East San Joaquin
WATER QUALITY COALITION
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May 1, 2014

Pamela Creedon
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 (Coalition or ESJWQC) is submitting the 2014 Annual Report for review by the Central Valley Regional Water Quality Control Board (CVRWQCB) as required by the Waste Discharge Requirements General Order for Growers within the Eastern San Joaquin River Watershed that are Members of ESJWQC (R5-2012-0116-R1).

The 2014 Annual Report is being submitted to inform the Regional Board of the ESJWQC monitoring and reporting program and management of water quality within the Coalition region for the period of January 1, 2013 through September 30, 2013. Included in the 2014 Annual Report are updates of monitoring results, a status update of constituents and subwatersheds requiring a management plan, an evaluation of the current Management Plan strategy including a status update of high priority site subwatershed performance goals, a summary of outreach and education activities, and a summary of current and newly implemented management practices in high priority site subwatersheds. In addition, the 2014 Annual Report includes an evaluation of management practice effectiveness, a summary of required grower submittals, and an analysis of spatial trends of the relationship between exceedances and use of various pesticides or the presence of dairies.

Electronic files will be mailed including:

1. 2014 Annual Report (electronic)
2. Appendices I – IX (electronic)
3. SWAMP Comparable Database with ESJWQC results through September 2013 (Microsoft Access; electronic), and GIS Geodatabase (electronic)
4. 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. The Coalition guarantees the quality of the data received from laboratories. The Coalition report these data accurately 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.

During the January through September 2013 reporting period, the Coalition's monitoring program met MRP requirements as described in the Annual Report. Sampling occurred during all months of the reporting period (including two storm events and two sediment events), and all data generated are an accurate reflection of conditions in the Coalition region. Overall, there was compliance with completeness, accuracy, and precision requirements for data collected from January through September 2013. The Coalition addressed each of the programmatic questions, performed a spatial trends analysis, and included conclusions and recommendations in the Annual Report.

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

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

Submitted respectfully,

Parry Klassen
Executive Director
East San Joaquin Water Quality Coalition

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

Annual Report

January 2013 – September 2013

Submitted May 1, 2014

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A	Assessment
AG	Agriculture
AI	Active Ingredient
AMR	Annual Monitoring Report
APN	Assessor Parcel Number
AWEP	Agricultural Water Enhancement Program
BMP	Best Management Practice
BU	Beneficial Use
C	Core
CalPIP	California Pesticide Information Portal
CDEC	California Data Exchange Center
CEDEN	California Environmental Data Exchange Network
CEQA	California Environmental Quality Act
COC	Chain of Custody
CRM	Certified Reference Materials
CURES	Coalition for Urban and Rural Environmental Stewardship
CVRWQCB	Central Valley Regional Water Quality Control Board
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
CVSC	Central Valley Salinity Coalition
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
DPR	Department of Pesticide Regulation
DQO	Data Quality Objective
DWR	(California) Department of Water Resources
DWSC	Deep Water Ship Channel
EC_{50}	Effective Concentration of 50% of the measured endpoint
EPA	(United States) Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
ESJHVA	East San Joaquin High Vulnerability Area
ESJWQC	East San Joaquin Water Quality Coalition
F	Field
FD	Field Duplicate
FEP	Farm Evaluation Plan
GAR	Groundwater Quality Assessment Report
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
MPEP	Management Practice Evaluation Program
MPM	Management Plan Monitoring
MPN	Most Probable Number
MPU	Monitoring Plan Update
MPUR	Management Plan Update Report
MRP	Monitoring and Reporting Program Order No. R5-2008-0005
MRPP	Monitoring and Reporting Program Plan
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MUN	Municipal and Domestic Supply
NA	Not Applicable
ND	Not Detected
NM	Normal Monitoring
NMP	Nitrogen Management Plan
NOA	Notice of Applicability
NRCS	Natural Resources Conservation Service
OP	Organophosphate Pesticides
PAM	Polyacrylamide
PCA	Pest Control Advisor
pH	Power of Hydrogen
PR	Percent Recovery
PTFE	Polytetraflouroethylene (Teflon™)
PUR	Pesticide Use Report
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
REC 1	Water Contact Recreation
RfD	Reference Dose
RL	Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SC	Specific Conductance
SD	Standard Deviation
SECP	Sediment and Erosion Control Plan
SG	Statistically significantly different from control; Greater than 80% threshold
SL	Statistically significantly different from control; Less than 80% threshold
SOP	Standard Operating Procedure
SWAMP	Surface Water Ambient Monitoring Program
TBD	To Be Determined
TDS	Total Dissolved Solids
TID	Turlock Irrigation District
TIE	Toxicity Identification Evaluation
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TSS	Total Suspended Solids
USDA	United States Department of Agriculture

US EPA	United States Environmental Protection Agency
VOA	Volatile Organic Analyte
WDR	Waste Discharge General Order R5-2012-0116
WQO	Water Quality Objective
WQTL	Water Quality Trigger Limit
WY	Water Year
YSI	Yellow Springs Instruments

