were also all run outside of associated hold times due to an internal miscommunication regarding sediment chemistry analysis. Management Plan Monitoring sites were not originally scheduled for sediment chemistry analysis and samples were only collected for sediment toxicity. In September 2010, one of the four MPM sediment samples exhibited toxicity. Since sediment was not originally sent to the laboratory for chemistry analysis for these four sites, the extra sediment left over from the toxicity analysis was shipped to the chemistry laboratory for total organic carbon, grain size, and pesticide analysis. The extra un-frozen sediment was extracted past the 14-day (total organic carbon, pyrethroids) and 28-day (grain size) hold times, but was considered more representative of the original September sampling conditions than would be newly collected samples. Samples from another project were also sent from the toxicity laboratory (unfrozen) for chemistry analysis past hold time and compared to a frozen sample analyzed within hold times; although the results were different there was no evidence of pesticide degradation due to delayed extraction/analysis. Differences in the frozen versus unfrozen chemistry analysis are more likely a function of sediment heterogeneity rather than degradation of pesticides. Therefore, the results from the unfrozen sediment sample collected in September are considered accurate of the sediment chemistry potentially responsible for the *Hyalella* toxicity.

Chemistry Precision and Accuracy

A review of the number of samples analyzed and the percentage per analyte that meets acceptability criteria are listed in the tables following this section (Tables 17 through 30). A brief overview is provided below to assess overall precision and accuracy per analyte (all pesticides and metals are grouped and discussed together). Overall, precision and accuracy criteria were met for more than 90% of the samples for all analytes and all criteria.

Ammonia as N: 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

= $1/(10(pK_a\text{-}pH)+ 1$

pK_a = the temperature related equilibrium constant

= $0.0901821 + (2729.92/T_k)$

T_k = temperature in degrees Kelvin

= field temperature (°C) +273.2

pH = field pH

Ammonia and calculated unionized ammonia results can be found in Table 6 in Appendix II and Table 9 in Appendix III.

One hundred percent of field blanks met acceptability criteria. Ninety-two percent of field duplicates had RPDs below 25% (11 of 12). One hundred percent of laboratory blanks and LCSs met acceptability criteria. The MS and MSDs were run with each batch and 93.7% of MSs and 100% of MSDs met acceptability criteria.

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

Hardness: One hundred percent of hardness field blanks were below the reporting limit. Eighty-three percent of hardness field duplicates (10 of 12) met acceptability criteria. All laboratory blanks and LCSs met laboratory QC criteria. Sixty percent of MS met the acceptability criteria (18 of 30). Six MS/MSD pairs, two pairs of them were non project samples, recovered below the acceptability criteria (PR 80-120). Two pairs recovered low due to possible matrix interferences. Batch QC data based on LCS and RPD data. One hundred percent of MSDs met acceptability criteria for precision (RPD < 25).

Inorganic sediment (grain size and Total Organic Carbon): Sediment grain size and total organic carbon were analyzed for both sets of sediment samples collected during the 2010 sampling period (March 23 and September 14, 2010). Though not originally scheduled, TOC and grain size were analyzed for a September MPM site when the sediment sample exhibited toxicity.

The Coalition QAPP lists the acceptable limit criterion for grain size duplicates as RSD ≤ 20% where RSD is the relative standard deviation (SD). The RSD is traditionally defined as the standard deviation divided by the mean (equivalent to the Coefficient of Variation). The Coalition discussed with the sediment laboratory possible methods for evaluating sediment grain size precision, and it was agreed that evaluating the relative percent difference between grain size standard deviations of the environmental sample and the duplicate sample is the most suitable and accurate method for determining precision. Currently there is no standard method for evaluating grain size precision. Due to the nature of sediment and grain size analysis, results should be evaluated with the understanding that samples are not homogenous in grain size due to 1) settling of sediment within the sample container (affects laboratory duplicate precision) and 2) heterogeneity of the sediment in the field (affects field duplicate precision).

Individual grain size classes are reported as a percentage based on the composition of the entire sample and therefore are not values that can be evaluated individually (they are not independent from other percentages in the sample). Therefore it is more accurate to assess precision of the entire sample rather than each grain size class for both field and laboratory duplicates. The grain size standard deviation for all classes of a single sample was calculated using the following Folk and Ward (1957) Logarithmic equation:

$$SD = \sigma 1 = \frac{\Phi_{84} - \Phi_{16}}{4} + \frac{\Phi_{95} - \Phi_{5}}{6.6}$$

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

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

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

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

The criterion used in this report to assess precision for sediment grain size and sediment total organic carbon is RPD_{SD} ≤20%. The grain size field duplicate and laboratory duplicate RPD_{SD} were less than 20% (Table 30). One grain size batch RPD_{SD} could not be calculated since the batch was run without a lab duplicate.

One hundred percent of the sediment TOC lab blank samples had results less than the RL. Fifty percent (1 of 2) of the field duplicate samples and 100% of the lab duplicate samples were within acceptability criteria (RSD <20). Thirty-three percent (1 of 3) of the TOC certified reference materials were within acceptability criteria (PR 75-125). The laboratory CRM acceptability criteria varies in each of their reports and therefore the data are being evaluated based on the ILRP MRP acceptability requirement of 75-125%.

Metals (dissolved): Dissolved cadmium and lead were added back into the ESJWQC constituent sampling list in July 2010.

One hundred percent of dissolved metal field blanks met field precision 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.

Dissolved metal field duplicate samples met acceptability criteria (FD RPD < 25%) for 90% of the samples analyzed except for: cadmium (80%), lead (80%) and zinc (82%). The cadmium, lead and one of the zinc field duplicates outside of acceptability criteria were collected in November 2010 and analyzed in the same laboratory batch. The cadmium field duplicate and associated environmental samples were both below the reporting limit (estimated values) making it difficult to calculate field precision. The lead field duplicate and environmental sample were both slightly above the reporting limit of 0.25 µg/L (0.4 µg/L and 0.3 µg/L respectively); due to such low concentrations it is difficult to obtain field sampling precision of less than 25%. The zinc field duplicate and environmental samples were both above the RL. The total metal field duplicates and environmental samples collected at the same time had RPDs within acceptance criteria. The field sheets describe the sample site as having murky, brown colored water with no observed flow. It is possible that metals present in the sediment could have been mobilized in the water column while the samples were being collected resulting in slight differences between dissolved metals for these samples. Overall, field duplicate precision for all dissolved metals was 86%. The LCSs and MSs were within acceptable recovery limits for 100% of dissolved metals. All dissolved metal MSDs met acceptance criteria for precision.

Metals (total): Arsenic, cadmium, lead and molybdenum were added back into the ESJWQC constituent sampling list in July 2010.

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.

Field duplicates, except for total cadmium and total copper, met acceptability criteria (FD RPD < 25) for at least 90% of samples. It is most likely that the high RPD for the cadmium duplicate was due to the environmental and field duplicate results being below the reporting limit (estimated results). When detections are below the reporting limit it is difficult to maintain precision due to the limitation of the instrument quantification.

The two copper RPDs outside of acceptance limits had RPDs of 28% and 43.2%. Both pairs of field duplicate and environmental samples were above the reporting limit. The sample site associated with the high RPDs was characterized by a mud substrate, murky, brown water and very low flow. All field SOPs were followed including collecting the environmental and field duplicate samples at the same time next to one another in the water column. A water body that is not well mixed across the width of the channel can result in unequal concentrations of metals and pesticides. As the analyses involved total metals (no filtration in the field), elevated amounts of suspended sediment in the sample could account for the differences between the copper detected in the environmental and field duplicate samples.

The LCSs were within acceptable recovery limits for 100% of samples run. The MS recoveries were within control limits for 96% of all total metals samples analyzed. Total metals had 100% of MSDs samples meet the acceptability criteria for precision (RPD < 25%).

Nitrate + Nitrite as N: Ninety-two percent (11 of 12) of field blanks met acceptability criteria. The single field blank not meeting acceptability criteria (5.2 µg/L) had an associated environmental sample result above the reporting limit (1.3 µg/L). The laboratory checked the bottles for a potential labeling mix-up and no errors were found. The lab also checked the electrical conductivity of the samples and tested the nitrate levels with a "nitrate strip"; both confirmed the original results. Contamination in the field may be due to contamination of the field blank water, the field blank storage container, the field blank bottle, or contamination from the sampler. All sampling SOPs (which include the steps to prevent contamination presented in the total metals analysis section above) were followed. Other sources of contamination may have occurred during transport from the field to the laboratory (all bottles were closed tightly and only touched when being put in the cooler by the sampler and taken from the cooler by the laboratory with gloved hands) and/or during the laboratory extraction process.

Seventy-five percent of field duplicates had RPDs below 25% (9 of 12). Of the three instances of high RPDs, one of the field duplicate and associated environmental results slightly above the reporting limit, one field duplicate and associated environmental results were less than or equal to the reporting limit, and one of the instances involved an undiluted field duplicate result being compared to a diluted environmental result.

Laboratory blanks and LCSs were run with each batch and 100% of the samples met acceptance criteria. Ninety-seven percent of MS were within the acceptability criteria (31 of 32). The single MS recovered below criteria was due to possible matrix interferences. Ninety-three percent of MSDs met the acceptability requirement for precision.

Nitrogen, Total Kjeldahl (TKN): Total Kjeldahl Nitrogen was added back into the ESJWQC constituent sampling list in July 2010. From July -December 2010, 100% of field blanks met acceptance criteria. One hundred percent of field duplicates had RPDs below 25%. Lab blanks were run with every batch and 100% were less than the MDL. Laboratory control spikes were within acceptance criteria for all batches. Matrix spikes were performed in each batch with 85% meeting acceptability requirements (17 of 20). The MS/MSD pair below control limits was due to possible matrix interferences in the QC sample. A separate MSD was recovered below control limits as well, and in both cases the batch QC data was accepted based on LCS and RPD results. One hundred percent of MS duplicates met the requirements for precision.

Orthophosphate as P: Orthophosphate was added back into the ESJWQC constituent sampling in July 2010. From July-December 2010 one hundred percent of field blanks and field duplicates collected met acceptance criteria. Lab blanks were run with every batch and 100% were less than the reporting limit. The LCSs were within acceptability criteria for all batches. The MS were performed in each batch with 86% (12 of 14) meeting acceptability criteria. The MS/MSD pair recovered below control limits, but the batch LCS and MS RPD met the requirements for accuracy and precision. One hundred percent of MSDs met the requirements of precision.

Pesticides: Pesticides were analyzed in eight different groups: organochlorines (EPA 8081A), Group A pesticides (EPA 8081A), organophosphates (EPA 8141A), carbamates (EPA 8321A), methamidophos (EPA 8141A January-June 2010, EPA 8321A July-December 2010), paraquat (EPA 549.2), glyphosate (EPA 547M) and triazines (EPA 619). Starting in July 2010 four groups of pesticides were added back into the ESJWQC constituent sampling list (organochlorines, Group A pesticides, glyphosate and paraquat). Field blanks were run with each batch and 100% met acceptability criteria except for Dichlorodiphenyldichloroethane (DDD; 83%, 5 of 6) and endrin (83%, 5 of 6). Both DDD and endrin field blanks exhibited detections in the same batch (0.11 µg/L and 0.026 µg/L respectively) and both environmental samples were non-detect. The samples were re-extracted and re-analyzed outside hold time and no target analytes were detected.

Lab blanks were run with each batch and 100% of the samples met acceptability criteria.

All field duplicates met acceptability criteria for at least 90% of the samples analyzed except for glyphosate (5 of 6). The RPD outside the acceptance limits for glyphosate was 31.75%, with the environmental sample and field duplicate sample results both above the RL. The laboratory confirmed both sample results on a second column.

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 95.9% of all samples analyzed. The organophosphate and triazine surrogates were all below control limits for the March 2010 samples from Deadman Creek @ Gurr Rd due to matrix interference caused by something that was not part of the normal organphosphate scan. The field sheet indicated the site smelled like manure, the water was black in color, and the associated toxicity tests had complete mortality for all species due to high ammonia. Due to the extent of the low surrogate recoveries the samples were not re-extracted. All batches with laboratory QC analyses outside of acceptability criteria have been flagged in addition to the specific sample acceptability criteria. When a surrogate is recovered outside of the acceptability criteria, the associated environmental sample is flagged as well. Batches are approved by evaluating all measures of precision and accuracy 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.

The MS and LCSs were performed for each batch to assess accuracy as well as possible matrix interference. Either a MSD and/or a Laboratory Control Spike Duplicate (LCSD) were performed per batch to assess precision. Ninety-six percent of MS samples run were within acceptability criteria. The individual pesticides with less than 90% of samples within acceptable recoveries for MSs include paraquat (71.43%), demeton (83.3%), and malathion (87.5%). Two pairs of MS/MSD were below the control limit for paraquat (PR 51-144). All environmental samples were non-detect, and the MS/MSD were re-extracted and re-analyzed with acceptable recoveries. One pair of MS/MSD was above control limits (PR 40-125) for demeton, while the other MS/MSD pair was below the control limits. All associated environmental samples were non-detect, and all had LCS samples within acceptability range. A single malathion MS sample recovered above control limits, and an MS/MSD pair recovered below control limits. In both cases the remaining QC samples in the batch were within acceptable recovery ranges, and all environmental samples were non-detect. All LCS samples met the acceptability criteria for at least 90% of the samples analyzed.

Laboratory precision assessed by the RPD of laboratory duplicates, met acceptability criteria in 98.5% of matrix spike duplicates. The individual pesticides with less than 90% of samples within acceptable recoveries for matrix spike duplicates include paraquat 85.7% (6 of 7) and methamidophos run with the EPA 8321A method 85.7% (6 of 7). The single paraquat RPD above the QC limit was due to the very low recoveries of the MS/MSD in the batch (1.6% and 0% respectively). The samples were re-analyzed with acceptable recoveries. Methamidophos had an RPD above 25% in one batch. All other quality control measures in the batch met acceptance criteria and all environmental samples were non-detect. The LCSDs met acceptability criteria for precision in 88.8% of pesticide samples (8 of 9). Due to laboratory error a single methamidophos batch was run without MS/MSD, so a duplicate was performed on the LCS in order to meet the batch precision requirements. The LCS/LCSD RPD was above the acceptability criteria of 25%, but both LCS and LCSD recoveries were within range.

The Coalition supplies the laboratory with sufficient sample water to perform MS/MSDs for every 20 samples. Therefore, the laboratory will only perform a laboratory duplicate in a batch where there is no MSD. During the 2010 sampling year no lab duplicates were performed for pesticide batches.

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

Sediment Pesticides: Sediment pesticides were analyzed for any sediment sample that exhibited significant *Hyalella azteca* toxicity. One sample in September 2010 was tested for sediment pesticides. The sample was from a MPM site not originally scheduled for sediment chemistry analysis. Since sediment was not originally sent to the laboratory for pesticide analysis for this site, the extra sediment left over from the toxicity analysis was shipped to the chemistry laboratory for sediment pesticide testing.

Field duplicates were not analyzed for the single sediment pesticide batch. An MS and LCS were performed to assess accuracy for each pesticide analyzed. Eighty-nine percent of MSs met acceptance criteria. The individual pyrethroid with less than 90% of acceptable samples was cyhalothrin, 50% (0 of 2). The cyhalothrin MS/MSD pair was above control limits due to possible matrix effects. The associated RPD was also above the acceptable criteria but the LCS/LCSD RPD was acceptable. A single permethrin MS recovered above control limits, however the MSD recovered within acceptability criteria as did the LCS and LCSD.

Laboratory precision met acceptability criteria in 89% of MSDs and LCSDs. One cyhalothrin MS RPD and one permethrin LCS RPD were above the acceptance criteria (RPD < 25%). In the case of cyhalothrin the associated MS/MSD were above control limits. For permethrin, the LCS/LCSD had an RPD of 28% however the MS/MSD RPD was within acceptability criteria.

Surrogates were run for each sediment pesticide analysis. The laboratory is continuing to refine its extraction and analytical procedures regarding sediment pyrethroid analysis. Due to these refinements the lab has only recently had sufficient sample matrix data to generate control charts for their surrogate recoveries. The surrogate recoveries from the September sediment analyses have been evaluated using the laboratories internal recovery range of 30-180% which is a fairly common range for pesticides analyzed in sediment. Surrogate recoveries were within specific acceptance criteria for 100% of all samples analyzed.

Total Dissolved Solids (TDS): Field blanks met acceptability criteria in 92% of the samples analyzed (11 of 12). The lab blank result associated with the single field blank detection was non-detect. The laboratory checked the bottles for a potential labeling mix-up and no errors were found. The lab also checked the electrical conductivity of the samples and confirmed the original results for TDS in the field blank and associated environmental sample. Contamination in the field may be due to contamination of the field blank water, the field blank storage container, the field blank bottle, or contamination from the sampler. All sampling SOPs (which include the steps to prevent contamination presented in the total metals analysis section above) were followed. Other sources of contamination may have occurred during transport from the field to the laboratory (all bottles were closed tightly and only touched when being put in the cooler by the sampler and taken from the cooler by the laboratory with gloved hands) and/or during the laboratory extraction process.

One hundred percent of field duplicates had RPDs less than 25%. Lab blanks were run with every batch and met acceptance criteria for 100% of samples. The LCSs met acceptability criteria in 100% of the samples analyzed. One hundred percent of lab duplicates met the batch precision requirements, RPD < 25%. Matrix spikes are not performed for total dissolved solid analysis.

Total Organic Carbon (TOC): Ninety-two percent of field blanks met acceptability criteria (11 of 12). One hundred percent of field duplicates had RPDs less than 25%. Laboratory blanks and LCSs met acceptance criteria for 100% of the samples. One hundred percent of MS and MSDs performed met acceptability requirements.

Total Suspended Solids (TSS): One hundred percent of field blanks met acceptability criteria. Sixty-seven percent of field duplicates (8 of 12) had RPDs less than 25%. The four field duplicate RPDs greater than 25% ranged from 34.3% - 52.2%, and all field duplicate and associated environmental sample results were above the reporting limit (3 mg/L). All sampling SOPs were followed to ensure that field duplicates are collected at the same time and manner as the associated environmental sample. It is likely that the difference in total suspended solids results is due to heterogeneity of the water column, low flow and/or high turbidity. One hundred percent of lab blanks, LCSs and laboratory duplicates met acceptance criteria. Matrix spikes are not performed for total suspended solids.

Turbidity: One hundred percent of field blanks and 75% of field duplicates (9 of 12) met acceptability criteria. Field duplicates with RPDs greater than 25% were all diluted due to high concentrations of turbidity in the samples. It is likely that the difference in turbidity results between the environmental and field duplicate samples was due to high concentrations of turbidity as well as heterogeneity within the water column of the sampled water body. Laboratory blanks were run with every batch and 100% were less than the reporting limit. 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.

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 TIEs). Test acceptability requirements are documented in the method documents for each bioassay method and are included in the ESJWQC QAPP. In addition to the quality assurance (QA) requirements for the toxicity testing methods, a field duplicate must be collected with each sampling event or every 20 samples, whichever is more frequent. Field duplicates were collected every sampling event. The overall percentage of field duplicates are as follows: *Ceriodaphnia* 19%, *Pimephales* 19.4%, *Selenastrum* 15.6% and *Hyalella* 13.3%.

Water Column Toxicity: Field duplicates were collected during each monitoring event and were tested for toxicity to *Ceriodaphnia*, *Selenastrum* and *Pimephales* (Table 29). All three species had 100% of field duplicates within the acceptability criteria (RPD < 25%) except for *Selenastrum* (11 of 12 field duplicates had RPDs less than 25%). Neither the *Selenastrum* field duplicate or environmental sample associated with the high RPD (45.4%) exhibited significant toxicity compared to the control. All tests met holding time requirements (< 36 hours), water quality requirements and control requirements (as listed in the EPA method guidelines).

Sediment Toxicity: Sediment was collected on March 23, 2010 and September 14, 2010. Two field duplicates were collected and both had RPDs less than 25% (Table 29). One hundred percent of the sediment samples had laboratory control negatives within acceptability criteria. All sediment samples met holding time criteria.

Table 17. ESJWQC sample counts, field quality control counts and percentages.

Method	Analyte	Env. Samples (#)	Env. and Field QC Samples (#)	Field Blanks (#)	Field Blanks (%)	Field Dup. (#)	Field Dup. (%)	Equip. Blank (#)	Equip. Blank (%)	Travel Blank (#)	Travel Blank (%)
EPA 8321A CARB	Aldicarb	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8321A CARB	Carbaryl	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8321A CARB	Carbofuran	53	77	12	15.6%	12	15.6%		NA		NA
EPA 8321A CARB	Methiocarb	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8321A CARB	Methomyl	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8321A CARB	Oxamyl	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8321A CARB	Diuron	46	70	12	17.1%	12	17.1%		NA		NA
EPA 8321A CARB	Linuron	42	66	12	18.2%	12	18.2%		NA		NA
EPA 619	Atrazine	42	66	12	18.2%	12	18.2%		NA		NA
EPA 619	Cyanazine	50	74	12	16.2%	12	16.2%		NA		NA
EPA 619	Simazine	50	74	12	16.2%	12	16.2%		NA		NA
EPA 547M	Glyphosate	18	30	6	20%	6	20%		NA		NA
EPA 549.2M	Paraquat dichloride	18	30	6	20%	6	20%		NA		NA
EPA 8081A	DDD(p,p')	16	28	6	21.4%	6	21.4%		NA		NA
EPA 8081A	DDE(p,p')	16	28	6	21.4%	6	21.4%		NA		NA
EPA 8081A	DDT(p,p')	16	28	6	21.4%	6	21.4%		NA		NA
EPA 8081A	Dicofol	16	28	6	21.4%	6	21.4%		NA		NA
EPA 8081A	Dieldrin	16	28	6	21.4%	6	21.4%		NA		NA
EPA 8081A	Endrin	16	28	6	21.4%	6	21.4%		NA		NA
EPA 8081A	Methoxychlor	16	28	6	21.4%	6	21.4%		NA		NA
EPA 8081A	Aldrin	14	26	6	23.1%	6	23.1%		NA		NA
EPA 8081A	Chlordane	14	26	6	23.1%	6	23.1%		NA		NA
EPA 8081A	Heptachlor	14	26	6	23.1%	6	23.1%		NA		NA
EPA 8081A	Heptachlor epoxide	14	26	6	23.1%	6	23.1%		NA		NA
EPA 8081A	HCH, alpha	14	26	6	23.1%	6	23.1%		NA		NA
EPA 8081A	HCH, beta	14	26	6	23.1%	6	23.1%		NA		NA
EPA 8081A	HCH, delta	14	26	6	23.1%	6	23.1%		NA		NA
EPA 8081A	HCH, gamma	14	26	6	23.1%	6	23.1%		NA		NA
EPA 8081A	Endosulfan I	14	26	6	23.1%	6	23.1%		NA		NA
EPA 8081A	Endosulfan II	14	26	6	23.1%	6	23.1%		NA		NA
EPA 8081A	Toxaphene	14	26	6	23.1%	6	23.1%		NA		NA
EPA 8141A OP	Azinphos methyl	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8141A OP	Chlorpyrifos	62	86	12	14.0%	12	14.0%		NA		NA
EPA 8141A OP	Diazinon	43	67	12	17.9%	12	17.9%		NA		NA
EPA 8141A OP	Dichlorvos	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8141A OP	Dimethoate	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8141A OP	Demeton-s	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8141A OP	Disulfoton	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8141A OP	Malathion	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8141A OP	Methidathion	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8141A OP	Parathion, Methyl	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8141A OP	Phorate	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8141A OP	Phosmet	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8141A OP	Trifluralin	42	66	12	18.2%	12	18.2%		NA		NA
EPA 8141A OP	Methamidophos	27	39	6	15.4%	6	15.4%		NA		NA
EPA 8321A	Methamidophos	18	31	7	22.6%	6	19.4%		NA		NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	88	112	12	10.7%	12	10.7%		NA		NA
EPA 160.1	TDS	108	132	12	9.1%	12	9.1%		NA		NA
EPA 160.2	TSS	108	132	12	9.1%	12	9.1%		NA		NA
EPA 180.1	Turbidity	108	132	12	9.1%	12	9.1%		NA		NA
EPA 350.2	Ammonia as N	108	132	12	9.1%	12	9.1%		NA		NA

Method	Analyte	Env. Samples (#)	Env. and Field QC Samples (#)	Field Blanks (#)	Field Blanks (%)	Field Dup. (#)	Field Dup. (%)	Equip. Blank (#)	Equip. Blank (%)	Travel Blank (#)	Travel Blank (%)
EPA 351.3	Nitrogen, Total Kjeldahl	50	62	6	9.7%	6	9.7%		NA		NA
EPA 353.2	Nitrate+Nitrite as N	108	132	12	9.1%	12	9.1%		NA		NA
EPA 365.2	OrthoPhosphate as P	50	62	6	9.7%	6	9.7%		NA		NA
EPA 365.2	Phosphate as P	108	132	12	9.1%	12	9.1%		NA		NA
EPA 415.1	Total Organic Carbon	108	132	12	9.1%	12	9.1%		NA		NA
SM 9223	*E. coli*	108	132	12	9.1%	12	9.1%		NA		NA
EPA 200.8	Arsenic	18	36	6	16.7%	6	16.7%		NA	6	16.7%
EPA 200.8	Boron	42	78	12	15.4%	12	15.4%		NA	12	15.4%
EPA 200.8	Cadmium	18	36	6	16.7%	6	16.7%		NA	6	16.7%
EPA 200.8	Copper	82	118	12	10.2%	12	10.2%		NA	12	10.2%
EPA 200.8	Lead	30	48	6	12.5%	6	12.5%		NA	6	12.5%
EPA 200.8	Molybdenum	18	36	6	16.7%	6	16.7%		NA	6	16.7%
EPA 200.8	Nickel	42	78	12	15.4%	12	15.4%		NA	12	15.4%
EPA 200.8	Selenium	42	78	12	15.4%	12	15.4%		NA	12	15.4%
EPA 200.8	Zinc	42	78	12	15.4%	12	15.4%		NA	12	15.4%
EPA 200.8	Cadmium (Dissolved)	18	35	6	17.1%	5	14.3%	6	16.7%		NA
EPA 200.8	Copper (Dissolved)	82	117	12	10.3%	11	9.4%	12	10.3%		NA
EPA 200.8	Lead (Dissolved)	30	47	6	12.8%	5	10.6%	6	12.8%		NA
EPA 200.8	Nickel (Dissolved)	42	77	12	15.6%	11	14.3%	12	15.6%		NA
EPA 200.8	Zinc (Dissolved)	42	77	12	15.6%	11	14.3%	12	15.6%		NA
Walkley-Black	TOC (sediment)	10	2	NA		2	16.7%		NA		NA
EPA 8270M_NCI_SIM	Bifenthrin	1	0	NA		0	0%		NA		NA
EPA 8270M_NCI_SIM	Chlorpyrifos	1	0	NA		0	0%		NA		NA
EPA 8270M_NCI_SIM	Cyfluthrin	1	0	NA		0	0%		NA		NA
EPA 8270M_NCI_SIM	Cyhalothrin, lambda	1	0	NA		0	0%		NA		NA
EPA 8270M_NCI_SIM	Cypermethrin	1	0	NA		0	0%		NA		NA
EPA 8270M_NCI_SIM	Deltamethrin: Tralomethrin	1	0	NA		0	0%		NA		NA
EPA 8270M_NCI_SIM	Esfenvalerate/ Fenvalerate	1	0	NA		0	0%		NA		NA
EPA 8270M_NCI_SIM	Fenpropathrin	1	0	NA		0	0%		NA		NA
EPA 8270M_NCI_SIM	Permethrin	1	0	NA		0	0%		NA		NA

Table 18. ESJWQC summary of field blank quality control sample evaluations.

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)	6	6	100.00
EPA 549.2M	Paraquat dichloride	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	DDD(p,p')	<RL or < (env sample/5)	6	5	83.33
EPA 8081A	DDE(p,p')	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	DDT(p,p')	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	Dicofol	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	Dieldrin	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	Endrin	<RL or < (env sample/5)	6	5	83.33
EPA 8081A	Methoxychlor	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	Aldrin	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	Chlordane	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	Heptachlor	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	Heptachlor epoxide	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	HCH, alpha	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	HCH, beta	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	HCH, delta	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	HCH, gamma	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	Endosulfan I	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	Endosulfan II	<RL or < (env sample/5)	6	6	100.00
EPA 8081A	Toxaphene	<RL or < (env sample/5)	6	6	100.00
EPA 8141A OP	Azinphos methyl	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Chlorpyrifos	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Diazinon	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Dichlorvos	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Dimethoate	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Demeton-s	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Disulfoton	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Malathion	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Methidathion	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Parathion, Methyl	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Phorate	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Phosmet	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Trifluralin	<RL or < (env sample/5)	12	12	100.00
EPA 8141A OP	Methamidophos	<RL or < (env sample/5)	6	6	100.00
EPA 8321A	Methamidophos	<RL or < (env sample/5)	7	7	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL or < (env sample/5)	12	12	100.00

METHOD	ANALYTE	DATA QUALITY OBJECTIVE	NUMBER OF SAMPLES	SAMPLES WITHIN CONTROL LIMITS	PERCENT SAMPLES ACCEPTABLE
EPA 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)	6	6	100.00
EPA 353.2	Nitrate + Nitrite as N	<RL or < (env sample/5)	12	11	91.67
EPA 365.2	OrthoPhosphate as P	<RL or < (env sample/5)	6	6	100.00
EPA 365.2	Phosphate as P	<RL or < (env sample/5)	12	12	100.00
EPA 415.1	Total Organic Carbon	<RL or < (env sample/5)	12	11	91.67
SM 9223	*E. coli*	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Arsenic	<RL or < (env sample/5)	6	6	100.00
EPA 200.8	Boron	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Cadmium	<RL or < (env sample/5)	6	6	100.00
EPA 200.8	Copper	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Lead	<RL or < (env sample/5)	6	6	100.00
EPA 200.8	Molybdenum	<RL or < (env sample/5)	6	6	100.00
EPA 200.8	Nickel	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Selenium	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Zinc	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Cadmium (Dissolved)	<RL or < (env sample/5)	6	6	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)	6	6	100.00
EPA 200.8	Nickel (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Zinc (Dissolved)	<RL or < (env sample/5)	12	12	100.00
Walkley-Black	Total Organic Carbon (sediment)	NA			NA
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	NA			NA
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	NA			NA
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	NA			NA
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	NA			NA
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	NA			NA
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	NA			NA
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	NA			NA
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	NA			NA
EPA 8270M_NCI_SIM	Permethrin (sediment)	NA			NA
		TOTAL	**673**	**668**	**99.26**

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

METHOD	ANALYTE	DATA QUALITY OBJECTIVE	NUMBER OF SAMPLES	SAMPLES WITHIN CONTROL LIMITS	PERCENT SAMPLES ACCEPTABLE
EPA 200.8	Arsenic	<RL or < (env sample/5)	6	6	100.00
EPA 200.8	Boron	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Cadmium	<RL or < (env sample/5)	6	6	100.00
EPA 200.8	Copper	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Lead	<RL or < (env sample/5)	6	6	100.00
EPA 200.8	Molybdenum	<RL or < (env sample/5)	6	6	100.00
EPA 200.8	Nickel	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Selenium	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Zinc	<RL or < (env sample/5)	12	12	100.00
		TOTAL	**84**	**84**	**100.00**
EPA 200.8	Cadmium (Dissolved)	<RL or < (env sample/5)	6	6	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)	6	6	100.00
EPA 200.8	Nickel (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 200.8	Zinc (Dissolved)	<RL or < (env sample/5)	12	12	100.00
		TOTAL	**48**	**48**	**100.00**

Table 20. ESJWQC summary of field duplicate quality control sample evaluations.

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	6	5	83.33
EPA 549.2M	Paraquat dichloride	RPD ≤ 25	6	6	100.00
EPA 8081A	DDD(p,p')	RPD ≤ 25	6	6	100.00
EPA 8081A	DDE(p,p')	RPD ≤ 25	6	6	100.00
EPA 8081A	DDT(p,p')	RPD ≤ 25	6	6	100.00
EPA 8081A	Dicofol	RPD ≤ 25	6	6	100.00
EPA 8081A	Dieldrin	RPD ≤ 25	6	6	100.00
EPA 8081A	Endrin	RPD ≤ 25	6	6	100.00
EPA 8081A	Methoxychlor	RPD ≤ 25	6	6	100.00
EPA 8081A	Aldrin	RPD ≤ 25	6	6	100.00
EPA 8081A	Chlordane	RPD ≤ 25	6	6	100.00
EPA 8081A	Heptachlor	RPD ≤ 25	6	6	100.00
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	6	6	100.00
EPA 8081A	HCH, alpha	RPD ≤ 25	6	6	100.00
EPA 8081A	HCH, beta	RPD ≤ 25	6	6	100.00
EPA 8081A	HCH, delta	RPD ≤ 25	6	6	100.00
EPA 8081A	HCH, gamma	RPD ≤ 25	6	6	100.00
EPA 8081A	Endosulfan I	RPD ≤ 25	6	6	100.00
EPA 8081A	Endosulfan II	RPD ≤ 25	6	6	100.00
EPA 8081A	Toxaphene	RPD ≤ 25	6	6	100.00
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	12	11	91.67
EPA 8141A OP	Diazinon	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	12	11	91.67
EPA 8141A OP	Demeton-s	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	12	12	100.00
EPA 8141A OP	Methamidophos	RPD ≤ 25	6	6	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	6	6	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	12	10	83.33

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 160.1	Total Dissolved Solids	RPD ≤ 25	12	12	100.00
EPA 160.2	Total Suspended Solids	RPD ≤ 25	12	8	66.67
EPA 180.1	Turbidity	RPD ≤ 25	12	9	75.00
EPA 350.2	Ammonia as N	RPD ≤ 25	12	11	91.67
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25	6	6	100.00
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	12	9	75.00
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25	6	6	100.00
EPA 365.2	Phosphate as P	RPD ≤ 25	12	12	100.00
EPA 415.1	Total Organic Carbon	RPD ≤ 25	12	12	100.00
SM 9223	*E. coli*	Rlog ≤ 1.30	12	12	100.00
EPA 200.8	Arsenic	RPD ≤ 25	6	6	100.00
EPA 200.8	Boron	RPD ≤ 25	12	12	100.00
EPA 200.8	Cadmium	RPD ≤ 25	6	5	83.33
EPA 200.8	Copper	RPD ≤ 25	12	10	83.33
EPA 200.8	Lead	RPD ≤ 25	6	6	100.00
EPA 200.8	Molybdenum	RPD ≤ 25	6	6	100.00
EPA 200.8	Nickel	RPD ≤ 25	12	11	91.67
EPA 200.8	Selenium	RPD ≤ 25	12	11	91.67
EPA 200.8	Zinc	RPD ≤ 25	12	11	91.67
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25	5	4	80.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 25	11	10	90.91
EPA 200.8	Lead (Dissolved)	RPD ≤ 25	5	4	80.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	11	10	90.91
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	11	9	81.82
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20	2	1	50.00
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	RPD <25			NA
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	RPD <25			NA
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	RPD <25			NA
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	RPD <25			NA
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	RPD <25			NA
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	RPD <25			NA
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	RPD <25			NA
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	RPD <25			NA
EPA 8270M_NCI_SIM	Permethrin (sediment)	RPD <25			NA
		TOTAL	**669**	**640**	**95.67**

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

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	<RL	12	12	100.00
EPA 8321A CARB	Carbaryl	<RL	12	12	100.00
EPA 8321A CARB	Carbofuran	<RL	12	12	100.00
EPA 8321A CARB	Methiocarb	<RL	12	12	100.00
EPA 8321A CARB	Methomyl	<RL	12	12	100.00
EPA 8321A CARB	Oxamyl	<RL	12	12	100.00
EPA 8321A CARB	Diuron	<RL	12	12	100.00
EPA 8321A CARB	Linuron	<RL	12	12	100.00
EPA 619	Atrazine	<RL	12	12	100.00
EPA 619	Cyanazine	<RL	12	12	100.00
EPA 619	Simazine	<RL	12	12	100.00
EPA 547M	Glyphosate	<RL	6	6	100.00
EPA 549.2M	Paraquat dichloride	<RL	6	6	100.00
EPA 8081A	DDD(p,p')	<RL	6	6	100.00
EPA 8081A	DDE(p,p')	<RL	6	6	100.00
EPA 8081A	DDT(p,p')	<RL	6	6	100.00
EPA 8081A	Dicofol	<RL	6	6	100.00
EPA 8081A	Dieldrin	<RL	6	6	100.00
EPA 8081A	Endrin	<RL	6	6	100.00
EPA 8081A	Methoxychlor	<RL	6	6	100.00
EPA 8081A	Aldrin	<RL	6	6	100.00
EPA 8081A	Chlordane	<RL	6	6	100.00
EPA 8081A	Heptachlor	<RL	6	6	100.00
EPA 8081A	Heptachlor epoxide	<RL	6	6	100.00
EPA 8081A	HCH, alpha	<RL	6	6	100.00
EPA 8081A	HCH, beta	<RL	6	6	100.00
EPA 8081A	HCH, delta	<RL	6	6	100.00
EPA 8081A	HCH, gamma	<RL	6	6	100.00
EPA 8081A	Endosulfan I	<RL	6	6	100.00
EPA 8081A	Endosulfan II	<RL	6	6	100.00
EPA 8081A	Toxaphene	<RL	6	6	100.00
EPA 8141A OP	Azinphos methyl	<RL	12	12	100.00
EPA 8141A OP	Chlorpyrifos	<RL	12	12	100.00
EPA 8141A OP	Diazinon	<RL	12	12	100.00
EPA 8141A OP	Dichlorvos	<RL	12	12	100.00
EPA 8141A OP	Dimethoate	<RL	12	12	100.00
EPA 8141A OP	Demeton-s	<RL	12	12	100.00
EPA 8141A OP	Disulfoton	<RL	12	12	100.00
EPA 8141A OP	Malathion	<RL	12	12	100.00
EPA 8141A OP	Methidathion	<RL	12	12	100.00
EPA 8141A OP	Parathion, Methyl	<RL	12	12	100.00
EPA 8141A OP	Phorate	<RL	12	12	100.00
EPA 8141A OP	Phosmet	<RL	12	12	100.00
EPA 8141A OP	Trifluralin	<RL	12	12	100.00
EPA 8141A OP	Methamidophos	<RL	6	6	100.00
EPA 8321A	Methamidophos	<RL	8	8	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL	15	15	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 160.1	Total Dissolved Solids	<RL	14	14	100.00
EPA 160.2	Total Suspended Solids	<RL	14	14	100.00
EPA 180.1	Turbidity	<RL	15	15	100.00
EPA 350.2	Ammonia as N	<RL	16	16	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	<RL	10	10	100.00
EPA 353.2	Nitrate + Nitrite as N	<RL	16	16	100.00
EPA 365.2	OrthoPhosphate as P	<RL	7	7	100.00
EPA 365.2	Phosphate as P	<RL	12	12	100.00
EPA 415.1	Total Organic Carbon	<RL	18	18	100.00
SM 9223	*E. coli*	<RL	13	13	100.00
EPA 200.8	Arsenic	<RL	6	6	100.00
EPA 200.8	Boron	<RL	12	12	100.00
EPA 200.8	Cadmium	<RL	6	6	100.00
EPA 200.8	Copper	<RL	14	14	100.00
EPA 200.8	Lead	<RL	6	6	100.00
EPA 200.8	Molybdenum	<RL	6	6	100.00
EPA 200.8	Nickel	<RL	12	12	100.00
EPA 200.8	Selenium	<RL	12	12	100.00
EPA 200.8	Zinc	<RL	15	15	100.00
EPA 200.8	Cadmium (Dissolved)	<RL	6	6	100.00
EPA 200.8	Copper (Dissolved)	<RL	12	12	100.00
EPA 200.8	Lead (Dissolved)	<RL	6	6	100.00
EPA 200.8	Nickel (Dissolved)	<RL	12	12	100.00
EPA 200.8	Zinc (Dissolved)	<RL	13	13	100.00
Walkley-Black	Total Organic Carbon (sediment)	<RL	3	3	100.00
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	<RL	1	1	100.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	<RL	1	1	100.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	<RL	1	1	100.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	<RL	1	1	100.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	<RL	1	1	100.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	<RL	1	1	100.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	<RL	1	1	100.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	<RL	1	1	100.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	<RL	1	1	100.00
		TOTAL	**722**	**722**	**100.00**

Table 22. ESJWQC summary of LCS quality control sample evaluations.