LIST OF UNITS

°C	degrees Celsius
cfs	cubic feet per second
cm	centimeter
dw	dry weight
g	gram
kg	kilogram
L	liter
lbs	pounds
mg	milligram
mL	milliliter
mm	millimeter
mph	miles per hour
MPN/100mL	most probable number per 100 milliliters
ng	nanograms
NTU	Nephelometric Turbidity Units
sec	second
µg	microgram
µm	micrometer
µmhos	micromhos
µS	microsiemens

LIST OF TERMS

Agricultural Commissioner – County Agriculture Commissioner
ArcGIS – Geographic Information Systems mapping software
Central Valley or Valley – California Central Valley
Coalition –East San Joaquin Water Quality Coalition
Coalition/ESJWQC region – The region within the Central Valley that is monitored by the East San Joaquin Water Quality Coalition
Drainage –Water that moves horizontally across the surface or vertically into the subsurface from land
General Order –Waste Discharge General Order R5-2012-0116
Landowners – One or more persons responsible for the management of the irrigated land
Non project QA sample – Sample results from another project other than the Coalition included to meet laboratory Quality Assurance requirements.
Normal Monitoring –Refers to monitoring in the most recent MRPP
Regional Board – Central Valley Regional Water Quality Control Board
Site subwatershed – Starting from the sampling site, all waterbodies that drain, directly or indirectly, into the waterbody before the point where sampling occurs.
Special study – A study conducted outside of Normal Monitoring activities that involves monitoring specific constituents in an effort to determine the mechanism responsible for the exceedances; also includes Total Maximum Daily Load (TMDL) monitoring.
Subwatershed – The topographic perimeter of the catchment area of a stream tributary (Environmental Protection Agency (EPA) terms of environment: http://www.epa.gov/OCEPAterms/sterms.html).
Tributary Rule – Beneficial uses for Coalition monitoring sites are applied based on the most immediate downstream waterbody (not applied to constructed agricultural drains such as ones in Delta islands).
Waiver – Central Valley Regional Water Quality Control Board Coalition Group Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands, Order No. R5-2008-0005 amending Order No. R5-2006-0053.
Waterbody –Standing or flowing water of any size that may or may not move into a larger body of water, including lakes, reservoirs, ponds, rivers, streams, tributaries, creeks, sloughs, canals, laterals and drainage ditches.
Watershed – The land area that drains into a stream; the watershed for a major river may encompass a number of smaller watersheds that ultimately combine at a common point (EPA terms of environment: http://www.epa.gov/OCEPAterms/wterms.html).

ANNUAL REPORT REQUIREMENTS – SECTION KEY

Required Sections: Annual Monitoring and Management Plan Update Reports as outlined in the Waste Discharge Requirements General Order (WDR or General Order) for Growers within the Eastern San Joaquin River Watershed (Order No. R5-2012-0116)	Section Name/Location – Annual Report
1. Signed Transmittal Letter	Cover Letter
2. Title page	East San Joaquin Water Quality Coalition Annual Report
3. Table of contents	Table of Contents, List of Tables, List of Figures, List Appendices, List of Acronyms, List of Units, and List of Terms
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	Sampling Site Descriptions and Rainfall Records
8. Location map(s) of sampling sites, crops and land uses	Sampling Site Descriptions and Rainfall Records, and Appendix VIII (Land Use Maps)
9. Tabulated results of all analyses arranged in readily discernible tabular form	Appendix III (Monitoring Results), and Appendix IV (Lab and Field QC Results)
10. Discussion of data relative to water quality objectives, and water quality management plan milestones where applicable	Monitoring Results and Sample Details, Discussion of Results, and Conclusions and Recommendations
11. Sampling and analytical methods used	Sampling and Analytical Methods
12. Summary of Quality Assurance Evaluation results (as identified in the most recent approved QAPP for Precision, Accuracy and Completeness)	Precision, Accuracy and Completeness
13. Specify method used to obtain flow at each monitoring site during each monitoring event	Sampling and Analytical Methods
14. Summary of Exceedance Reports submitted during reporting period and related pesticide use information	Discussion of Results, Appendix V (Pesticide Use Reports), Appendix VI (Exceedance Reports), and PUR Access Database (attached CD)
15. Actions taken to address water quality exceedances, including but not limited to, revised or additional management practices implemented	Actions Taken To Address Water Quality Exceedances, and Appendix VII (Meetings, Agendas and Handouts)
16. Evaluation of monitoring data to identify spatial trends and patterns	Six Key Programmatic Questions #3: Spatial Tends
17. Summary of Nitrogen Management Plan information	Summary of Required Grower Submittals (Nitrogen Management Plan section)
18. Summary of management practice information collected from Farm Evaluations	Summary of Required Grower Submittals (Farm Evaluations section)
19. Summary of mitigation monitoring	Summary of Required Grower Submittals (Nitrogen Management Plan section)
20. Updated table of exceedances for management plans	Status of Special Projects, Appendix I (High Priority Site Subwatershed Analysis), and Appendix II (High Priority Site Subwatershed Exceedance Tables)
21. List of new management plans triggered since the previous report	MPM Design: Management Plan Development Timelines and Priority Site Management, Status of Special Projects
22. Status update on preparation of new management plans and special projects	Status of Special Projects
23. Summary and assessment of MPM data collected during reporting period	Discussion of Results, Status of Special Projects, Evaluation of Management Practice Effectiveness (Six Key Programmatic Questions #4 and #6), Coalition Wide Evaluation, and Appendix I (High Priority Site Subwatershed Analysis)