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	12	12	100.00
EPA 619	Cyanazine	PR 22-172	12	12	100.00
EPA 619	Simazine	PR 21-179	12	12	100.00
EPA 547M	Glyphosate	PR 72-131	12	12	100.00
EPA 549.2M	Paraquat dichloride	PR 50-141	8	8	100.00
EPA 8081A	DDD(p,p')	PR 38-135	6	6	100.00
EPA 8081A	DDE(p,p')	PR 21-134	6	6	100.00
EPA 8081A	DDT(p,p')	PR 18-145	6	6	100.00
EPA 8081A	Dicofol	PR 40-135	6	6	100.00
EPA 8081A	Dieldrin	PR 48-121	6	6	100.00
EPA 8081A	Endrin	PR 24-143	6	6	100.00
EPA 8081A	Methoxychlor	PR 30-163	6	6	100.00
EPA 8081A	Aldrin	PR 11-138	6	6	100.00
EPA 8081A	Chlordane	PR 44-152	6	6	100.00
EPA 8081A	Heptachlor	PR 24-124	6	6	100.00
EPA 8081A	Heptachlor epoxide	PR 58-109	6	6	100.00
EPA 8081A	HCH, alpha	PR 33-111	6	6	100.00
EPA 8081A	HCH, beta	PR 49-119	6	6	100.00
EPA 8081A	HCH, delta	PR 12-97	6	6	100.00
EPA 8081A	HCH, gamma	PR 40-114	6	6	100.00
EPA 8081A	Endosulfan I	PR 50-131	6	6	100.00
EPA 8081A	Endosulfan II	PR 55-128	6	6	100.00
EPA 8081A	Toxaphene	PR 23-140	6	6	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	12	12	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	12	12	100.00
EPA 8141A OP	Diazinon	PR 57-130	12	12	100.00
EPA 8141A OP	Dichlorvos	PR 10-175	12	12	100.00
EPA 8141A OP	Dimethoate	PR 68-202	12	11	91.67
EPA 8141A OP	Demeton-s	PR 40-125	12	12	100.00
EPA 8141A OP	Disulfoton	PR 47-117	12	12	100.00
EPA 8141A OP	Malathion	PR 47-125	12	12	100.00
EPA 8141A OP	Methidathion	PR 50-150	12	12	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	12	12	100.00
EPA 8141A OP	Phorate	PR 44-117	12	12	100.00
EPA 8141A OP	Phosmet	PR 50-150	12	12	100.00
EPA 8141A OP	Trifluralin	PR 40-148	12	12	100.00
EPA 8141A OP	Methamidophos	PR 25-136	6	6	100.00
EPA 8321A	Methamidophos	PR 25-136	9	9	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	15	15	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 160.1	Total Dissolved Solids	PR 80-120	14	14	100.00
EPA 160.2	Total Suspended Solids	PR 80-120	14	14	100.00
EPA 180.1	Turbidity	PR 90-110	15	15	100.00
EPA 350.2	Ammonia as N	PR 80-120	16	16	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	PR 80-120	10	10	100.00
EPA 353.2	Nitrate + Nitrite as N	PR 80-120	16	16	100.00
EPA 365.2	OrthoPhosphate as P	PR 80-120	7	7	100.00
EPA 365.2	Phosphate as P	PR 80-120	12	12	100.00
EPA 415.1	Total Organic Carbon	PR 75-125	18	18	100.00
SM 9223	*E. coli*	NA			NA
EPA 200.8	Arsenic	PR 75-125	6	6	100.00
EPA 200.8	Boron	PR 75-125	12	12	100.00
EPA 200.8	Cadmium	PR 75-125	6	6	100.00
EPA 200.8	Copper	PR 75-125	14	14	100.00
EPA 200.8	Lead	PR 75-125	6	6	100.00
EPA 200.8	Molybdenum	PR 75-125	6	6	100.00
EPA 200.8	Nickel	PR 75-125	12	12	100.00
EPA 200.8	Selenium	PR 75-125	12	12	100.00
EPA 200.8	Zinc	PR 75-125	15	15	100.00
EPA 200.8	Cadmium (Dissolved)	PR 75-125	6	6	100.00
EPA 200.8	Copper (Dissolved)	PR 75-125	12	12	100.00
EPA 200.8	Lead (Dissolved)	PR 75-125	6	6	100.00
EPA 200.8	Nickel (Dissolved)	PR 75-125	12	12	100.00
EPA 200.8	Zinc (Dissolved)	PR 75-125	13	13	100.00
Walkley-Black	Total Organic Carbon (sediment)	PR 75-125	3	1	33.33
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	PR 10-160	2	2	100.00
		TOTAL	**727**	**724**	**99.59**

Table 23. ESJWQC summary of LCSD quality control sample evaluations.

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25			NA
EPA 8321A CARB	Carbaryl	RPD ≤ 25			NA
EPA 8321A CARB	Carbofuran	RPD ≤ 25			NA
EPA 8321A CARB	Methiocarb	RPD ≤ 25			NA
EPA 8321A CARB	Methomyl	RPD ≤ 25			NA
EPA 8321A CARB	Oxamyl	RPD ≤ 25			NA
EPA 8321A CARB	Diuron	RPD ≤ 25			NA
EPA 8321A CARB	Linuron	RPD ≤ 25			NA
EPA 619	Atrazine	RPD ≤ 25			NA
EPA 619	Cyanazine	RPD ≤ 25			NA
EPA 619	Simazine	RPD ≤ 25			NA
EPA 547M	Glyphosate	RPD ≤ 25	6	6	100.00
EPA 549.2M	Paraquat dichloride	RPD ≤ 25	2	2	100.00
EPA 8081A	DDD(p,p')	RPD ≤ 25			NA
EPA 8081A	DDE(p,p')	RPD ≤ 25			NA
EPA 8081A	DDT(p,p')	RPD ≤ 25			NA
EPA 8081A	Dicofol	RPD ≤ 25			NA
EPA 8081A	Dieldrin	RPD ≤ 25			NA
EPA 8081A	Endrin	RPD ≤ 25			NA
EPA 8081A	Methoxychlor	RPD ≤ 25			NA
EPA 8081A	Aldrin	RPD ≤ 25			NA
EPA 8081A	Chlordane	RPD ≤ 25			NA
EPA 8081A	Heptachlor	RPD ≤ 25			NA
EPA 8081A	Heptachlor epoxide	RPD ≤ 25			NA
EPA 8081A	HCH, alpha	RPD ≤ 25			NA
EPA 8081A	HCH, beta	RPD ≤ 25			NA
EPA 8081A	HCH, delta	RPD ≤ 25			NA
EPA 8081A	HCH, gamma	RPD ≤ 25			NA
EPA 8081A	Endosulfan I	RPD ≤ 25			NA
EPA 8081A	Endosulfan II	RPD ≤ 25			NA
EPA 8081A	Toxaphene	RPD ≤ 25			NA
EPA 8141A OP	Azinphos methyl	RPD ≤ 25			NA
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25			NA
EPA 8141A OP	Diazinon	RPD ≤ 25			NA
EPA 8141A OP	Dichlorvos	RPD ≤ 25			NA
EPA 8141A OP	Dimethoate	RPD ≤ 25			NA
EPA 8141A OP	Demeton-s	RPD ≤ 25			NA
EPA 8141A OP	Disulfoton	RPD ≤ 25			NA
EPA 8141A OP	Malathion	RPD ≤ 25			NA
EPA 8141A OP	Methidathion	RPD ≤ 25			NA
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25			NA
EPA 8141A OP	Phorate	RPD ≤ 25			NA
EPA 8141A OP	Phosmet	RPD ≤ 25			NA
EPA 8141A OP	Trifluralin	RPD ≤ 25			NA
EPA 8141A OP	Methamidophos	RPD ≤ 25			NA
EPA 8321A	Methamidophos	RPD ≤ 25	1	0	0.00
SM 2340 C	Hardness as $CaCO_3$ (Dissolved)	RPD ≤ 25			NA
EPA 160.1	Total Dissolved Solids	RPD ≤ 25			NA

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 160.2	Total Suspended Solids	RPD ≤ 25			NA
EPA 180.1	Turbidity	RPD ≤ 25			NA
EPA 350.2	Ammonia as N	RPD ≤ 25			NA
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25			NA
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25			NA
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25			NA
EPA 365.2	Phosphate as P	RPD ≤ 25			NA
EPA 415.1	Total Organic Carbon	RPD ≤ 25			NA
SM 9223	*E. coli*	RPD ≤ 25			NA
EPA 200.8	Arsenic	RPD ≤ 25			NA
EPA 200.8	Boron	RPD ≤ 25			NA
EPA 200.8	Cadmium	RPD ≤ 25			NA
EPA 200.8	Copper	RPD ≤ 25			NA
EPA 200.8	Lead	RPD ≤ 25			NA
EPA 200.8	Molybdenum	RPD ≤ 25			NA
EPA 200.8	Nickel	RPD ≤ 25			NA
EPA 200.8	Selenium	RPD ≤ 25			NA
EPA 200.8	Zinc	RPD ≤ 25			NA
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Copper (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Lead (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25			NA
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20			NA
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	RPD ≤ 25	1	1	100.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	RPD ≤ 25	1	0	0.00
		TOTAL	**18**	**16**	**88.89**

Table 24. ESJWQC summary of MS quality control sample evaluations. Non project MSs are included for batch completeness.

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	23	95.83
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	22	91.67
EPA 619	Atrazine	PR 39-156	24	23	95.83
EPA 619	Cyanazine	PR 22-172	24	24	100.00
EPA 619	Simazine	PR 21-179	24	24	100.00
EPA 547M	Glyphosate	PR 72-131	10	10	100.00
EPA 549.2M	Paraquat dichloride	PR 50-141	14	10	71.43
EPA 8081A	DDD(p,p')	PR 38-135	12	12	100.00
EPA 8081A	DDE(p,p')	PR 21-134	12	12	100.00
EPA 8081A	DDT(p,p')	PR 18-145	12	12	100.00
EPA 8081A	Dicofol	PR 40-135	12	12	100.00
EPA 8081A	Dieldrin	PR 48-121	12	12	100.00
EPA 8081A	Endrin	PR 24-143	12	12	100.00
EPA 8081A	Methoxychlor	PR 30-163	12	12	100.00
EPA 8081A	Aldin	PR 11-138	12	12	100.00
EPA 8081A	Chlordane	PR 44-152	12	12	100.00
EPA 8081A	Heptachlor	PR 24-124	12	12	100.00
EPA 8081A	Heptachlor epoxide	PR 58-109	12	12	100.00
EPA 8081A	HCH, alpha	PR 33-111	12	12	100.00
EPA 8081A	HCH, beta	PR 49-119	12	12	100.00
EPA 8081A	HCH, delta	PR 12-97	12	12	100.00
EPA 8081A	HCH, gamma	PR 40-114	12	12	100.00
EPA 8081A	Endosulfan I	PR 50-131	12	12	100.00
EPA 8081A	Endosulfan II	PR 55-128	12	12	100.00
EPA 8081A	Toxaphene	PR 23-140	12	12	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	24	23	95.83
EPA 8141A OP	Chlorpyrifos	PR 61-125	24	22	91.67
EPA 8141A OP	Diazinon	PR 57-130	24	22	91.67
EPA 8141A OP	Dichlorvos	PR 10-175	24	24	100.00
EPA 8141A OP	Dimethoate	PR 68-202	24	22	91.67
EPA 8141A OP	Demeton-s	PR 40-125	24	20	83.33
EPA 8141A OP	Disulfoton	PR 47-117	24	22	91.67
EPA 8141A OP	Malathion	PR 47-125	24	21	87.50
EPA 8141A OP	Methidathion	PR 50-150	24	22	91.67
EPA 8141A OP	Parathion, Methyl	PR 55-164	24	22	91.67
EPA 8141A OP	Phorate	PR 44-117	24	22	91.67
EPA 8141A OP	Phosmet	PR 50-150	24	22	91.67
EPA 8141A OP	Trifluralin	PR 40-148	24	24	100.00
EPA 8141A OP	Methamidophos	PR 25-136	12	12	100.00
EPA 8321A	Methamidophos	PR 25-136	14	14	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	30	18	60.00
EPA 160.1	Total Dissolved Solids	PR 80-120			NA
EPA 160.2	Total Suspended Solids	PR 80-120			NA
EPA 180.1	Turbidity	PR 90-110			NA
EPA 350.2	Ammonia as N	PR 80-120	32	30	93.75
EPA 351.3	Nitrogen, Total Kjeldahl	PR 80-120	20	17	85.00
EPA 353.2	Nitrate + Nitrite as N	PR 80-120	32	31	96.88
EPA 365.2	OrthoPhosphate as P	PR 80-120	14	12	85.71
EPA 365.2	Phosphate as P	PR 80-120	24	24	100.00
EPA 415.1	Total Organic Carbon	PR 75-125	36	36	100.00
SM 9223	*E. coli*	NA			NA
EPA 200.8	Arsenic	PR 75-125	12	12	100.00
EPA 200.8	Boron	PR 75-125	24	22	91.67
EPA 200.8	Cadmium	PR 75-125	12	12	100.00
EPA 200.8	Copper	PR 75-125	28	27	96.43
EPA 200.8	Lead	PR 75-125	12	12	100.00
EPA 200.8	Molybdenum	PR 75-125	12	12	100.00
EPA 200.8	Nickel	PR 75-125	24	24	100.00
EPA 200.8	Selenium	PR 75-125	26	24	92.31
EPA 200.8	Zinc	PR 75-125	32	31	96.88
EPA 200.8	Cadmium (Dissolved)	PR 75-125	12	12	100.00
EPA 200.8	Copper (Dissolved)	PR 75-125	24	24	100.00
EPA 200.8	Lead (Dissolved)	PR 75-125	12	12	100.00
EPA 200.8	Nickel (Dissolved)	PR 75-125	24	24	100.00
EPA 200.8	Zinc (Dissolved)	PR 75-125	26	26	100.00
Walkley-Black	Total Organic Carbon (sediment)	PR 75-125			NA
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	PR 10-160	2	0	0.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	PR 10-160	2	2	100.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	PR 10-160	2	2	100.00
		TOTAL	**1328**	**1268**	**95.48**

Table 25. ESJWQC summary of MSD quality control sample evaluations. Non project MSs are included for batch completeness.

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	11	91.67
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	11	91.67
EPA 619	Simazine	RPD ≤ 25	12	12	100.00
EPA 547M	Glyphosate	RPD ≤ 25	5	5	100.00
EPA 549.2M	Paraquat dichloride	RPD ≤ 25	7	6	85.71
EPA 8081A	DDD(p,p')	RPD ≤ 25	6	6	100.00
EPA 8081A	DDE(p,p')	RPD ≤ 25	6	6	100.00
EPA 8081A	DDT(p,p')	RPD ≤ 25	6	6	100.00
EPA 8081A	Dicofol	RPD ≤ 25	6	6	100.00
EPA 8081A	Dieldrin	RPD ≤ 25	6	6	100.00
EPA 8081A	Endrin	RPD ≤ 25	6	6	100.00
EPA 8081A	Methoxychlor	RPD ≤ 25	6	6	100.00
EPA 8081A	Aldrin	RPD ≤ 25	6	6	100.00
EPA 8081A	Chlordane	RPD ≤ 25	6	6	100.00
EPA 8081A	Heptachlor	RPD ≤ 25	6	6	100.00
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	6	6	100.00
EPA 8081A	HCH, alpha	RPD ≤ 25	6	6	100.00
EPA 8081A	HCH, beta	RPD ≤ 25	6	6	100.00
EPA 8081A	HCH, delta	RPD ≤ 25	6	6	100.00
EPA 8081A	HCH, gamma	RPD ≤ 25	6	6	100.00
EPA 8081A	Endosulfan I	RPD ≤ 25	6	6	100.00
EPA 8081A	Endosulfan II	RPD ≤ 25	6	6	100.00
EPA 8081A	Toxaphene	RPD ≤ 25	6	6	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	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	12	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	12	11	91.67
EPA 8141A OP	Methamidophos	RPD ≤ 25	6	6	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	7	6	85.71
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	14	14	100.00

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 160.1	Total Dissolved Solids	RPD ≤ 25			NA
EPA 160.2	Total Suspended Solids	RPD ≤ 25			NA
EPA 180.1	Turbidity	RPD ≤ 25			NA
EPA 350.2	Ammonia as N	RPD ≤ 25	16	16	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25	10	10	100.00
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	16	15	93.75
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25	7	7	100.00
EPA 365.2	Phosphate as P	RPD ≤ 25	12	12	100.00
EPA 415.1	Total Organic Carbon	RPD ≤ 25	18	18	100.00
SM 9223	*E. coli*	NA			NA
EPA 200.8	Arsenic	RPD ≤ 25	6	6	100.00
EPA 200.8	Boron	RPD ≤ 25	12	12	100.00
EPA 200.8	Cadmium	RPD ≤ 25	6	6	100.00
EPA 200.8	Copper	RPD ≤ 25	14	14	100.00
EPA 200.8	Lead	RPD ≤ 25	6	6	100.00
EPA 200.8	Molybdenum	RPD ≤ 25	6	6	100.00
EPA 200.8	Nickel	RPD ≤ 25	12	12	100.00
EPA 200.8	Selenium	RPD ≤ 25	13	13	100.00
EPA 200.8	Zinc	RPD ≤ 25	16	16	100.00
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25	6	6	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 25	6	6	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	12	12	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	13	13	100.00
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20			NA
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	RPD <25	1	0	0.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	RPD <25	1	1	100.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	RPD <25	1	1	100.00
		TOTAL	**663**	**655**	**98.79**

Table 26. ESJWQC summary of lab duplicate quality control sample evaluations. Non project MSs are included for batch completeness.

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

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25			NA
EPA 160.1	Total Dissolved Solids	RPD ≤ 25	14	14	100.00
EPA 160.2	Total Suspended Solids	RPD ≤ 25	14	14	100.00
EPA 180.1	Turbidity	RPD ≤ 25	15	15	100.00
EPA 350.2	Ammonia as N	RPD ≤ 25			NA
EPA 351.3	Nitrogen, Total Kjeldahl	RPD ≤ 25			NA
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25			NA
EPA 365.2	OrthoPhosphate as P	RPD ≤ 25			NA
EPA 365.2	Phosphate as P	RPD ≤ 25			NA
EPA 415.1	Total Organic Carbon	RPD ≤ 25			NA
SM 9223	*E. coli*	Rlog ≤ 1.3	12	12	100.00
EPA 200.8	Arsenic	RPD ≤ 25			NA
EPA 200.8	Boron	RPD ≤ 25			NA
EPA 200.8	Cadmium	RPD ≤ 25			NA
EPA 200.8	Copper	RPD ≤ 25			NA
EPA 200.8	Lead	RPD ≤ 25			NA
EPA 200.8	Molybdenum	RPD ≤ 25			NA
EPA 200.8	Nickel	RPD ≤ 25			NA
EPA 200.8	Selenium	RPD ≤ 25			NA
EPA 200.8	Zinc	RPD ≤ 25			NA
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Copper (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Lead (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25			NA
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25			NA
Walkley-Black	Total Organic Carbon (sediment)	RSD ≤ 20	1	1	100.00
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	RPD ≤ 25			NA
EPA 8270M_NCI_SIM	Permethrin (sediment)	RPD ≤ 25			NA
		TOTAL	**56**	**56**	**100.00**

Table 27. ESJWQC summary of surrogate recovery quality control sample evaluations. Surrogates were run with water samples collected and Laboratory Quality Assurance (LABQA) analyzed during the 2010 sampling year for all organics except paraquat and glyphosate; non project samples are included.

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	129	128	99.22
EPA 8321A	Diphenamid(Surrogate)	RPD ≤ 25; PR 70-130 (Jan-Nov 2010); PR 52-122 (Dec 2010)	62	51	82.26
EPA 619	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 62-145	122	118	96.72
EPA 619	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 54-144	122	118	96.72
EPA 8081A	Decachlorobiphenyl(Surrogate)	RPD ≤ 25; PR 16-146	62	62	100.00
EPA 8081A	Tetrachloro-m-xylene(Surrogate)	RPD ≤ 25; PR 15-98	62	62	100.00
EPA 8141A OP	Tributylphosphate(Surrogate)	RPD ≤ 25; PR 60-150	197	189	95.94
EPA 8141A OP	Triphenyl phosphate(Surrogate)	RPD ≤ 25; PR 56-129	197	186	94.42
EPA 8270M_NCI_SIM	Decachlorobiphenyl(Surrogate) sediment	RPD ≤ 25; PR 30-180	7	7	100.00
		TOTAL	**960**	**921**	**95.94**

Table 28. ESJWQC summary of holding time evaluations for environmental, field blank, field duplicate and MS samples.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	7 days	78	78	100.00
EPA 8321A CARB	Carbaryl	7 days	78	78	100.00
EPA 8321A CARB	Carbofuran	7 days	89	89	100.00
EPA 8321A CARB	Methiocarb	7 days	78	78	100.00
EPA 8321A CARB	Methomyl	7 days	78	78	100.00
EPA 8321A CARB	Oxamyl	7 days	78	78	100.00
EPA 8321A CARB	Diuron	7 days	82	82	100.00
EPA 8321A CARB	Linuron	7 days	78	78	100.00
EPA 619	Atrazine	7 days	78	78	100.00
EPA 619	Cyanazine	7 days	86	86	100.00
EPA 619	Simazine	7 days	86	86	100.00
EPA 547M	Glyphosate	14 days	35	35	100.00
EPA 549.2M	Paraquat dichloride	7 days	37	27	72.97
EPA 8081A	DDD(p,p')	7 days	34	34	100.00
EPA 8081A	DDE(p,p')	7 days	34	34	100.00
EPA 8081A	DDT(p,p')	7 days	34	34	100.00
EPA 8081A	Dicofol	7 days	34	34	100.00
EPA 8081A	Dieldrin	7 days	34	34	100.00
EPA 8081A	Endrin	7 days	34	34	100.00
EPA 8081A	Methoxychlor	7 days	34	34	100.00
EPA 8081A	Aldrin	7 days	32	32	100.00
EPA 8081A	Chlordane	7 days	32	32	100.00
EPA 8081A	Heptachlor	7 days	32	32	100.00
EPA 8081A	Heptachlor epoxide	7 days	32	32	100.00
EPA 8081A	HCH, alpha	7 days	32	32	100.00
EPA 8081A	HCH, beta	7 days	32	32	100.00
EPA 8081A	HCH, delta	7 days	32	32	100.00
EPA 8081A	HCH, gamma	7 days	32	32	100.00
EPA 8081A	Endosulfan I	7 days	32	32	100.00
EPA 8081A	Endosulfan II	7 days	32	32	100.00
EPA 8081A	Toxaphene	7 days	32	32	100.00
EPA 8141A OP	Azinphos methyl	7 days	78	78	100.00
EPA 8141A OP	Chlorpyrifos	7 days	98	98	100.00
EPA 8141A OP	Diazinon	7 days	79	79	100.00
EPA 8141A OP	Dichlorvos	7 days	78	78	100.00
EPA 8141A OP	Dimethoate	7 days	78	78	100.00
EPA 8141A OP	Demeton-s	7 days	78	78	100.00
EPA 8141A OP	Disulfoton	7 days	78	78	100.00
EPA 8141A OP	Malathion	7 days	78	78	100.00
EPA 8141A OP	Methidathion	7 days	78	78	100.00
EPA 8141A OP	Parathion, Methyl	7 days	78	78	100.00
EPA 8141A OP	Phorate	7 days	78	78	100.00
EPA 8141A OP	Phosmet	7 days	78	78	100.00
EPA 8141A OP	Trifluralin	7 days	78	78	100.00
EPA 8141A OP	Methamidophos	7 days	45	45	100.00
EPA 8321A	Methamidophos	7 days	38	36	94.74

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 2340 C	Hardness as CaCO3 (Dissolved)	6 months	126	126	100.00
EPA 160.1	Total Dissolved Solids	7 days	132	132	100.00
EPA 160.2	Total Suspended Solids	7 days	132	132	100.00
EPA 180.1	Turbidity	48 hours	132	132	100.00
EPA 350.2	Ammonia as N	Field acidify, 28 days	144	144	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	Field acidify, 28 days	68	68	100.00
EPA 353.2	Nitrate + Nitrite as N	Field acidify, 28 days	146	145	99.32
EPA 365.2	OrthoPhosphate as P	48 hours	69	69	100.00
EPA 365.2	Phosphate as P	Field acidify, 28 days	144	144	100.00
EPA 415.1	Total Organic Carbon	28 days	147	147	100.00
SM 9223	*E. coli*	24 hours	132	132	100.00
EPA 200.8	Arsenic	Field acidify, 6 months	42	42	100.00
EPA 200.8	Boron	Field acidify, 6 months	90	90	100.00
EPA 200.8	Cadmium	Field acidify, 6 months	42	42	100.00
EPA 200.8	Copper	Field acidify, 6 months	130	130	100.00
EPA 200.8	Lead	Field acidify, 6 months	54	54	100.00
EPA 200.8	Molybdenum	Field acidify, 6 months	42	42	100.00
EPA 200.8	Nickel	Field acidify, 6 months	90	90	100.00
EPA 200.8	Selenium	Field acidify, 6 months	90	90	100.00
EPA 200.8	Zinc	Field acidify, 6 months	90	90	100.00
EPA 200.8	Cadmium (Dissolved)	Field acidify, 6 months	41	41	100.00
EPA 200.8	Copper (Dissolved)	Field acidify, 6 months	129	129	100.00
EPA 200.8	Lead (Dissolved)	Field acidify, 6 months	53	53	100.00
EPA 200.8	Nickel (Dissolved)	Field acidify, 6 months	89	89	100.00
EPA 200.8	Zinc (Dissolved)	Field acidify, 6 months	89	89	100.00
Walkley-Black	Total Organic Carbon (sediment)	Not frozen, 2 days	12	0	0.00
EPA 8270M_NCI_SIM	Bifenthrin (sediment)	Not frozen, 2 days	1	0	0.00
EPA 8270M_NCI_SIM	Chlorpyrifos (sediment)	Not frozen, 2 days	1	0	0.00
EPA 8270M_NCI_SIM	Cyfluthrin (sediment)	Not frozen, 2 days	1	0	0.00
EPA 8270M_NCI_SIM	Cyhalothrin, lambda (sediment)	Not frozen, 2 days	1	0	0.00
EPA 8270M_NCI_SIM	Cypermethrin (sediment)	Not frozen, 2 days	1	0	0.00
EPA 8270M_NCI_SIM	Deltamethrin:Tralomethrin (sediment)	Not frozen, 2 days	1	0	0.00
EPA 8270M_NCI_SIM	Esfenvalerate/Fenvalerate (sediment)	Not frozen, 2 days	1	0	0.00
EPA 8270M_NCI_SIM	Fenpropathrin (sediment)	Not frozen, 2 days	1	0	0.00
EPA 8270M_NCI_SIM	Permethrin (sediment)	Not frozen, 2 days	1	0	0.00
		TOTAL	**5133**	**5099**	**99.34**

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

Method	Toxicity Species	Total Field Duplicate Samples	Data Quality Objective (DQO)	Total Field Duplicate Samples Within DQO	Percent Samples Within Acceptable Criteria
EPA 821/R-02-012	*Ceriodaphnia dubia*	12	RPD ≤ 25	12	100.00
EPA 821/R-02-012	*Pimephales promelas*	12	RPD ≤ 25	12	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	12	RPD ≤ 25	11	91.67
EPA 600/R-99-064	*Hyalella azteca*	2	RPD ≤ 25	2	100.00

Table 30. ESJWQC summary of calculated sediment grain size RPD_{SD} results. Batch calculations based on the relative percent difference between the standard deviation of the environmental samples and the standard deviation of their duplicate samples. The second September grain size batch was run without lab and field duplicates; therefore RPDs could not be calculated.

Sample Type	Analysis Month	Φ_5	Φ_{16}	Φ_{84}	Φ_{95}	SD	RPD_{SD}
Environmental Sample	March 2010	2.95	4.09	7.84	9.23	1.88	-
Lab Duplicate	March 2010	2.25	3.54	7.87	9.37	2.16	13.44
Field Duplicate	March 2010	1.66	3.05	7.63	9.12	2.27	18.55
Environmental Sample	September 2010	-0.56	0.05	6.19	8.1	2.84	-
Lab Duplicate	September 2010	-0.6	-0.01	6.08	7.81	2.79	1.17
Field Duplicate	September 2010	-0.54	0.13	6.12	7.82	2.76	2.95

Tables 4, 5 and 6 outline the constituents monitored from January through June and from July through December 2010. On May 15, 2009, the Coalition submitted to the Regional Board an amendment to its MRPP which included the following changes: 1) omission of TKN and orthophosphate and 2) reduction of monitoring for some metals and sediment bound pesticides to a single high total suspended solids event. As a result, the Coalition changed its monitoring program to reflect these requested changes. However, the Coalition resumed sampling for the above mentioned constituents at the request of the Regional Board starting July 2010.

The Coalition monitored all constituents as required in the MRP and outlined in the MRPP (Table 11, pages 69-71). At least 90% of samples collected in 2010 met data quality objectives for completeness, precision and accuracy. A discussion of all quality control is included in the Precision and Accuracy section of this report. All exceedances of WQTLs were reported within five business days upon receipt of lab results except for a pH exceedance that occurred in samples collected on February 23, 2010 (revised report sent on June 24, 2010) and an ammonia exceedance that occurred in the environmental and field duplicate samples collected on December 14, 2010 revised report sent on February 19, 2011; Appendix V).

Toxicity Identification Evaluations were performed on all samples when survival or growth was 50 percent or less compared to the control, except for one sample collected on March 23, 2010 at Deadman Creek (Dutchman) @ Gurr Rd. These samples tested toxic to both *Ceriodaphnia dubia* and *Pimephales promelas* resulting in 100% mortality to both species on the first day of the test. The laboratory was unable to stabilize the dissolved oxygen levels due to the extremely high ammonia and therefore a TIE could not be conducted on these samples. *Selenastrum capricornutum* toxicity tests could not be conducted due to extremely high levels of ammonia as the amount of pigment and suspended solids within the sample prohibited measurements of algae cells used to determine algae growth. It is assumed that there would have been no growth of algae in the sample water as a result of the high ammonia. A TIE report is included in Appendix VI.

Determining sources of WQTL exceedances of applied pesticides was made by reviewing PUR data. Pesticide Use Report data from January through November 2010 (Madera, Merced and Stanislaus counties) were available for review (Table 31). Any outstanding PUR data that become available after this report is submitted will be included in an addendum to the AMR on June 1, 2011.

Table 31. Status of PUR data associated with exceedances that occurred from January through December 2010.

COUNTY	2010 PUR DATA OBTAINED	2010 PUR DATA OUTSTANDING
Madera	January through November	December
Merced	January through November	December
Stanislaus	January through November	December

Coalition monitoring between January 1, 2010 and December 31, 2010 resulted in exceedances of WQTLs (Table 32) for dissolved oxygen, pH, specific conductivity, *E. coli*, total dissolved solids, ammonia, nitrate, arsenic, copper, chlorpyrifos and diuron. Water column toxicity to *Ceriodaphnia dubia,* *Pimephales promelas* and *Selenastrum capricornutum,* and sediment toxicity to *Hyalella azteca* also occurred. The next section summarizes all exceedance data.

Table 32. Water Quality Trigger Limits (WQTLs).

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
pH	6.5 - 8.5 units	Numeric		Sacramento/San Joaquin Rivers Basin Plan (page III.6.00)	1
Electrical Conductivity (maximum)	700 umhos/cm	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
Dissolved Oxygen (minimum)	7 mg/L	Numeric	Cold Freshwater Habitat, Spawning	Sacramento/San Joaquin Rivers Basin Plan. Water Quality Control Plan for the Tulare Lake Basin.	1
	5 mg/L		Warm Freshwater Habitat	Basin Plan Objective, page III-5.00: for waters designated WARM (aquatic life). Tulare Lake Basin Plan	
Turbidity	variable	Numeric	Municipal and Domestic Supply	Basin Plan Objective - increase varies based on natural turbidity	1
Total Dissolved Solids	450 mg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & 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				

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

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
Phorate	0.7 µg/L	Narrative	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: Drinking Water Health Advisories or Suggested No-Adverse-Response Levels for non-cancer health effects. USEPA IRIS Reference Dose 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
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

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

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
	15 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Molybdenum	15 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan - San Joaquin River, Mouth of the Merced River to Vernalis	1
	50 µg/L			Sacramento/San Joaquin Basin Plan - Salt Slough, Mud Slough (north), San Joaquin River from Sack Dam to the mouth of Merced River	
	10 µg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
	35 µg/L		Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Toxicity Objective: USEPA IRIS Reference Dose as a drinking water level.	
Nickel	For aquatic life variable (see Nickel worksheet).	Numeric	Freshwater Habitat	CTR Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
	100 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
Selenium	50 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: California Primary MCL (MUN, human health)	1
	5 µg/L (4-day average)	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: NTR Freshwater Aquatic Life Protection - Continuous Concentration - 4-Day Average	
Zinc	For aquatic life variable (see Zinc worksheet).	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average - varies with water hardness	1
Nutrients					
Nitrate as 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 WQO listed by reference such as MCLs (Page III-3.0)* , CTRs (Page III-10.1)*,
Category 2: Pesticides with discharge prohibitions. Prohibitions apply to any discharges not subject to board-approved management practices (Page IV-25.0)*.

Category 3: Constituent does not have numeric WQO, and does not have a primary MCL. WQ Trigger Limit exceedance is based on implementation of narrative objective. All detections should be tracked. None are default exceedances.
MUN-Municipal and Domestic Supply
NA-Not Available. 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 are included in Appendix V. If any errors occurred in the original communication of the exceedance to the Regional Board from the Coalition, an updated report was emailed to the Regional Board; all communications regarding updates are documented in Appendix V. All exceedances and a tally of all exceedances that occurred between January and December 2010 are listed by constituent in Tables 33 through 37. Tallies include subtotals for environmental sample exceedances, exceedances that occurred in samples collected from non contiguous water bodies and samples collected for MPM. Non contiguous water body exceedances have been flagged and are indicated separately because the water was not connected to a downstream water body. If a WQTL exceedance occurred in the environmental sample and the field duplicate sample, the result is counted only once.

Table 33. Exceedances of WQTLs for parameters measured in the field including dissolved oxygen, specific conductivity and pH.

Field parameters under a management plan are all classified as Priority E constituents and are monitored only as a part of normal monitoring (see Management Plan submitted September 30, 2008, Prioritization of Exceedances section).

Site Name	Sample Date	Season	DO, mg/L	pH, none	SC, µS/cm
Dry Creek @ Wellsford Rd	1/19/2010	Storm1	2.05		
Mustang Creek @ East Ave	1/19/2010	Storm1	5.22		856
Prairie Flower Drain @ Crows Landing Rd	1/19/2010	Storm1, NM, MPM			1837
Highline Canal @ Lombardy Rd	2/23/2010	Storm2, MPM		9.36	
Prairie Flower Drain @ Crows Landing Rd	2/23/2010	Storm2, NM, MPM			2833
Deadman Creek @ Gurr Rd	3/23/2010	Non Contiguous, Winter1	0.20		4023
Mootz Drain Downstream of Langworth Pond	3/23/2010	Non Contiguous, Winter1, NM, MPM	5.94		
Mustang Creek @ East Ave	3/23/2010	Winter1	3.87		877
Prairie Flower Drain @ Crows Landing Rd	3/23/2010	Winter1			2833
Cottonwood Creek @ Rd 20	4/20/2010	Storm3, NM, MPM	6.36		
Dry Creek @ Wellsford Rd	4/20/2010	Storm3, MPM	6.99		
Mootz Drain Downstream of Langworth Pond	4/20/2010	Storm3	6.54		
Prairie Flower Drain @ Crows Landing Rd	4/20/2010	Storm3, MPM			2399
Mootz Drain Downstream of Langworth Pond	5/18/2010	Irrigation1	6.30		
Prairie Flower Drain @ Crows Landing Rd	5/18/2010	Irrigation1, NM, MPM			2428
Deadman Creek @ Gurr Rd	6/15/2010	Irrigation2	4.56		
Dry Creek @ Wellsford Rd	6/15/2010	Irrigation2	5.77		
Mootz Drain Downstream of Langworth Pond	6/15/2010	Irrigation2	3.8		
Prairie Flower Drain @ Crows Landing Rd	6/15/2010	Irrigation2	4.25		2703
Cottonwood Creek @ Rd 20	7/20/2010	Irrigation3, NM, MPM	6.80		
Deadman Creek @ Gurr Rd	7/20/2010	Irrigation3	6.60		
Dry Creek @ Wellsford Rd	7/20/2010	Irrigation3, NM, MPM	6.30		
Duck Slough @ Gurr Rd	7/20/2010	Irrigation3, NM, MPM		5.41	
Howard Lateral @ Hwy 140	7/20/2010	Irrigation3		8.93	
Mootz Drain Downstream of Langworth Pond	7/20/2010	Irrigation3	4.24		
Prairie Flower Drain @ Crows Landing Rd	7/20/2010	Irrigation3			2556
Cottonwood Creek @ Rd 20	8/17/2010	Irrigation4, NM, MPM	6.04		
Deadman Creek @ Gurr Rd	8/17/2010	Irrigation4	6.77		
Dry Creek @ Wellsford Rd	8/17/2010	Irrigation4, NM, MPM	6.91		
Howard Lateral @ Hwy 140	8/17/2010	Irrigation4		9.05	
Mootz Drain Downstream of Langworth Pond	8/17/2010	Irrigation4	3.35		
Prairie Flower Drain @ Crows Landing Rd	8/17/2010	Irrigation4, NM, MPM			2776
Cottonwood Creek @ Rd 20	9/14/2010	Irrigation 5, Sed, NM, MPM	6.44		
Deadman Creek @ Gurr Rd	9/14/2010	Irrigation 5, Sed	6.82		
Howard Lateral @ Hwy 140	9/14/2010	Irrigation 5, Sed		9.28	
Mootz Drain Downstream of Langworth Pond	9/14/2010	Irrigation 5, Sed	4.68		

Site Name	Sample Date	Season	DO, mg/L	pH, none	SC, µS/cm
Dry Creek @ Wellsford Rd	10/19/2010	Fall1	6.01		
Prairie Flower Drain @ Crows Landing Rd	10/19/2010	Fall1			1795
Deadman Creek @ Gurr Rd	11/16/2010	Fall2	6.82		1547
Dry Creek @ Wellsford Rd	11/16/2010	Fall2	5.36	6.14	
Prairie Flower Drain @ Crows Landing Rd	11/16/2010	Fall2			2710
Deadman Creek @ Gurr Rd	12/14/2010	Fall3, Non Contiguous	5.20		
Mootz Drain Downstream of Langworth Pond	12/14/2010	Fall3	4.69		
Prairie Flower Drain @ Crows Landing Rd	12/14/2010	Fall3			2688
		Environmental Exceedances	**19**	**4**	**9**
		Non Contiguous Water Body Exceedances	**2**	**0**	**1**
		Management Plan Monitoring Exceedances[1]	**8**	**2**	**5**
		Total Exceedances	**29**	**6**	**15**

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

Table 34. Exceedances of WQTLs for *E. coli*, nutrients, metals and physical parameters (sorted by Station Name and Sample Date).
If a field duplicate and an environmental sample both have an exceedance, only the environmental sample exceedance is included in this table. If there is an exceedance in the field duplicate sample and not the environmental sample, this field duplicate result is included and is noted by (FD) at the end of the station name. Physical parameters under a management plan that are classified as Priority E constituents are monitored only as a part of normal monitoring and not counted toward Management Plan Monitoring Exceedances (see Management Plan submitted September 30, 2008, Prioritization of Exceedances section).

Site Name	Sample Date	Season	*E. coli*, MPN/100 mL	TDS, mg/L	Ammonia, mg/L	Nitrate + Nitrite, mg/L	Arsenic[1], µg/L	Copper Dissolved[2], µg/L (hardness based trigger limit)
Deadman Creek @ Gurr Rd	1/19/2010	Storm1	>2400					
Highline Canal @ Hwy 99	1/19/2010	Non Contiguous, Storm1, NM, MPM	1700					
Merced River @ Santa Fe Rd	1/19/2010	Storm1, NM, MPM	>2400					
Mootz Drain Downstream of Langworth Pond	1/19/2010	Storm1	>2400					
Mustang Creek @ East Ave	1/19/2010	Storm1	1000	570				
Prairie Flower Drain @ Crows Landing Rd	1/19/2010	Storm1, NM, MPM	2400	1300		43		
Deadman Creek @ Gurr Rd	2/23/2010	Storm2	370					
Highline Canal @ Hwy 99	2/23/2010	Storm2	790					
Highline Canal @ Lombardy Rd	2/23/2010	Storm2, MPM						16 (14.10)
Mootz Drain downstream of Langworth Pond	2/23/2010	Storm2	980					
Mustang Creek @ East Ave	2/23/2010	Storm2, NM, MPM	360					20 (17.57)
Prairie Flower Drain @ Crows Landing Rd	2/23/2010	Storm2, NM, MPM	440	1700		32		
Deadman Creek @ Gurr Rd	3/23/2010	Non Contiguous, Winter1	>2400	2100	155.4			
Mootz Drain Downstream of Langworth Pond	3/23/2010	Non Contiguous, Winter1, NM, MPM	520					
Mustang Creek @ East Ave	3/23/2010	Winter1		580				
Prairie Flower Drain @ Crows Landing Rd	3/23/2010	Winter1	1400	1700		31		
Ash Slough @ Ave 21	4/20/2010	Storm3						3.2 (1.67)
Cottonwood Creek @ Rd 20	4/20/2010	Storm3, NM, MPM						3.1 (2.17)
Deadman Creek @ Gurr Rd	4/20/2010	Storm3	280					
Dry Creek @ Wellsford Rd	4/20/2010	Storm3, MPM	2000					

Site Name	Sample Date	Season	*E. coli*, MPN/100 mL	TDS, mg/L	Ammonia, mg/L	Nitrate + Nitrite, mg/L	Arsenic[1], µg/L	Copper Dissolved[2], µg/L (hardness based trigger limit)
Howard Lateral @ Hwy 140	4/20/2010	Storm3						3.7 (2.65)
Merced River @ Santa Fe Rd	4/20/2010	Storm3	440					
Mootz Drain Downstream of Langworth Pond	4/20/2010	Storm3	1200					
Mustang Creek @ East Ave	4/20/2010	Storm3	>2400					
Prairie Flower Drain @ Crows Landing Rd	4/20/2010	Storm3, MPM	1300	1500		33		
Cottonwood Creek @ Rd 20	5/18/2010	Irrigation1, NM, MPM						3.6 (2.36)
Deadman Creek @ Gurr Rd (FD)	5/18/2010	Irrigation1	240					
Dry Creek @ Wellsford Rd	5/18/2010	Irrigation1	370					
Mootz Drain Downstream of Langworth Pond	5/18/2010	Irrigation1	>2400					
Prairie Flower Drain @ Crows Landing Rd	5/18/2010	Irrigation1, NM, MPM	460	1500		35		
Cottonwood Creek @ Rd 20	6/15/2010	Irrigation2, NM, MPM	2000					
Deadman Creek @ Gurr Rd (FD)	6/15/2010	Irrigation2	370					
Mootz Drain Downstream of Langworth Pond	6/15/2010	Irrigation2	>2400					
Prairie Flower Drain @ Crows Landing Rd	6/15/2010	Irrigation2	820	1600		29		
Deadman Creek @ Gurr Rd	7/20/2010	Irrigation3	580					
Dry Creek @ Wellsford Rd	7/20/2010	Irrigation3, NM, MPM	490					
Howard Lateral @ Hwy 140	7/20/2010	Irrigation3						3.1 (2.5)
Mootz Drain Downstream of Langworth Pond	7/20/2010	Irrigation3	>2400					
Prairie Flower Drain @ Crows Landing Rd	7/20/2010	Irrigation3	260	1500		26		
Cottonwood Creek @ Rd 20	8/17/2010	Irrigation4, NM, MPM						5.3 (4.9)
Dry Creek @ Wellsford Rd	8/17/2010	Irrigation4, NM, MPM	490					
Mootz Drain Downstream of Langworth Pond	8/17/2010	Irrigation4	820					
Prairie Flower Drain @ Crows Landing Rd	8/17/2010	Irrigation4, NM, MPM	870	1700		24		
Deadman Creek @ Gurr Rd	9/14/2010	Irrigation 5, Sed	360					
Mootz Drain Downstream of Langworth Pond	9/14/2010	Irrigation 5, Sed	>2400					

Site Name	Sample Date	Season	*E. coli*, MPN/100 mL	TDS, mg/L	Ammonia, mg/L	Nitrate + Nitrite, mg/L	Arsenic[1], µg/L	Copper Dissolved[2], µg/L (hardness based trigger limit)
Prairie Flower Drain @ Crows Landing Rd	9/14/2010	Irrigation 5, Sed, NM, MPM				12		
Cottonwood Creek @ Rd 20	10/19/2010	Fall1	290					
Deadman Creek @ Gurr Rd	10/19/2010	Fall1	340					
Dry Creek @ Wellsford Rd	10/19/2010	Fall1	370					
Duck Slough @ Gurr Rd	10/19/2010	Fall1	250					
Howard Lateral @ Hwy 140	10/19/2010	Fall1	280					
Prairie Flower Drain @ Crows Landing Rd	10/19/2010	Fall1	580	1100		20		
Deadman Creek @ Gurr Rd	11/16/2010	Fall2	>2400	840	31		14	
Dry Creek @ Wellsford Rd	11/16/2010	Fall2	390					
Prairie Flower Drain @ Crows Landing Rd	11/16/2010	Fall2	460	1700		42		
Deadman Creek @ Gurr Rd	12/14/2010	Fall3, Non Contiguous	>2400					
Prairie Flower Drain @ Crows Landing Rd	12/14/2010	Fall3	>2400	1700		40		
		Environmental Exceedances	**33**	**9**	**1**	**6**	**1**	**3**
		Non Contiguous Water Body Exceedances	**4**	**1**	**1**	**0**	**0**	**0**
		Management Plan Monitoring Exceedances[3]	**11**	**5**	**0**	**6**	**0**	**5**
		Total Exceedances	**48**	**15**	**2**	**12**	**1**	**8**

[1]Arsenic was omitted from normal monitoring in May 2009 (see Monitoring Objectives section) and added back in July 2010.
[2] If copper exceedance is the dissolved fraction of copper, the limit based on hardness is shown in parenthesis.
[3]Refers to monitoring for high priority management plan constituents at Assessment, Core and/or MPM locations.
FD – Field Duplicate
MPM – Management Plan Monitoring
NM-Normal monitoring
Sed-Sediment monitoring

Table 35. Exceedances of WQTLs for pesticides.
If a field duplicate and an environmental sample both have an exceedance, only the environmental sample exceedance is included in this table. If there is an exceedance in the field duplicate sample and not the environmental sample, this field duplicate result is included and is noted by (FD) at the end of the station name.

STATION NAME[1]	SAMPLE DATE	SEASON	CHLORPYRIFOS, µG/L	DIURON, µG/L
Cottonwood Creek @ Rd 20	1/19/2010	Non Contiguous, Storm1, NM, MPM	0.21	
Highline Canal @ Lombardy Rd	1/19/2010	Storm1, NM, MPM	0.016	
Deadman Creek @ Gurr Rd	3/23/2010	Non Contiguous, Winter1	0.14	
Deadman Creek @ Gurr Rd	4/20/2010	Storm3	0.018	
Lateral 2 ½ near Keyes Rd	4/20/2010	Storm3	0.076	
Howard Lateral @ Hwy 140	6/15/2010	Irrigation2	0.022	
Dry Creek @ Wellsford Rd	7/20/2010	Irrigation3, NM, MPM	0.067	
Lateral 2 ½ near Keyes Rd	7/20/2010	Irrigation3	0.061	
Deadman Creek @ Gurr Rd	8/17/2010	Irrigation4	0.024	
Mootz Drain downstream of Langworth Pond	12/14/2010	Fall3		2.7
		Environmental Exceedances	**5**	**1**
		Non Contiguous Water Body Exceedances	**1**	**0**
		Management Plan Monitoring Exceedances[1]	**3**	**0**
		Total Exceedances	**9**	**1**

[1]Refers to monitoring for high priority management plan constituents at Assessment, Core and/or MPM locations.
FD – Field Duplicate
MPM – Management Plan Monitoring
NM-Normal monitoring
Sed-Sediment monitoring

Table 36. Water column and sediment toxicity exceedance summary.
If a field duplicate and an environmental sample both have an exceedance, only the environmental sample exceedance is included in this table. If there is an exceedance in the field duplicate sample and not the environmental sample, this field duplicate result is included and is noted by (FD) at the end of the station name.

Station Name	Sample Date	Season	Species	Toxicity End Point	Mean	Percent Control	Toxicity Significance	Summary Comments
Prairie Flower Drain @ Crows Landing Rd	1/19/2010	Storm1, MPM	*S. capricornutum*	Total Cell Count (cells/ml)	390545	56	SL	
Deadman Creek (Dutchman) @ Gurr Rd	3/23/2010	Non Contiguous, Winter1	*C. dubia*	Survival (%)	0	0	SL	Total mortality on Day 1. No TIE conducted due to unstable DO levels and extremely high ammonia levels.
Deadman Creek (Dutchman) @ Gurr Rd	3/23/2010	Non Contiguous, Winter1	*P. promelas*	Survival (%)	0	0	SL	Total mortality on Day 1. No TIE conducted due to unstable DO levels and extremely high ammonia levels.
Duck Slough @ Gurr Rd	9/14/2010	Irrigation5, Sediment, MPM	*H. azteca*	Survival (%)	60	70	SL	Pyrethroids were detected in the associated chemistry sample.
Deadman Creek (Dutchman) @ Gurr Rd	11/16/2010	Fall2	*C. dubia*	Survival (%)	0	0	SL	Complete mortality on Day 1. A TIE was conducted on 11/19/10 and it was concluded that ammonia was the cause of toxicity.
Deadman Creek (Dutchman) @ Gurr Rd	11/16/2010	Fall2	*P. promelas*	Survival (%)	0	0	SL	Complete mortality on Day 1. A TIE was conducted on 11/19/10 and it was concluded that ammonia was the cause of toxicity.

MPM – Management Plan Monitoring
SL-Statistically significantly different from control; Less than 80% threshold

Table 37. Water column and sediment toxicity exceedance counts.

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

[1]Refers to monitoring for high priority management plan constituents at Assessment, Core or Management Plan Monitoring locations.

DISCUSSION OF EXCEEDANCES

Pesticide Use Report Data

Pesticide Use Report data are provided to the Coalition from each of the county Agricultural Commissioner's offices and are evaluated for applications most likely to contribute to exceedances. 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 then pesticides with a K_{oc} of 1600 or greater are considered relevant. If water toxicity occurs then pesticides with a K_{oc} below 1900 are evaluated. Most pesticides are queried for applications within 30 days prior to water sampling. Pyrethroid pesticides, due to their long half-life, are queried for applications made 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 38). If there were no applications within the specified time period, the PUR database was queried for applications an additional 30 days prior to the standard query period. Appendix IV includes tables and maps of all pesticide applications that are relevant to WQTL exceedances or toxicity. If the PUR data for any county were unattainable at the time of this report, a note is made in Appendix IV. Information regarding obtained and outstanding PUR is included in Table 31 in the Discussion of Results section of this report. Any outstanding PUR will be submitted in an addendum to the AMR on June 1, 2011.

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

Table 38. Pesticide use data collected for exceedances reported.

EXCEEDANCE TYPE	PESTICIDES USE DATA COLLECTED
Pesticides	1 month
Metals	3 months
Sediment Toxicity	3 months with 6 months for pyrethroids
Water Column Toxicity	1 month with 6 months for pyrethroids 3 months for metals

Exceedances that occurred from January through December 2010 are tabulated by zone in Tables 39 through 44. The following section discusses possible sources of WQTL exceedances that are due to pesticide applications. All exceedances are included in the Tables 39 through 44 are reference when discussing possible sources and contributing factors. An assessment of agricultural pesticide applications that are potential sources of the exceedances accompanies the Tables. All PUR data relevant to pesticide exceedances and toxicity are discussed based on the pounds (lbs) of active ingredient (AI) applied upstream of the sampling site. Measures taken to address these exceedances are described in the section Actions Taken to Address Water Quality Exceedances.

Table 39. Zone 1 (Dry Creek @ Wellsford Rd, Mootz Drain downstream of Langworth Pond) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	pH, none	*E. coli*, MPN/100 mL	Chlorpyrifos, µg/L	Diuron, µg/L
1	Dry Creek @ Wellsford Rd	NM	1/19/2010	2.05				
1	Dry Creek @ Wellsford Rd	MPM, NM	4/20/2010	6.99		2000		
1	Dry Creek @ Wellsford Rd	NM	5/18/2010			370		
1	Dry Creek @ Wellsford Rd	NM	6/15/2010	5.77				
1	Dry Creek @ Wellsford Rd	MPM, NM	7/20/2010	6.30		490	0.067	
1	Dry Creek @ Wellsford Rd	MPM, NM	8/17/2010	6.91		490		
1	Dry Creek @ Wellsford Rd	NM	10/19/2010	6.01				
1	Dry Creek @ Wellsford Rd	NM	11/16/2010	5.36	6.14			
1	Mootz Drain downstream of Langworth Pond	NM	1/19/2010			>2400		
1	Mootz Drain downstream of Langworth Pond	NM	2/23/2010			980		
1	Mootz Drain downstream of Langworth Pond	NM	3/23/2010	5.94		520		
1	Mootz Drain downstream of Langworth Pond	NM	4/20/2010	6.54		1200		
1	Mootz Drain downstream of Langworth Pond	NM	5/18/2010	6.30		>2400		
1	Mootz Drain downstream of Langworth Pond	NM	6/15/2010	3.80		>2400		
1	Mootz Drain downstream of Langworth Pond	NM	7/20/2010	4.24		>2400		
1	Mootz Drain downstream of Langworth Pond (FD)	NM	7/20/2010			>2400		
1	Mootz Drain downstream of Langworth Pond	NM	8/17/2010	3.35		820		
1	Mootz Drain downstream of Langworth Pond (FD)	NM	8/17/2010			610		
1	Mootz Drain downstream of Langworth Pond	NM	9/14/2010	4.68		>2400		
1	Mootz Drain downstream of Langworth Pond (FD)	NM	9/14/2010			>2400		
1	Mootz Drain downstream of Langworth Pond	NM	12/14/2010	4.69				2.7
1	Mootz Drain downstream of Langworth Pond (FD)	NM	12/14/2010					2.9

NM-Normal Monitoring
MPM-Management Plan Monitoring
DO-Dissolved Oxygen
FD-Field Duplicate

Physical Parameters, Total Dissolved Solids and E. coli

Exceedances of water quality objectives for pH, dissolved oxygen, and specific conductivity are difficult to track to sources. 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 sediment and can vary diurnally and seasonally. There were 15 exceedances of the WQTL for dissolved oxygen and one for pH in Zone 1 between January and December 2010.

E. coli inhabits the intestinal tracts of animals and is voided in fecal material. *E. coli* may persist in the presence of oxygen in the environment for periods of time after being voided. The bacteria are also known to reproduce and magnify in the environment. However, conditions under which this occurs are not well understood and require additional research to fully understand. Any species of vertebrate that voids feces can contribute *E. coli* to surface waters. Consequently, there may be a large amount of bacteria in any environmental sample that is collected. There were 13 exceedances of the WQTL for *E. coli* in Zone 1 between January and December 2010.

Chlorpyrifos

Chlorpyrifos is an organophosphate pesticide applied for pest control on alfalfa, grapes, and deciduous orchards, among other crops in California. In a water body, chlorpyrifos can both bind to sediment and remain in the water column (K_{oc} of 6070). The lethal concentration at 50% mortality (LC_{50}) for chlorpyrifos to *Ceriodaphnia dubia* is 0.055 µg/L. There was one exceedance of the WQTL for chlorpyrifos experienced in Zone 1 between January and December 2010 (Table 39). The chlorpyrifos exceedance occurred at a MPM location and will be discussed in further detail in the 2011 MPUR.

Management Plan Monitoring was conducted at Dry Creek @ Wellsford Rd for chlorpyrifos in July, August and September 2010 as specified in the Coalition's MPM schedule. Samples collected for MPM on July 20, 2010 exceeded the WQTL containing 0.067 µg/L chlorpyrifos. No samples were collected to test for *C. dubia* toxicity. The PUR data associated with the July exceedance indicate there were 22 applications ranging between 0.06 and 2.03 lbs AI per acre of chlorpyrifos (Lorsban and Warhawk) across 1,104.3 acres of corn, walnut and almonds between July 2, 2010 and July 20, 2010 (Appendix IV).

Diuron

Diuron is a broad-spectrum herbicide used for weed control on agriculture and on highway rights of way. It acts by inhibiting photosynthesis and can also affect seed germination. Diuron has a half-life (in soil) of about 90 days and is very mobile. It inhibits growth of *Selenastrum capricornutum* with an Effective Concentration of 50% of the measured endpoint (EC_{50}) of 2.4 µg/L. There was an exceedance of the WQTL for diuron in the environmental and field duplicate samples collected at Mootz Drain downstream of Langworth Pond on December 14, 2010 (Table 39).

Samples collected during the third winter monitoring event exceeded the WQTL containing 2.7 µg/L (environmental sample) and 2.9 µg/L (FD) of diuron (considered one exceedance). Any PUR data associated with December diuron exceedances will be submitted in an addendum to the AMR on June 1, 2011.

Table 40. Zone 2 (Lateral 2 ½ near Keyes Rd, Prairie Flower Drain @ Crows Landing Rd) Exceedances.

ZONE	STATION NAME	SAMPLE TYPE CODE	SAMPLE DATE	DO, MG/L	SC, µS/CM	TOTAL DISSOLVED SOLIDS, MG/L	*E. COLI*, MPN/100 ML	NITRATE + NITRITE AS N, MG/L	CHLORPYRIFOS, µG/L	*S. CAPRICORNUTUM*, % CONTROL
2	Lateral 2 ½ near Keyes Rd	NM	4/20/2010						0.076	
2	Lateral 2 ½ near Keyes Rd	NM	7/20/2010						0.061	
2	Prairie Flower Drain @ Crows Landing Rd	MPM, NM	1/19/2010		1837	1300	2400	43		56
2	Prairie Flower Drain @ Crows Landing Rd	MPM. NM	2/23/2010		2833	1700	440	32		
2	Prairie Flower Drain @ Crows Landing Rd	MPM, NM	3/23/2010		2833	1700	1400	31		
2	Prairie Flower Drain @ Crows Landing Rd	MPM, NM	4/20/2010		2399	1500	1300	33		
2	Prairie Flower Drain @ Crows Landing Rd	MPM, NM	5/18/2010		2428	1500	460	35		
2	Prairie Flower Drain @ Crows Landing Rd	NM	6/15/2010	4.25	2703	1600	820	29		
2	Prairie Flower Drain @ Crows Landing Rd	NM	7/20/2010		2556	1500	260	26		
2	Prairie Flower Drain @ Crows Landing Rd	MPM, NM	8/17/2010		2776	1700	870	24		
2	Prairie Flower Drain @ Crows Landing Rd	MPM, NM	9/14/2010					12		
2	Prairie Flower Drain @ Crows Landing Rd	NM	10/19/2010		1795					
2	Prairie Flower Drain @ Crows Landing Rd	NM	11/16/2010		2710	1700	460	42		
2	Prairie Flower Drain @ Crows Landing Rd	NM	12/14/2010		2688	1700	>2400	40		

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

Physical Parameters, Total Dissolved Solids and E. coli

In Zone 2 there was one exceedance of the WQTL for dissolved oxygen, 11 specific conductivity, and 10 *E. coli* between January and December 2010.

Excessive nutrients can cause eutrophication of surface waters resulting in low dissolved oxygen and an inability to support normal aquatic communities. Sources of nutrients, organic carbon, and low dissolved oxygen are difficult to identify. There were 10 exceedances of the WQTL for total dissolved solids in Zone 2 between January and December 2010.

Nitrates

Potential sources of nitrate in surface waters include runoff of fertilizers or organic matter from irrigated pasture, leaking septic systems, waste-treatment facility effluent, and inputs from animal waste. These sources can move to surface waters through above ground runoff or shallow subsurface flows. Total Kjeldahl Nitrogen and ammonia in animal waste that enter surface waters can be converted to nitrate by nitrifying bacteria. Possible sources of animal waste in a water body include dairies, poultry operations, pasture and/or wildlife. From years of movement of nitrate from dairies into groundwater, there is a significant amount of nitrate in the aquifers beneath the Coalition 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 this area of the Coalition, and these further remove shallow ground water from the subsurface and move it 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 nitrate WQTL. Because of its extreme solubility, the only way for nitrates in fertilizer to enter surface water is for them to move to surface waters immediately after application and it is unlikely that applications in the spring would result in exceedances of the WQTL throughout the irrigation season. In Zone 2, there were 11 exceedances of the nitrate WQTL between January and December 2010, all were from samples collected at Prairie Flower Drain @ Crows Landing Rd (Table 40). Nitrate + Nitrite was monitored at Prairie Flower Drain in 2010 as part of Normal Monitoring and MPM. Nitrate results will be discussed in further detail in the MPUR to be submitted on April 1, 2011.

Chlorpyrifos

Two exceedances of the WQTL for chlorpyrifos occurred in Zone 2 between January and December 2010 (Table 40). Neither chlorpyrifos exceedance was associated with water column toxicity.

Samples collected on April 20, 2010 and July 20, 2010 at Lateral 2 ½ near Keyes Rd exceeded the WQTL for chlorpyrifos (0.076 µg/L and 0.061 µg/L respectively, Table 40). The PUR data associated with the April exceedance indicate there were six applications of chlorpyrifos ranging between 1.88 and 2.01 lbs AI per acre (Lorsban and Warhawk) on 107 acres of almond and sweet potatoes between April 16, 2010 and April 20, 2010 (Appendix IV). The PUR data associated with the July exceedance indicate there were 55 applications ranging between 0.50 and 2.90 lbs AI per acre of chlorpyrifos (Lorsban and Warhawk) on 1467.62 acres of alfalfa, almond, peach and walnuts between June 22, 2010 and July 20, 2010 (Appendix IV).

Toxicity

Water column toxicity occurred once in samples collected in Zone 2 between January and December 2010 (Table 40).

Prairie Flower Drain @ Crows Landing Rd was sampled for *Selenastrum capricornutum* toxicity (January, February, April and May) and for *Ceriodaphnia dubia* and *Hyalella azteca* toxicity (September) as specified in the Coalition's MPM schedule. Samples collected on January 19, 2010 from Prairie Flower Drain @ Crows Landing Rd tested toxic to *Selenastrum capricornutum* with 56 percent growth compared to the control. Algae growth was greater than 50% compared to the control and therefore a TIE was not initiated. The PUR data associated with the January toxicity indicate there were 13 herbicide applications ranging between 0.45 and 1.85 lbs AI per acre. Applications of herbicides included the following five AIs: dimethylamine salt, diglycolamine salt of 3, 6-dichlro-o-anisic acid, paraquat dichloride, pendimethalin and hexazinone (Butyrac, Clarity, Firestorm, Prowl, Riverdale MCPA-4 Amine and Du Pont Velpar L Herbicide). Applications occurred on 446.50 acres of alfalfa and oats between January 6, 2010 and January 16, 2010 (Appendix IV). There were no tests for herbicides during this MPM event.

Table 41. Zone 3 (Dry Creek @ Oakdale Ave, Highline Canal @ Hwy 99, Highline Canal @ Lombardy Ave, Mustang Creek @ East Ave) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	pH, none	SC, µS/cm	Total Dissolved Solids, mg/L	*E. coli*, MPN/100 mL,	Copper Dissolved, µg/L (Hardness based trigger limit)	Chlorpyrifos, µg/L
3	Highline Canal @ Hwy 99	MPM, NM, Non Contiguous	1/19/2010					1700		
3	Highline Canal @ Hwy 99	MPM, NM	2/23/2010					790		
3	Highline Canal @ Lombardy Rd	MPM	1/19/2010							0.016
3	Highline Canal @ Lombardy Rd	MPM	2/23/2010		9.36				16 (14.10)	
3	Mustang Creek @ East Ave	NM	1/19/2010	5.22		856	570	1000		
3	Mustang Creek @ East Ave	NM	2/23/2010					360	20 (17.57)	
3	Mustang Creek @ East Ave	NM	3/23/2010	3.87		877	580			
3	Mustang Creek @ East Ave	NM	4/20/2010					>2400		

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

Physical Parameters, Total Dissolved Solids and E. coli

In Zone 3 there were two exceedances of the WQTL for dissolved oxygen, one pH, two specific conductivity, two TDS and five for *E. coli* between January 2010 and December 2010.

Chlorpyrifos

In Zone 3 there was one chlorpyrifos exceedance of the WQTL between January 2010 and December 2010 (Table 41).

Highline Canal @ Lombardy Rd was sampled for chlorpyrifos during January and February 2010 as specified in the Coalition's MPM schedule. The samples collected on January 19, 2010 for MPM at Highline Canal @ Lombardy Rd experienced an exceedance of the chlorpyrifos WQTL, containing 0.016 µg/L of chlorpyrifos. The PUR data indicate that the last application of chlorpyrifos was on August 30, 2009.

Copper

There are a number of possible sources of copper in water bodies within the Coalition region. Copper hydroxide, copper sulfide and copper oxide are applied as a fungicide to a variety of vegetable crops, grains, and fruit and nut orchards. Copper can also enter a drainage system from sources other than agriculture. Copper is commonly used by dairies and can also enter water bodies 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. Dissolved copper results are adjusted for the hardness of the water to determine if the bioavailable amount of copper will be toxic to aquatic life. Therefore, the WQTL for dissolved copper will be different for each sample. There were two dissolved copper exceedances experienced in Zone 3 between January and December 2010 (Table 41).

Highline Canal @ Lombardy Rd MPM samples were collected for copper (dissolved and total) in January and February 2010 as specified in the Coalition's MPM schedule. Samples collected on February 23, 2010 for MPM (after a storm event) from Highline Canal @ Lombardy Rd exceeded the dissolved copper WQTL containing 16 µg/L (hardness based WQTL = 14.10 µg/L). The PUR data indicate there were 71 applications of copper (Champ, Nordox and NU-COP) ranging from 0.30 to 14.70 lbs AI per acre across 1788 acres of almonds, apricots, cherries, and peaches between December 2, 2009 and February 23, 2010 (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 tail water or storm water to the canal. All pesticide applications were made by ground indicating there is the potential of spray drift due to applications next to the canal. Samples were collected as part of MPM and therefore there are no associated toxicity data.

Mustang Creek @ East Ave samples were collected for copper (dissolved and total) on February 23, 2010 for the second storm event and exceeded the dissolved copper WQTL containing 20 µg/L (hardness based WQTL = 17.57 µg/L). Mustang Creek is upstream of Highline Canal and the copper detected in samples upstream may have contributed to the downstream exceedance at Highline Canal @ Lombardy Ave (see paragraph above). The PUR data indicate there were 12 applications of copper (Champ, Kocide, NU-COP and Cuprofix) ranging from 1.23 to 4.62 lbs AI per acre on 2914 acres of almonds between January 15, 2010 and February 23, 2010 (Appendix IV).

Table 42. Zone 4 (Bear Creek @ Kibby Rd, Howard Lateral @ Hwy 140 and Merced River @ Santa Fe) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	pH, none	*E. coli*, MPN/100 mL,	Copper Dissolved, µg/L (Hardness Based Trigger Limit)	Chlorpyrifos, µg/L
4	Howard Lateral @ Hwy 140	NM	4/20/2010			3.7 (2.65)	
4	Howard Lateral @ Hwy 140	NM	6/15/2010				0.022
4	Howard Lateral @ Hwy 140	NM	7/20/2010	8.93		3.1 (2.5)	
4	Howard Lateral @ Hwy 140	NM	8/17/2010	9.05			
4	Howard Lateral @ Hwy 140	NM	9/14/2010	9.28			
4	Howard Lateral @ Hwy 140	NM	10/19/2010		280		
4	Merced River @ Santa Fe	MPM, NM	1/19/2010		>2400		
4	Merced River @ Santa Fe	NM	4/20/2010		440		

NM-Normal Monitoring
MPM-Management Plan Monitoring

Physical Parameters, Total Dissolved Solids and E. coli

In Zone 4 there were three exceedances of the WQTL for pH and three *E. coli* between January and December 2010.

Chlorpyrifos

In Zone 4, one exceedance of the WQTL for chlorpyrifos occurred between January and December 2010 (Table 42).

Howard Lateral @ Hwy 140 was sampled during the second irrigation season of 2010 on June 15, 2010 and exceeded the chlorpyrifos WQTL containing 0.022 µg/L. The PUR data associated with the June exceedance indicate there was one application of 2.02 lbs AI per acre (82.5 gallons of Warhawk) to 165 acres of sweet potatoes on May 3, 2010 (Appendix IV).

Copper

There were two dissolved copper exceedances of the WQTL in Zone 4 between January and December 2010 (Table 42).

Howard Lateral @ Hwy 140 samples exceeded the WQTL for dissolved copper on April 20, 2010 and on July 20, 2010 (3.7 µg/L and 3.1 µg/L respectively). The PUR data associated with the April exceedance indicate there were 13 applications of copper (Nordox, Kocide and NU-COP) to almonds and walnuts ranging between 0.77 and 5.90 lbs AI per acre. Copper applications occurred on 462 acres between January 27 and April 10, 2010 (Appendix IV). The PUR data associated with the July copper exceedance indicate there was one application of 5.03 lbs AI per acre of copper oxide (Nordox 75 WG) to six acres of walnuts on April 10, 2010. There is no reported copper use after April 10, 2010 (Appendix IV).

Table 43. Zone 5 (Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59, Duck Slough @ Gurr Rd, Duck Slough @ Hwy 99, Miles Creek @ Reilly Rd) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	pH, none	SC, µS/cm	Ammonia as N, mg/L	Total Dissolved Solids, mg/L	*E. coli*, MPN/100 mL	Arsenic, µg/L	Chlorpyrifos, µg/L	*C. dubia*, % Control	*P. promelas*, % Control	*H. azteca*, % Control
5	Deadman Creek @ Gurr Rd	MPM, NM	1/19/2010						>2400					
5	Deadman Creek @ Gurr Rd (FD)	MPM, NM	1/19/2010						>2400					
5	Deadman Creek @ Gurr Rd	MPM, NM	2/23/2010						370					
5	Deadman Creek @ Gurr Rd (FD)	MPM, NM	2/23/2010						410					
5	Deadman Creek @ Gurr Rd	NM, Non Contiguous	3/23/2010	0.20		4023	155.4	2100	>2400		0.140	0	0	
5	Deadman Creek @ Gurr Rd (FD)	NM, Non Contiguous	3/23/2010				160	2300	>2400		0.097	0	0	
5	Deadman Creek @ Gurr Rd	NM	4/20/2010						280		0.018			
5	Deadman Creek @ Gurr Rd (FD)	NM	4/20/2010								0.017			
5	Deadman Creek @ Gurr Rd (FD)	NM	5/18/2010						240					
5	Deadman Creek @ Gurr Rd	NM	6/15/2010	4.56										
5	Deadman Creek @ Gurr Rd (FD)	NM	6/15/2010						370					
5	Deadman Creek @ Gurr Rd	NM	7/20/2010	6.60					580					
5	Deadman Creek @ Gurr Rd	NM	8/17/2010	6.77							0.024			
5	Deadman Creek @ Gurr Rd	NM	9/14/2010	6.82					360					
5	Deadman Creek @ Gurr Rd	NM	10/19/2010						340					
5	Deadman Creek @ Gurr Rd	NM	11/16/2010	6.82		1547	31	840	>2400	14		0	0	
5	Deadman Creek @ Gurr Rd (FD)	NM	11/16/2010				31	980	>2400	14		0	0	
5	Deadman Creek @ Gurr Rd	NM	12/14/2010	5.20					>2400					
5	Duck Slough @ Gurr Rd	MPM, NM	7/20/2010		5.41									
5	Duck Slough @ Gurr Rd	MPM, NM	9/14/2010											70
5	Duck Slough @ Gurr Rd	NM	10/19/2010						250					

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

Physical Parameters, Total Dissolved Solids and E. coli

In Zone 5 there were seven exceedances of the WQTL for dissolved oxygen, one pH, two specific conductivity, two TDS and 12 *E. coli* between January and December 2010.

Ammonia

Ammonia can enter a water body through three sources: 1) direct discharge from agricultural fertilizers (anhydrous ammonia), 2) direct discharge of animal waste, and 3) discharges 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, discharge of fertilizers to surface waters would have to be immediate to detect ammonia in the receiving water body. Ammonia can also be formed in the water body through the mineralization of organic nitrogen. Previous exceedances of the ammonia WQTL and associated water column toxicities have been attributed to discharge from dairies as opposed to fertilizer inputs.

There were two exceedances of the ammonia WQTL in environmental samples collected in Zone 5 between January 2010 and December 2010; both were from samples collected at Deadman Creek @ Gurr Rd and one was from a non-contiguous water body (Table 43). Samples collected on March 23, 2010 from Deadman Creek @ Gurr Rd (non contiguous), contained high concentrations of ammonia (environmental sample – 155.4 mg/L, field duplicate – 160 mg/L) which accounted for water toxicity to both *P. promelas and C. dubia* (0% survival for both species, Table 43). During the same event, toxicity analysis to *Selenastrum capricornutum* were not performed due to extremely high levels of ammonia and the pigment and suspended solids precluded measurements of algae cells. Both ammonia exceedances were also associated with very high *E. coli* counts (>2,400 MPN/100mL), high total dissolved solids, low dissolved oxygen and the smell of manure. It is likely that the exceedances on both March 23 and November 16, 2010 are due to an upstream dairy discharge.

Arsenic

The registrations of many products containing arsenic as an AI have been cancelled. However, there are four products currently registered (arsenic acid, arsenic acid anhydride, arsenic trioxide and chromate copper arsenate) which are used for wood protection, as a household ant killer, weed control around ditches, for use on ornamental plants, for nonagricultural weed control, and for weed control around buildings, driveways, sidewalks, rights-of-way, and fence rows. Exceedances of the arsenic WQTL may be due to these nonagricultural uses or historic uses of arsenic by numerous agricultural and nonagricultural entities. Arsenic is being detected in current samples due to resuspension of this element into the water column. There was a single event with an exceedance of the arsenic WQTL in Zone 5 between January and December 2010 which occurred on November 16, 2010 at Deadman Creek @ Gurr Rd(14 µg/L, both the environmental and the field duplicate sample, Table 43).

Chlorpyrifos

There were three exceedances of the chlorpyrifos WQTL in Zone 5 between January and December 2010; all were from samples collected at Deadman Creek @ Gurr Rd and one of the samples was collected when Deadman Creek was a non contiguous water body (Table 43). Two of the events had exceedances in the field duplicate samples collected at the same time.

Deadman Creek @ Gurr Rd samples collected on March 23, 2010 during the first winter monitoring event (non contiguous) exceeded the WQTL containing 0.140 µg/L (Grab) and 0.097 µg/L (FD). Toxicity to *Ceriodaphnia dubia* and *Pimephales promelas* occurred in samples collected at the same time; ammonia and chlorpyrifos are identified as the causes of those toxicities. At the time of sampling on March 23, 2010, Deadman Creek was a series of puddles. The previous precipitation recorded in this area was on March 8 – 12 and may have resulted in chlorpyrifos moving downstream from upstream applications. When the rain and flows ceased, Deadman Creek became a series of pools and any chlorpyrifos discharged from upstream was isolated in the puddles. The PUR data associated with the March chlorpyrifos exceedances indicate there were 26 applications of chlorpyrifos (Warhawk and Whirlwind) ranging between 0.13 to 0.375 lbs AI per acre across 1908 acres of alfalfa between March 11, 2010 and March 14, 2010.

Deadman Creek @ Gurr Rd samples collected on April 20, 2010 during the third storm monitoring event resulted in chlorpyrifos exceedances of 0.018 µg/L (environmental sample) and 0.017 µg/L (FD). Toxicity was not associated with the April chlorpyrifos exceedance. The PUR data associated with the April chlorpyrifos exceedance indicate there were two applications of chlorpyrifos (Lock-On Insecticide) of 0.50 lbs AI per acre across 20 acres of alfalfa on March 26, 2010 (Appendix IV). Both applications were made on parcels high in the subwatershed, more than three miles upstream of the sampling location.

Deadman Creek @ Gurr Rd samples collected on August 17, 2010 during the fourth irrigation monitoring event resulted in an exceedance of the chlorpyrifos WQTL (0.024 µg/L; Table 43). There was no water column toxicity associated with this exceedance. The PUR data associated with the April chlorpyrifos exceedance indicate there were 12 applications of chlorpyrifos (Lock-On, Whirlwind and Lorsban) ranging between 0.45 and 2.00 lbs AI per acre across 842 acres of alfalfa, figs, and almonds (with the majority being applied to alfalfa) between July 20, 2010 and August 17, 2010 (Appendix IV).

Toxicity

There were two events with toxicity to *C. dubia and P. promelas* in Zone 5 between January and December 2010; all water column toxicity occurred in samples from Deadman Creek @ Gurr Rd and occurred in both the environmental and field duplicate samples (Table 43).

Deadman Creek @ Gurr Rd sample water tested toxic to *Ceriodaphnia dubia* and *Pimephales promelas* during the first winter monitoring event on March 23, 2010. The samples contained ammonia at 155.4 mg/L (environmental sample) and 160 mg/L (FD); the amount of ammonia detected was enough to account for complete mortality to both *Ceriodaphnia dubia* and *Pimephales promelas*. A TIE was not initiated due to the inability to maintain dissolved oxygen levels at protocol specifications and exceedingly high ammonia levels that could not be removed. Toxicity testing with *Selenastrum capricornutum* was not performed due to the amount of pigment and suspended solids in the samples which precluded the measurement of algae cells. However, based on the high amount of ammonia in the sample, it is possible that the sample would have been toxic to algae as well. In addition to the high ammonia levels, chlorpyrifos exceeded the WQTL with 0.140 µg/L (see details in paragraph above for PUR data on chlorpyrifos applications). The PUR data associated with the March 2010 *Ceriodaphnia dubia* toxicity indicate a total of 200 applications of insecticides, fungicides, herbicides and algaecides applied across 18,411 acres of almond, alfalfa, corn, onion, peach, pistachio, and tomatoes between January 9, 2010 and March 23, 2010. In addition to chlorpyrifos, copper, paraquat dichloride and a range of pyrethroids were applied between 0.045 and 5.45 lbs AI per acre with the majority being applied to almonds and alfalfa (see PUR Appendix IV). The PUR data associated with *Pimephales promelas* toxicity indicate there were a total of 133 applications to 12,202 acres of almond, alfalfa, corn, peach and pistachios between August 11, 2009 and March 23, 2010. There were applications of bifenthrin, esfenvalerate, indoxacarb, lambda-cyhalothrin, permethrin and pyraclostrobin ranging between 0.019 and 0.79 lbs AI per acre with the majority being applied to almonds and alfalfa (Appendix IV). The cause of the *C. dubia* and *P. promelas* toxicities is assigned to a combination of ammonia and chlorpyrifos with ammonia being the dominant cause of toxicity.

Samples from Deadman Creek @ Gurr Rd tested toxic to *Ceriodaphnia dubia* and *Pimephales promelas* during the second fall monitoring event on November 16, 2010. Ammonia was detected at 31 mg/L (environmental sample) and 31 mg/L (FD); the amount of ammonia detected in these samples was enough to account for complete mortality to both *Ceriodaphnia dubia* and *Pimephales promelas*. Results of the Phase I TIE was conducted on the November 16, 2010 toxic water samples indicate ammonia to be the cause of the toxicity (Appendix VI). Toxicity analysis on *Selenastrum capricornutum* was not performed due to the extremely high levels of ammonia and the pigment and suspended solids precluded measurements of algae cells. Although the Coalition attributes the toxicity to ammonia, relevant PUR data has been tabulated in Appendix IV. The PUR data associated with the November *Ceriodaphnia dubia* toxicity indicate that there were a total of 102 applications of insecticides, fungicides and herbicides (pyrethroids, copper, chlorpyrifos, paraquat dichloride and sulfur) ranging between 0.00015 and 3.119 lbs AI per acres to 7440 acres of alfalfa, almond, corn, cotton, wine grape, peach, pepper, pistachio, radicchio and tomatoes with the majority being applied to almonds between June 6, 2010 and November 11, 2010 (Appendix IV). The PUR data associated with the November *Pimephales promelas* toxicity indicate that there were a total of 69 applications of insecticides, fungicides and herbicides (pyrethroids, chlorpyrifos, paraquat dichloride and sulfur) ranging between 0.00125 and 3.119 lbs AI per acre to 4962 acres of alfalfa, almonds, cotton, wine grape, pepper, pistachio and radicchio with the majority being applied to radicchio between August 24, 2010 and November 11, 2010 (Appendix IV).

Duck Slough @ Gurr Rd sediment samples collected for MPM on September 14, 2010 resulted in toxicity to *Hyalella azteca* with 70 percent survival compared to the control. Sediment chemistry analysis was performed and the following pesticides were detected: bifenthrin (J0.143 µg/kg dw), chlorpyrifos (J0.182 µg/kg dw), lambda-cyhalothrin (1.2 µg/kg dw) and permethrin (J0.127 µg/kg dw; see Appendix II for Monitoring Results, "J" indicates an estimated result). Total organic carbon concentration was 4.9 mg/kg for this sample with a median grain size of 0.035 mm which is categorized as silt. The PUR data indicate that a total of 447 applications of pyrethroids and chlorpyrifos ranging between 0.0001 and 2.503 lbs AI per acres were associated with this toxicity. The majority of applications were to almond, alfalfa, cotton and tomatoes on 218,085 acres between April 10, 2010 and September 14, 2010 (Appendix IV).

Table 44. Zone 6 (Ash Slough @ Ave 21, Cottonwood Creek @ Rd 20) Exceedances.

Zone	Station Name	Sample Type Code	Sample Date	DO, mg/L	*E. coli* MPN/100 mL	Copper Dissolved, µg/L (Hardness based trigger limit)	Chlorpyrifos, µg/L
6	Ash Slough @ Ave 21	NM	4/20/2010			3.2 (1.67)	
6	Cottonwood Creek @ Rd 20	MPM, NM, Non Contiguous	1/19/2010				0.210
6	Cottonwood Creek @ Rd 20	MPM, NM	4/20/2010	6.36		3.1 (2.17)	
6	Cottonwood Creek @ Rd 20	MPM, NM	5/18/2010			3.6 (2.36)	
6	Cottonwood Creek @ Rd 20	MPM, NM	6/15/2010		2000		
6	Cottonwood Creek @ Rd 20	MPM, NM	7/20/2010	6.80			
6	Cottonwood Creek @ Rd 20	MPM, NM	8/17/2010	6.04		5.3 (4.9)	
6	Cottonwood Creek @ Rd 20	MPM, NM	9/14/2010	6.44			
6	Cottonwood Creek @ Rd 20	NM	10/19/2010		290		

NM-Normal Monitoring
DO-Dissolved Oxygen
SC-Specific Conductance

Physical Parameters, Total Dissolved Solids and E. coli

In Zone 6 there were four exceedances of the WQTL for dissolved oxygen and two of the WQTL for *E. coli* between January and December 2010.

Chlorpyrifos

There was one exceedance of the chlorpyrifos WQTL in Zone 6 between January 2010 and December 2010 which occurred in a non contiguous water body (Table 44).

Cottonwood Creek @ Rd 20 was sampled during the first storm event on January 19, 2010 for chlorpyrifos as specified in the Coalition's MPM schedule. On January 19, 2010 Cottonwood Creek there was a single puddle under Rd 20 which was not connected to any puddles either upstream or downstream of the sampling location. Samples collected from this puddle resulted in an exceedance of the chlorpyrifos WQTL (0.210 µg/L; Table 44). No reported applications of chlorpyrifos were associated with the exceedance between November 2009 and January 2010 (Appendix IV).

Copper

There were four exceedances of the dissolved copper WQTL in Zone 6 between January 2010 and December 2010 (Table 44).

Samples from Ash Slough @ Ave 21 collected during the third storm event on April 20, 2010 had a exceedance with 3.2 µg/L of dissolved copper. There were 35 applications of copper on 2,688 acres of almonds ranging between 1.06 and 4.32 lbs AI per acre between January 26 and March 31, 2010 (Appendix IV).

Cottonwood Creek @ Rd 20 was sampled for copper (total and dissolved) from April through September 2010 as specified in the Coalition's MPM schedule. Samples collected for MPM from Cottonwood Creek @ Rd 20 on April 20, May 18, and August 17, 2010 exceeded the dissolved copper WQTL (3.1 µg/L, 3.6 µg/L, and 5.3 µg/L, respectively; Table 44). A majority of Cottonwood Creek is elevated above the surrounding farmland and therefore the most likely source of agricultural inputs to the creek is spray drift. In addition, Madera Irrigation District has a number of spill sites that feed into Cottonwood Creek and it is unclear if they are contributing to any of the copper detected within Cottonwood Creek. The PUR data associated with the April 20, 2010 exceedance indicate there were 154 applications of copper (Cuprofix, Champ, Nordox and Kocide) to 8,432 acres of almond, cherry, grape, peach, orange and vegetables (with the majority being applied to almonds and grapes) ranging between 0.35 and 6.40 lbs AI per acre between January 26, 2010 and April 19, 2010. The PUR data associated with the May 18, 2010 exceedance indicate there were 138 applications of copper (Cuprofix, Champ, Nordox and Kocide) to 7,315 acres of almonds, oranges, grapes and walnuts (majority being applied to grapes) ranging between 0.35 and 3.46 lbs AI per acre between March 9, 2010 and May 8, 2010 (Appendix IV). The PUR data associated with the August 17, 2010 exceedance indicate there were two applications of copper (Cuprofix, Champ, Nordox and Kocide) to 120 acres of wine grapes at 0.84 lbs AI per acre on June 26, 2010 and July 7, 2010 (Appendix IV).

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 can identify constituents, agricultural lands, crops and/or particular pesticides that need to be managed to reduce or eliminate input from agriculture. A series of actions taken to determine the potential sources of exceedances may include the following: 1) the use of PURs to identify relevant applications that occurred upstream of the sample site and within a specified time period prior to the sampling event, 2) an analysis of monitoring data and toxicity results to better understand the potential sources and toxicity of detected constituents, and 3) special studies where appropriate and cost effective.

The Coalition notified the Regional Board of all exceedances in Exceedance Reports (Appendix V). In addition, the Coalition creates an annual report for Coalition members to notify them of exceedances that have occurred throughout the year. Results are also disseminated via grower mailings, at grower outreach meetings, and, in some cases, by personal communication.

Grower notification, management practice outreach and education, and management practice implementation and tracking are additional actions taken by the Coalition to address water quality exceedances (Table 45). Appendix VII includes available meeting agendas and handouts.

MANAGEMENT PRACTICES

In previous years the Coalition has provided members with handbooks that contain information on management practices to reduce storm water runoff, discharge of irrigation water, and mobilization of sediments into receiving waters. In 2010, additional management practices such as the use of alternative products, structural changes to manage drain water, and pesticide application practices for minimizing spray drift have been presented at meetings and in various mailings. Appendix VII includes available meeting agendas and handouts that occurred from January 2010 through December 2010.

The Coalition obtains updates to management practice information by conducting individual contacts within subwatersheds requiring a management plan. The Coalition's Management Plan includes a schedule of prioritized subwatersheds and details regarding this strategy (last updated in the 2010 MPUR, pages 23-27 and Table 6). The purpose of the individual contacts is to review current farm management practices, determine if additional management practices are applicable, and document implementation of any new practices.

From 2008 through 2010, the Coalition has conducted focused outreach in first designated priority subwatersheds: Dry Creek @ Wellsford Rd, Prairie Flower Drain @ Crows Landing Rd and Duck Slough @ Hwy 99. Growers were contacted during the spring and summer of 2009, during which a review of management practices was conducted and documented, including any recommended practices. Mailings occurred on February 9, February 15, and February 17, 2010 to all targeted members in the Duck Slough above Hwy 99, Dry Creek (Stanislaus County), and Prairie Flower Drain subwatersheds, respectively, to announce subwatershed-wide follow-up to 2009 individual contacts meetings. Eleven Coalition members attended the Duck Slough follow-up grower meeting held on February 19, 2010. Members indicated which of the management practices recommended during their individual meetings they had implemented since the previous year. At the February 26, 2010 Dry Creek and March 19, 2010 Prairie Flower Drain follow-up meetings, a total of 16 members attended and answered questions regarding new management practices that were implemented in 2009. A Coalition representative made individual phone calls between March 1 and August 4, 2010 to eight targeted members unable to attend the scheduled follow-up meetings to assess their implemented management practices. On August 24, 2010 the Coalition sent out the results from the individual contact meetings summarizing management practices implemented and recommendations recorded during each grower's individual meeting. Growers reviewed their responses for accuracy and made corrections if necessary.

On, November 8, 2010 two new members in the Dry Creek @ Wellsford Rd subwatershed were mailed a letter to notify them of the management plan high priority tracking process and the need to schedule an individual meeting with Parry Klassen or Wayne Zipser. Both of these members joined the Coalition in 2010 after the initial contacts were made in 2009 and are therefore not part of the original list of targeted members. The Coalition is in the process of assessing and analyzing the results of the first priority subwatershed meetings and phone calls, and will provide a summary of management practices implemented as a result of individual contacts conducted in 2010 in the MPUR to be submitted on April 1, 2011.

The Coalition also initiated a management plan tracking process with growers in the second set of high priority subwatersheds (2010-2012): Bear Creek @ Kibby Rd, Cottonwood Creek @ Hwy 20, Duck Slough @ Gurr Rd, and Highline Canal @ Hwy 99. The Coalition reviewed and documented the targeted growers' current management practices, and recommended and encouraged the adoption of new practices during individual meetings conducted in the spring and summer of 2010. Follow-up contacts with growers to document the implementation of new practices is ongoing and is expected to be completed by April 1, 2012. This process is further detailed below (Management Plan Status and Table 45), and all information obtained from these individual contacts before February 28, 2011 will be summarized in the Coalition MPUR to be submitted on April 1, 2011.

As described in the 2010 AMR, targeted members in the Cottonwood Creek @ Hwy 20 and Highline Canal @ Hwy 99 subwatersheds were contacted during the fall of 2009 and individual meetings began shortly thereafter (Table 42, page 154). On April 28, 2010, a letter went out to 13 growers in the Bear Creek @ Kibby Rd subwatershed and six growers in the Duck Slough @ Gurr subwatershed to notify them of the management plan tracking process and the need to schedule an individual meeting with Parry Klassen or Wayne Zipser. A similar mailing went out to three additional growers in the Bear Creek @ Kibby subwatershed on November 8, 2010. Individual contact meetings are ongoing. Follow-up meetings have begun this winter (2011) to assess whether management practices were implemented. The specifics of these meetings will be detailed in the MPUR to be submitted on April 1, 2011.

In the fall of 2010, the Coalition began contacting targeted members in the third set of high priority subwatersheds: Berenda Slough, Dry Creek @ Rd 18, Lateral 2 ½ near Keyes Rd, and Livingston Drain @ Robin Ave. A letter was mailed on November 8, 2010 to notify 27 targeted growers in the Lateral 2 1/2 @ Keyes Rd subwatershed and 11 targeted growers in the Livingston Drain @ Robin Ave subwatershed requesting that they contact the Coalition to schedule a required meeting with Parry Klassen or Wayne Zipser. Eighteen members in the Dry Creek @ Rd 18 subwatershed were also sent notification of individual contact meetings on November 22, 2010. Targeted members in the Berenda Slough subwatershed will receive notice to schedule individual meetings in the early months of 2011. The

Coalition is in the process of conducting these individual meetings and a summary of the Coalition's process will be included in the MPUR to be submitted on April 1, 2011.

The Coalition continues to be committed to collaboration with outside sponsors to secure unique opportunities that will enhance the Coalition's ability to achieve its goal of reducing the impact of agricultural discharge on water quality. As described in the 2010 AMR, 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 $2 million annually over 5 years ($10 million total) from the USDA Agricultural Water Enhancement Program (AWEP) to be used in Stanislaus and Merced counties (page 150 and Table 42, page 154). 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 Coalition sent a CURES / AWEP Funding Informational mailing on April 26, 2010 to 429 members in the Bear Creek @ Kibby, Cottonwood Creek @ Rd 20, Dry Creek @ Wellsford, Highline Canal @ 99, Duck Slough @ Hwy 99, Duck Slough @ Gurr, and Prairie Flower Drain subwatersheds. The mailing included a letter informing growers of available CURES / AWEP funding and instructions on how to apply. A similar mailing went out to 503 members in the same subwatersheds on October 8, 2010 encouraging growers to apply for funding and implement management practices prior to the 2011 irrigation season.

Aside from the AWEP Funding, the Coalition promotes management practice implementation in other ways. The Coalition, along with CURES, encouraged orchard sprayer calibrations prior to the dormant season and organized the service to be offered to members free of charge. On November 23, 2010 a mailing went out to members in Madera, Merced, and Stanislaus Counties advertising the free service; a sign-up form to be returned was included in the mailing.

The Coalition also hosts a website: http://www.esjcoalition.org/home.asp. This website serves as a clearing house for Coalition activities and outreach on management practices. Information provided on the website functions as a useful supplement to regular grower contacts and meetings.

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, at regular meetings, at meetings conducted by the County Agricultural Commissioner, and by personal contact. Coalition presentations during 2010 provided members with information regarding the Coalition's mission, progress, monitoring results, and management practices. All outreach and education activities are documented in Table 45. Overall, Coalition representatives conducted or participated in nine meetings from January 2010 through December 2010. All meetings addressed sediment runoff issues; eight meetings addressed storm and irrigation water quality issues, specific site subwatershed management plans and reviewed management practices. Overall, the Coalition sent out 22 mailings and/or emails from January 2010 through December 2010. Of those mailings, 21 addressed storm water quality issues, 20 addressed irrigation water quality issues, 21 addressed sediment runoff issues, 16 reviewed management practices and seven addressed specific site subwatershed management plans.

The ESJWQC member Annual Report and ESJWQC Update Newsletter were mailed to all members on January 15, 2010. In addition, the Coalition has created a mailing system to keep interested members informed of current water quality monitoring results on a quarterly basis. On May 4, 2010, the Coalition sent out a Sample Water Monitoring Results mailing to all 2,373 members. The mailing included a return form for interested growers to request to receive regular quarterly water monitoring reports. Quarterly Monitoring Results were sent out in 131 mailings and 114 emails on August 24, 2010 and in 117 mailings and 118 emails on October 27, 2010.

Coalition members are also kept informed of the status of management practice tracking and its implications for local water quality. On May 21, 2010, a Watershed Approach Brochure mailing was sent to all Coalition members. The brochure summarized the ESJWQC management practice tracking process, first priority subwatershed results and related management practice information to subwatershed water quality improvements.

To broaden public awareness and understanding of the Coalition's intensions, goals, and outreach and education activities, on May 21, 2010, the Coalition mailed the Watershed Approach Brochure to key industry contacts. Additionally, the ESJWQC Watershed Coalition News was inserted into the June 30 and December 15, 2010 editions of Farm Bureau News, of which 6,000 copies of each edition were distributed in Merced and Stanislaus Counties.

The Coalition also allocates resources to specific areas of concern within its region as necessary. In an effort to inform and educate growers about recent regulatory actions taken by the Regional Board related to sediment discharge to waterways in the Sierra Foothills area, a mailing was sent on July 13, 2010, to 303 members to announce the Sediment Discharges from Lower Sierra Foothill Farms/Ranches Meeting. The same 303 members were reminded of the meeting via a July 22, 2010 postcard. Coalition, California Department of Fish and Game, and Regional Board representatives discussed with attendees the recent regulatory changes on sediment discharge as well as management practices to reduce sediment discharge. Twenty-three members were represented at the August 5, 2010 meeting.

The Annual Grower Meetings continue to serve as an opportunity to present and discuss all aspects of the Coalition over the past year. The Annual Grower Meeting Announcement first went out on November 23, 2010 via email to 284 members and was mailed to all growers on November 29, 2010. The 284 members on the email list received a meeting reminder on December 8, 2010. Seventy-seven members were in attendance at the December 14 meeting in Modesto County, 38 members attended the December 15, 2010 meeting in Merced County, and 32 growers attended the December 16, 2010 meeting in Madera County. At all three meetings, Coalition representatives reviewed the past year's water quality monitoring results, the ESJWQC management plan strategy and status, and various Coalition activities including outreach, collaborations and member responsibilities. The approaching groundwater program requirements and their anticipated impact on Coalition members was also discussed. Various informational handouts were made available to growers, including Management Practice information and the 2010 Watershed Update Report.

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 2010, the Coalition collaborated with each of these entities as needed to follow-up on exceedances.

Table 45. Table of ESJWQC actions and deliverables dealing with grower notification of exceedances, management practice tracking, and best management practices (BMPs) outreach and education, relevant to the monitoring conducted during 2010 (sorted by date).

Area	Date	Category	Details	Constituents Addressed	Who
Entire Coalition Region	15-Jan-10	Grower Notification	Annual Report and ESJWQC Update Newsletter Mailing: sent to all members.	All	Parry Klassen
Duck Slough @ Hwy 99	9-Feb-10	Grower Notification / Management Practice Tracking	Duck Slough Follow-Up to 2009 Individual Contacts Meeting Announcement Mailing: sent to all members who participated in an individual meeting during 2009.	All	Parry Klassen
Dry Creek @ Wellsford	15-Feb-10	Grower Notification / Management Practice Tracking	Dry Creek Follow-Up to 2009 Individual Contacts Meeting Announcement Mailing: sent to all members who participated in an individual meeting during 2009.	All	Parry Klassen
Prairie Flower Drain	17-Feb-10	Grower Notification / Management Practice Tracking	Prairie Flower Drain Follow-Up to 2009 Individual Contacts Meeting Announcement Mailing: sent to all members who participated in an individual meeting during 2009.	All	Parry Klassen
Duck Slough @ Hwy 99	19-Feb-10	BMP Outreach and Education / Management Practice Tracking	Duck Slough Follow-Up to 2009 Individual Contacts Grower Meeting: 11 members in attendance. Turning Interactive Survey Devices were used to assess implementation of management practices since individual contact meetings in 2009.	All	Parry Klassen, Wayne Zipser
Dry Creek @ Wellsford	26-Feb-10	BMP Outreach and Education / Management Practice Tracking	Dry Creek Follow-Up to 2009 Individual Contacts Grower Meeting: 13 members in attendance. Turning Interactive Survey Devices were used to assess implementation of management practices since individual contact meetings in 2009.	All	Parry Klassen, Wayne Zipser
Dry Creek @ Wellsford, Duck Slough @ Hwy 99, Prairie Flower Drain	1-Mar-10 through 4-Aug-10	BMP Outreach and Education / Management Practice Tracking	Phone call to assess management practice implementation of all targeted members with recommended practices for 2009 that did not attend their respective subwatershed follow-up meeting (8 members total).	All	Parry Klassen

Area	Date	Category	Details	Constituents Addressed	Who
Prairie Flower Drain	19-Mar-10	BMP Outreach and Education / Management Practice Tracking	Prairie Flower Drain Follow-Up to 2009 Individual Contacts Grower Meeting: 3 members in attendance. By using the Turning Interactive Survey Devices, assessed implementation of management practices since individual contact meetings in 2009.	All	Parry Klassen, Wayne Zipser
Bear Creek @ Kibby, Cottonwood Creek @ Rd 20, Dry Creek @ Wellsford, Highline Canal @ 99, Duck Slough @ Hwy 99, Duck Slough @ Gurr, and Prairie Flower Drain	26-Apr-10	Grower Notification	CURES AWEP Funding Informational Mailing: sent to 429 members. Letter informed growers of available CURES AWEP funding for their operations and the necessary steps to apply.	All	Parry Klassen
Bear Creek @ Kibby, Duck Slough @ Gurr	28-Apr-10	Grower Notification / Management Practice Tracking	Individual Contacts Meeting Announcement Mailing: 13 growers in Bear Creek @ Kibby subwatershed and 6 growers in Duck Slough @ Gurr subwatershed. Letter mailed to notify growers of the management plan high priority tracking process and that they need to schedule an individual meeting with Parry Klassen or Wayne Zipser.	All	Parry Klassen, Wayne Zipser
Entire Coalition Region	4-May-10	Grower Notification	Sample of Water Monitoring Results Mailing: sent to 2,373 members. Included return form to request quarterly reports like this if interested.	All	Parry Klassen, Wayne Zipser
Entire Coalition Region	21-May-10	Grower Notification	Watershed Approach Brochure Mailing: sent to all Coalition members, including key industry contacts. Brochure detailed findings during management practice tracking grower meetings and how this information will help water quality. One of three cover letter versions was included with each mailing: the 58 members and the 53 members whom participated in the first priority set and second priority set, respectively; of meetings received a cover letter thanking them for their cooperation; and the remaining 2,266 members received a general cover letter.	All	Parry Klassen, Wayne Zipser

Area	Date	Category	Details	Constituents Addressed	Who
Merced and Stanislaus Counties	30-Jun-10	Grower Notification	The Watershed Coalition News was inserted into the Farm Bureau News, of which 6,000 copies were distributed.	All	Parry Klassen
Sierra Foothills	13-Jul-10	Grower Notification	Sediment Discharges from Lower Sierra Foothill Farms/Ranches Meeting Announcement Mailing: sent to 303 members with property in the Sierra Foothills area.	Sediment Runoff	Parry Klassen
Sierra Foothills	22-Jul-10	Grower Notification	Sediment Discharges from Lower Sierra Foothill Farms/Ranches Meeting Reminder Postcard Mailing: sent to 303 members with property in the Sierra Foothills area.	Sediment Runoff	Parry Klassen
Sierra Foothills	5-Aug-10	BMP Outreach and Education	Sediment Discharges from Lower Sierra Foothill Farms/Ranches Meeting: 23 members represented in attendance. To inform and educate growers of both the recent regulatory actions taken by Regional Board related to sediment discharge to waterways and management practices to reduce sediment discharge.	Sediment Runoff	Parry Klassen
Entire Coalition Region	24-Aug-10	Grower Notification	Quarterly Monitoring Results: 131 mailings and 114 emails. Sent to all Coalition Members who requested these results in their response to the May 4, 2010 Sample of Water Monitoring Results Mailing.	All	Parry Klassen, Wayne Zipser
Dry Creek @ Wellsford, Duck Slough @ Hwy 99, Prairie Flower Drain	24-Aug-10	Grower Notification / Management Practice Tracking	Results from Individual Contact Meeting Confirmation Mailing: sent to all members whom participated in individual contacts. 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.	All	Parry Klassen

Area	Date	Category	Details	Constituents Addressed	Who
Bear Creek @ Kibby, Cottonwood Creek @ Rd 20, Dry Creek @ Wellsford, Highline Canal @ 99, Duck Slough @ Hwy 99, Duck Slough @ Gurr, and Prairie Flower Drain	8-Oct-10	Grower Notification	CURES AWEP Funding Informational Mailing: sent to 503 members. Letter informed growers of available CURES AWEP funding for their operations and the necessary steps to apply.	All	Parry Klassen
Entire Coalition Region	27-Oct-10	Grower Notification	Quarterly Monitoring Results: 117 mailings and 118 emails. Sent to all Coalition Members who requested these results in their response to the May 4, 2010 Sample of Water Monitoring Results Mailing.	All	Parry Klassen, Wayne Zipser
Lateral 2 1/2 @ Keyes Rd, Livingston Drain @ Robin Ave, Bear Creek @ Kibby, Dry Creek @ Wellsford Rd	8-Nov-10	Grower Notification / Management Practice Tracking	Individual Contacts Meeting Announcement Mailing: 27 growers in Lateral 2 1/2 @ Keyes Rd subwatershed (1st portion), 11 growers in Livingston Drain @ Robin Ave subwatershed, 3 growers in Bear Creek @ Kibby subwatershed (additional members), and 2 growers in Dry Creek @ Wellsford subwatershed (additional members). Letter mailed to notify growers of the management plan high priority tracking process and that they need to schedule an individual meeting with Parry Klassen or Wayne Zipser.	All	Parry Klassen, Wayne Zipser
Dry Creek @ Rd 18	22-Nov-10	Grower Notification / Management Practice Tracking	Individual Contacts Meeting Announcement Mailing: 18 growers in Dry Creek @ Road 18 subwatershed. Letter mailed to notify growers of the management plan high priority tracking process and that they need to schedule an individual meeting with Parry Klassen or Wayne Zipser.	All	Parry Klassen, Wayne Zipser
Madera, Merced, and Stanislaus Counties	23-Nov-10	Grower Notification / Management Practice Tracking	Orchard Sprayer Calibration Mailing: advertisement and sign-up sheet mailed to all Coalition members within the three county area offering free orchard sprayer calibrations, sponsored by the Coalition and CURES. The advertisement encouraged growers to participate to improve application efficiency and protect local watersheds.	Pesticides	Parry Klassen

Area	Date	Category	Details	Constituents Addressed	Who
Entire Coalition Region	23-Nov-10	Grower Notification	Annual Grower Meeting Announcement Email: sent to all members on the email list to announce meeting dates in their local areas (284 members request communication by email and comprise the email list).	All	Parry Klassen, Wayne Zipser
Entire Coalition Region	29-Nov-10	Grower Notification	Annual Grower Meeting Announcement Postcard Mailing: sent to all members and new applicants to announce meeting dates in their local areas (2,048 mailings went out).	All	Parry Klassen, Wayne Zipser
Entire Coalition Region	8-Dec-10	Grower Notification	Annual Grower Meeting Announcement Email Reminder: sent to all members on the email list to remind them of meeting dates in their local areas (284 members request communication by email and comprise the email list).	All	Parry Klassen, Wayne Zipser
Modesto County	14-Dec-10	BMP Outreach and Education	Annual Grower Meeting: 77 members represented in attendance. Reviewed and discussed Coalition actions toward and progress in solving water quality problems over the past year. Also discussed impending groundwater regulations and impact on Coalition members. Various handouts were made available to growers, including Management Practice information and 2009 Watershed Update Report.	All	Parry Klassen, Wayne Zipser, Mike Johnson
Merced County	15-Dec-10	BMP Outreach and Education	Annual Grower Meeting: 38 members represented in attendance. Reviewed and discussed Coalition actions toward and progress in solving water quality problems over the past year. Also discussed impending groundwater regulations and impact on Coalition members. Various handouts were made available to growers, including Management Practice information and 2009 Watershed Update Report.	All	Parry Klassen, Wayne Zipser, Mike Johnson
Merced and Stanislaus Counties	15-Dec-10	Grower Notification	The Watershed Coalition News was inserted into the Farm Bureau News, of which 6,000 copies were distributed.	All	Parry Klassen

AREA	DATE	CATEGORY	DETAILS	CONSTITUENTS ADDRESSED	WHO
Madera County	16-Dec-10	BMP Outreach and Education	Annual Grower Meeting: 32 members represented in attendance. Reviewed and discussed Coalition actions toward and progress in solving water quality problems over the past year. Also discussed impending groundwater regulations and impact on Coalition members. Various handouts were made available to growers, including Management Practice information and 2009 Watershed Update Report.	All	Parry Klassen, Wayne Zipser, Mike Johnson
Dry Creek @ Wellsford Rd and Duck Slough @ Hwy 99	5-Jan-11 through 28-Feb-11	BMP Outreach and Education / Management Practice Tracking	Phone call to assess management practice implementation of all targeted members with recommended practices for 2010 (8 members total).	All	Wayne Zipser

MANAGEMENT PLAN STATUS AND SPECIAL PROJECTS

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

Management plans address focused efforts within subwatersheds that occur in addition to normal monitoring, reporting, and outreach. Coalition efforts in all zones include but are not limited to: (1) continued monitoring based on 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) address compliance with approved TMDLs. The Coalition addresses exceedances associated with toxicity, pesticides, and sediment bound analytes with specific management practices whether or not a TMDL is in place. In the Coalition's Management Plan approved on November 25, 2008 (pages 24-31) the Coalition describes how it is meeting the TMDL requirements for Coalition members. The Management Plan will be updated in the MPUR to be submitted on April 1, 2011 which will document activities that occurred during 2010. Total maximum daily load constituents currently include chlorpyrifos, diazinon, dissolved oxygen, and salt/boron.

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 ESJWQC and 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 the required information necessary to assess compliance with the seven monitoring objectives. 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 at these compliance points occurs on a quarterly basis and results of monitoring from the first three quarters of 2010 (January through September 2010) are reported in the ESJWQC's San Joaquin River Chlorpyrifos and Diazinon 2010 AMR (submitted October 31, 2010). Results of San Joaquin River monitoring conducted during the last quarter of 2010 and first three quarters of 2011 (October 2010 through September 2011) will be reported in the San Joaquin River Chlorpyrifos and Diazinon 2011 AMR (to be submitted October 31, 2011). The Coalitions independently assesses compliance with the remaining Monitoring Objectives (2 through 7) by reviewing the results of the San Joaquin River monitoring relative to the monitoring conducted in the upstream tributaries within each coalition region respectively. The management plans developed by each coalition under the ILRP include a section to assess TMDL compliance, including the chlorpyrifos and diazinon TMDL for the Lower San Joaquin River. The ESJWQC will discuss San Joaquin River monitoring results from 2010 and its compliance with Monitoring Objectives 2 through 7 in the MPUR to be submitted April 1, 2011.

The Coalition's Management Plan describes the Coalition's strategy for evaluating the effectiveness of new management practices implemented to reduce the effects of agricultural practices on water quality. As described in the Actions Taken section, intensive outreach and documentation of management practices occur throughout the Coalition, but greater efforts to acquire these details are made within site subwatersheds designated as High Priority (see November 17, 2010 Approval Letter of Management Plan Schedule Prioritization Modification Request; updated proposed schedule for addressing each site subwatershed will be provided in the MPUR to be submitted on April 1, 2011).

The 2011 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
4. Status of TMDL constituents and Basin Plan requirements

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations answer the five key Program questions (ILRP MRP Order No. R5-2008-0005) based on water quality information obtained under the Coalition's MRPP for January through December 2010.

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

The results of the monitoring program from January through December 2010 indicate that although there has been substantial improvement in water quality in many areas, water quality is still not protective of beneficial uses across most of the coalition region (Table 46). The most common exceedances of WQTLs involve physical parameters such as dissolved oxygen and specific conductance which resulted in impaired Agricultural and Aquatic Life Beneficial Uses. Surface waters within the Coalition region also experienced numerous exceedances of *E. coli* and total dissolved solids WQTLs which resulted in impaired Recreational and Aquatic Life Beneficial Uses. Impairment of the Municipal Beneficial Use resulted from elevated concentrations of nitrate/nitrite and ammonium. While discharges from irrigated lands are possible sources of impairments to beneficial uses in many instances, natural conditions or other sources are potentially 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 i.e., other dischargers may need to improve the quality of their discharge.

Table 46. Monitoring sites (January through December 2010), beneficial uses (BU) associated with the downstream water body, and whether the sites met the WQTLs for the assigned beneficial uses. X indicates no sampling occurred during the years specified.

Monitoring Site	Immediate Downstream Water Body	Beneficial Use Immediate Downstream Water Body	Status 2004-2007 Meets BUs?	Status 2008 Meets BUs?	Status 2009 Meets BUs?	Status 2010 Meets BUs?
Howard Lateral @ Hwy 140	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	X	X	No	Yes
		AG	X	X	No	Yes
		REC 1	X	X	No	No
		AQ Life	X	X	No	No
Lateral 2 ½ near Keyes Rd	San Joaquin River (mouth of Merced River to Vernalis)	MUN	X	X	No	Yes
		AG	X	X	No	Yes
		REC 1	X	X	No	Yes
		AQ Life	X	X	No	No
Merced River @ Santa Fe Rd	Merced River (McSwain Reservoir to SJ River)	MUN	No	Yes	Yes	Yes
		AG	Yes	Yes	Yes	Yes
		REC 1	No	Yes	Yes	No
Highline Canal @ Hwy 99	San Joaquin River (mouth of Merced River to Vernalis) / Merced River (McSwain Reservoir to SJR)	MUN	No	No	No	Yes
		AG	Yes	No	No	Yes
		REC 1	No	No	No	No
		AQ Life	No	No	No	Yes
Mustang Creek @ East Ave	San Joaquin River (mouth of Merced River to Vernalis) / Merced River (McSwain Reservoir to SJR)	MUN	No	No	No	Yes
		AG	No	No	No	No
		REC 1	No	No	No	No
		AQ Life	Yes	No	No	No
Prairie Flower Drain @ Crows Landing Rd	San Joaquin River (mouth of Merced River to Vernalis)	MUN	No	No	No	No
		AG	No	No	No	No
		REC 1	No	No	No	No
		AQ Life	No	No	No	No
Ash Slough @ Ave 21	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	Yes	Yes	Yes
		AG	Yes	Yes	Yes	Yes
		REC 1	No	Yes	Yes	Yes
		AQ Life	No	Yes	No	No
Cottonwood Creek @ Rd 20	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	Yes	Yes	Yes
		AG	Yes	Yes	Yes	Yes
		REC 1	No	Yes	No	No
		AQ Life	No	No	Yes	No
Deadman Creek @ Gurr Rd	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	No	No	No
		AG	Yes	Yes	No	No
		REC 1	No	No	No	No

Monitoring Site	Immediate Downstream Water Body	Beneficial Use Immediate Downstream Water Body	Status 2004-2007 Meets BUs?	Status 2008 Meets BUs?	Status 2009 Meets BUs?	Status 2010 Meets BUs?
		AQ Life	No	No	No	No
Duck Slough @ Gurr Rd	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	Yes	No	Yes
		AG	No	Yes	No	Yes
		REC 1	No	Yes	No	No
		AQ Life	No	No*	No	No*
Duck Slough @ Hwy 99	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	No	Yes	Yes
		AG	Yes	No	Yes	Yes
		REC 1	No	No	Yes	Yes
		AQ Life	No	No	No	Yes
Dry Creek @ Wellsford Rd	Tuolumne River (New Don Pedro Dam to SJ River)	MUN	No	No	No	Yes
		AG	No	Yes	Yes	Yes
		REC 1	No	No	No	No
		AQ Life	No	No	No	No
Bear Creek @ Kibby Rd	San Joaquin River (Bear Creek to SJ River)	MUN	No	No	X	Yes
		AG	Yes	Yes	X	Yes
		REC 1	No	No	X	Yes
		AQ Life	No	No	X	Yes
Mootz Drain downstream of Langworth Pond	San Joaquin River (mouth of Merced River to Vernalis)	MUN	X	X	Yes	No
		AG	X	X	Yes	Yes
		REC 1	X	X	No	No
		AQ Life	X	X	No	No

*Does not meet BUs requirements due to sediment toxicity to *Hyalella azteca* in one or more occurrences.
MUN- Municipal and Domestic Supply
AG- Agriculture
REC 1- Water Contact Recreation
AQ Life- Aquatic Life

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

Appendix II includes all tabulated results from January 2010 through December 2010. Exceedances occurred in every zone during 2010 (Table 47).

In 2010, there were no exceedances of WQTLs for carbamates, organochlorines and Group A pesticides. Less than 0.5% of samples exceeded WQTLs for herbicides (Table 47). Exceedances of WQTLs for physical parameters and *E. coli* were more common than exceedances of WQTLs for pesticides or metals (7.1%, 44.4%, 0.9%, and 1.6%, respectively; Table 47). Some exceedances were more common seasonally. For example, warm water with little or no flow occurred during summer as did consistent exceedances of the dissolved oxygen WQTL.

As described in the Discussion of Results section, the zones differed substantially in the types of exceedances. For example, in Zone 2 (Prairie Flower Drain @ Crows Landing Rd) there were a large number of exceedances of specific conductivity, total dissolved solids, and nitrate. Zone 2 is located in the western portion of the Coalition region with shallow salty groundwater and a high density of dairy operations. The discharges are most probably a result of intrusion of shallow ground water into Prairie Flower Drain (see response to Question #3 below). Zones 1 and 5 experienced frequent *E. coli* exceedances (16 of 22 samples and 16 of 21 samples, respectively) and are locations within the Coalition region with large numbers of rural dwellings near surface waters.

Exceedances of some parameters were limited to a single location. For example, exceedances of the arsenic WQTL occurred only at Deadman Creek @ Gurr Rd once in both the environmental and FD samples. This suggests that geologic conditions and/or soils with elevated arsenic were responsible for the exceedances.

Overall, Zones 2 and 6 experienced the greatest percentage of exceedances (7.5 % and 5.4%, respectively) while Zones 3 and 4 experienced the lowest percentage (3.9% and 1.3%, respectively). In comparison to 2009, all analyte groups had lower percentages of exceedances except for *E. coli* and organophosphates. In 2009, there were 50 *E. coli* exceedances (40.7% of samples) versus 48 exceedances in 2010 (44.4% of samples). In 2009 and 2010, the only organophosphate with exceedances was chlorpyrifos and there was a slight increase in percentage of samples with exceedances from 0.9% in 2009 to 1.6% in 2010. Overall, samples with exceedances decreased from 5.9% to 4.3% from 2009 to 2010.

There were nine chlorpyrifos exceedances during 2010 (1.6% of samples); one exceedance occurred in a water body that was non contiguous and three exceedances occurred as part of MPM. Exceedances occurred in both the storm and the irrigation seasons. Of the six subwatersheds with chlorpyrifos exceedances, four are currently high priority subwatersheds and are receiving focused outreach and education. Chlorpyrifos is registered for use on agricultural crops only and its chemistry is such that it can enter surface waters in storm water, irrigation return flows, or bound to sediment. Consequently, chlorpyrifos exceedances are the responsibility of agriculture (defined broadly to include dairy operations that farm). The Coalition represents growers that do not operate dairy facilities and is responsible for outreach to those growers. A majority of dairy operators in the Dairy Program have repeatedly refused to join the Coalition and participate in Coalition programs to reduce the movement of chlorpyrifos to surface waters. It is doubtful that chlorpyrifos exceedances can be prevented until all farmers and dairy operators are engaged in active product management. The Coalition anticipates that it will take two to five years of increased efforts in priority subwatersheds to see improvement in downstream water quality.

There was a single diuron exceedance in 2010 that occurred in December 2010 (non storm related). Diuron is a soluble pre-emergent herbicide that is used by a large number of groups including but not limited to agriculture, cities, counties, Caltrans, and the railroads. All groups apply diuron during the winter weed growing season and consequently, this is another chemical for which it is difficult to assign responsibility for exceedances. However, diuron applications by irrigated agriculture indicate that exceedances may be the responsibility of irrigated agriculture and the Coalition will continue to provide outreach to its members about the management of the product.

Finally, 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. 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. 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 there may be exceedances 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 47. Number of 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	60	0	48	0	24	0	42	0	83	0	6	0	263	0%
E. coli	15	22	11	20	5	15	3	19	12	23	2	9	48	108	44.4%
Group A Pesticides	0	44	0	44	0	0	0	66	0	0	0	0	0	154	0%
Herbicides	1	69	0	56	0	26	0	50	0	84	0	23	1	308	0.3%
Metals	0	120	0	88	2	48	2	118	1	154	4	20	9	548	1.6%
Nutrients	1	86	12	80	0	55	0	77	2	91	0	35	15	424	3.5%
Organochlorines	0	28	0	28	0	0	0	21	0	35	0	0	0	112	0%
Organophosphates	1	133	2	106	1	60	1	94	3	161	1	16	9	570	1.6%
Physical parameters	16	175	23	151	7	132	3	168	12	214	4	73	65	913	7.1%
Sediment toxicity	0	3	0	3	0	2	0	1	1	3	0	1	1	13	7.7%
Water column toxicity	0	31	1	29	0	21	0	24	4	42	0	19	5	166	3.0%
Count per Zone	**34**	**771**	**49**	**653**	**15**	**383**	**9**	**680**	**35**	**890**	**11**	**202**	**153**	**3579**	
Pct Exceed. per Zone	**4.4%**		**7.5%**		**3.9%**		**1.3%**		**3.9%**		**5.4%**		**4.3%**		

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 off-site movement of farm inputs and sediment into waterways. Source identification is difficult especially for non-conserved constituents. There are numerous non-conserved constituents that cannot be traced upstream, e.g. dissolved oxygen. For example, locations at the west side of the coalition region (Zone 2) experienced numerous exceedances of specific conductivity and total dissolved solids. The construction of drains such as Prairie Flower Drain occurred in the late 1800s as a means of lowering the shallow ground water table to a level that allowed crops to be grown. The shallow ground water is very salty and although indirectly a result of agriculture, 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. Consequently, locations along the western margin of the Coalition region may have exceedances that result from normal farming practices and those practices will have to be adjusted to reduce the potential for discharges which impair beneficial uses.

Nutrient exceedances 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 where surface drains intercept shallow groundwater that is has high concentrations 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 applications of pesticides may result in pesticides entering surface waters as a result of spray drift or runoff in either storm water or irrigation return flows. The only two pesticides with exceedances of their WQTL were chlorpyrifos and diuron and are being addressed in the Coalition's Management Plan. Legacy pesticides no longer legal to use also continue to be found in Coalition water and sediment and the sources of those exceedances will never be determined. Current thinking that these legacy pesticides reside in the soil column in agricultural fields is difficult to reconcile with the pattern of exceedances. In 2010, there were no exceedances of any legacy pesticide and if the soil maintains a reservoir of legacy organochlorine pesticides, there should be more regular exceedances as storm water and irrigation tail water moves those pesticide residues to surface waters. The Coalition is continuing to identify sources of WQTL exceedances of currently registered pesticides through PUR, assessment of water quality data and evaluation of current management practices. The Coalition's sourcing strategy is further described in the Coalition's Management Plan.

Exceedances of the copper WQTL occurred eight times in 2010 over five subwatersheds. The Coalition monitors for both dissolved and total copper and only dissolved copper concentrations have exceeded WQTLs. There are a number of sources that could be responsible for dissolved copper including recent agricultural applications (either through storm/irrigation runoff or spray drift), dairy uses of copper sulfate in footbaths, resuspension of historic copper from upstream mining, brake pads and other anthropogenic uses. 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 conducts outreach and education regarding management practices known to be effective in reducing impact of irrigated agriculture on waters of the State through grower meetings, handouts and booklets addressing management practices, and through individual grower visits in high priority subwatersheds. The section Actions Taken to Address Water Quality Exceedances includes documentation of outreach activities.

The Coalition has obtained management practice information from members since 2007 through General Surveys which have been mailed to members in the Coalition region. The Coalition submitted a General Survey Summary Report in January 2009 tabulating management practices documented through those surveys on a subwatershed level and is used by the Coalition as an overall baseline of management practices.

The Coalition has prioritized Management Plan sites and constituents and is focusing on obtaining management practice information from priority subwatersheds. A subwatershed prioritization schedule is included in the Coalition's Management Plan. In high priority subwatersheds, the Coalition conducts individual visits with growers to discuss current management practices and the potential for implementing additional management practices.

Information on management practices provided by the Coalition to growers is tailored to the individual grower and typically involves practices to eliminate spray drift and/or surface runoff or switching to inputs or farming practices that do not pose a risk to water quality. Growers that are possible sources of exceedances are identified and individual visits are scheduled. During the visit, the Coalition representative tours the farming operation and determines if surface runoff or drift are possible. After identifying the most probable source of contamination, the Coalition representative discusses the appropriate management practices with the grower and assesses whether the grower can implement additional practices.

For locations with the potential for spray drift, the following practices are recommended:

1. Shut off outside nozzles when spraying outer rows; and/or
2. Spray areas close to water bodies when the wind is blowing away from them; and/or
3. When using orchard air blast sprayers, making applications when the wind is between 3-10 mph and upwind of a sensitive site

For locations with the potential for surface runoff, recommended practices include:

1. Controlling the timing of pumping/draining into the waterway,
2. Planting vegetation in the ditches and
3. Constructing drainage basins/sediment ponds
4. Using farm inputs or practices that do not pose a risk to water quality.

Details on these specific management practices are provided in the MPUR submitted every April 1. In early 2009 the Coalition conducted visits to growers within the first priority subwatersheds and documented current management practices and any practices that the grower would implement in 2009 and 2010. Results from those surveys were summarized in the 2010 MPUR. In 2010 and 2011, the Coalition began visits to growers in second and third priority subwatersheds, respectively. Information from the second priority subwatershed contacts will be included in the 2011 MPUR. The Coalition has followed up with growers in the first priority subwatersheds to determine what new practices were implemented in 2009 and 2010. An analysis of changes in management practices within the first priority subwatershed in relation to water quality monitoring results will be included in the 2011 MPUR.

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

Monitoring data indicate that the number of exceedances of pesticides and metals decreased relative to in previous years, most notably in the first three high priority site subwatersheds. Pesticide exceedances decreased from 11 in 2009 to 10 in 2010 and metals exceedances decreased from 11 in 2009 to 9 in 2010. These three locations were prioritized first due to the frequency and magnitude of pesticide exceedances from 2004 to 2008; in particular chlorpyrifos and overall poor water quality. Of the first high priority subwatersheds, there was a single chlorpyrifos exceedance which may be due to a non-member that has recently joined the Coalition; the Coalition has recently met with this grower to discuss management practices. Of the four second priority subwatersheds, there was a single chlorpyrifos exceedance however the water body was non contiguous at the time (Cottonwood Creek @ Rd 20 sampled on January 19, 2010). Monitoring results from the summer of 2010 indicate that visits from Coalition representatives and the presumed implementation of management practices are resulting in improved water quality. Of the remaining seven chlorpyrifos exceedances, two were from Lateral 2 ½ near Keyes which is a third priority subwatershed and will have focused outreach and education in 2011.

In the case of metals, one explanation for the reduction in exceedances is the Coalition's testing for dissolved metals rather than total (dissolved plus particulate) metals. When testing for total metals, a calculation was performed to convert total metal to dissolved metal and the conversion resulted in numerous exceedances. 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 Coalition will perform an analysis of the data and provide the results in the Management Plan Update to be submitted on April 1, 2011. The metals causing the greatest number of exceedances were copper with eight exceedances in 164 samples (4.9%) and arsenic with one exceedance in 18 samples (5.6%). As mentioned above, there was only one arsenic exceedance and the 8 copper exceedances occurred at 5 sites suggesting that arsenic was a result of site-specific factors and copper exceedances were a result of similar conditions across the Coalition region. For copper, it is difficult to determine if these conditions are the result of agricultural practices. 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.

There were fewer pesticide exceedances in 2010 compared to past years. Chlorpyrifos remains the most problematic pesticide applied in the Coalition region with 9 exceedances from January through December 2010. The only other currently registered pesticide that caused a single exceedance was diuron.

Water column toxicity occurred in five of 166 samples (3.0%) in 2010. In 2010, one sample was toxic to *Selenastrum*, two to *Pimephales*, and two to *Ceriodaphnia* indicating a significant decline in *Selenastrum* toxicity (five algae toxicities occurred in 2009). The other area with notable improvement was sediment toxicity. In the past, sediment toxicity occurred at between 40 and 60% of the samples. Sediment toxicity in samples occurred only once in 2009 and in 2010, a significant improvement over previous years. For example, in 2008, sediment toxicity occurred in 24 samples.

The conclusions from these data are that 1) individual grower visits are an effective method of communicating with members, and 2) implementation of management practices is improving water quality in the Coalition region.

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

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

The Coalition recommends that the CVRWQCB do the following:

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