Required Sections: Annual Monitoring and Management Plan Update Reports as outlined in the Waste Discharge Requirements General Order (WDR or General Order) for Growers within the Eastern San Joaquin River Watershed (Order No. R5-2012-0116)	Section Name/Location – Annual Report
24. Summary of management plan grower education and outreach conducted	Actions Taken to Address Exceedances of Water Quality Objectives: Summary of Outreach, Education and Collaboration Activities, Management Practices, and Appendix I (High Priority Site Subwatershed Analysis)
25. Summary of the degree of implementation of management practices	Management Practices, and Appendix I (High Priority Site Subwatershed Analysis)
26. Results from evaluation of management practice effectiveness	Evaluation of Management Practice Effectiveness (Six Key Programmatic Questions #4), Coalition Wide Evaluation, and Appendix I (High Priority Site Subwatershed Analysis)
27. Evaluation of progress in meeting Performance Goals and Schedules	Actions Taken to Address Exceedances of Water Quality Objectives: Performance Goals and Schedules, Management Practices, and Appendix I (High Priority Site Subwatershed Analysis)
28. Recommendations for changes to the Management Plan	Conclusions and Recommendations
29. Conclusions and recommendations	Conclusions and Recommendations

MPM-Management Plan Monitoring
PUR-Pesticide Use Report
QC- Quality Control
SWAMP- Surface Water Ambient Monitoring Program

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

Table A. ESJWQC MRPP and QAPP amendments summary.

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

Item Number	Amendments Descriptions	Date Submitted[1]	MRP Plan Page Number	Date Approved
1	Request to exchange sites: Exchanged Mootz Drain @ Langworth Rd for Mootz Drain downstream of Langworth Pond.	September 4, 2009	Table 4, Page 30 Figure 11, Page 32 Table 5, Page 37 Figure 12, Page 40 Verbiage, Pages 44-45 Table 7, Page 47 Table 10, Page 52 Table 11, Page 55 Table 13, Page 61 Attachment II	November 18, 2009
2	Request to submit quarterly monitoring results in electronic format[1]	May 6, 2010	Table 16, Page 73 Verbiage, Page 72	May 17, 2010
3	Request to stop monitoring at South Slough @ Quinley Rd.	June 5, 2009	Table 4, Page 30 Figure 11, Page 32 Table 5, Page 37 Figure 12, Page 40 Verbiage, Pages 44-45 Table 7, Page 47 Table 10, Page 52 Table 11, Page 55 Table 13, Page 61 Attachment II	June 3, 2010
4	Updated MRPP to consolidate all approved amendments since 9/15/2008 MRPP approval. Updates included type corrections as well.	October 20, 2010	Verbiage, Page 8 Table 10, Page 52 Table 12, Page 58 Table 13, Page 61 Table 14, Page 66 Verbiage, Page 59	February 23, 2011
5	Modification to Monitoring Strategy- Request to stop monitoring for certain Assessment constituents except during high Total Suspended Solids (TSS) events	Originally sent: May 14, 2009 Resent: November 11, 2010	Table 13, Page 63 Table 13B	May 6, 2011
6	Modification to Monitoring Schedule-Request to remove Yori Grove Drain @ East Taylor Rd from the monitoring plan and replace site with Levee Drain @ Carpenter Rd.	December 28, 2011	Table 4, Page 31 Table 5, Page 37 Verbiage, Page 46 Table 7, Page 49 Table 10, Page 52	February 7, 2012

Item Number	Amendments Descriptions	Date Submitted[1]	MRP Plan Page Number	Date Approved
7	Modification to Monitoring Schedule-Request to remove Duck Slough @ Hwy 99 from the monitoring plan due to highway construction.	April 12, 2012	Table A Table 4, Pages 30-31 Table 5, Page 37 Verbiage, Page 42 Table 7, Pages 46-48 Table 10, Pages 53-54	April 26, 2012
8	Updated associated tables to reflect the suspension of Core and Management Plan Monitoring and the reduction of Assessment Monitoring constituents.	April 30, 2012	Table 8, Page 50 Table 9, Page 51 Table 10, Pages 52-53 Table 12, Pages 60-62	April 17, 2012
9	Request to update MRPP and associated QAPP sample preservation temperatures to be consistent with EPA method requirements, to update preservation and holding requirements for sediment chemistry and sediment Total Organic Carbon (TOC) analysis, and to update the analytical method for triazines to EPA 8141A.	November 26, 2012	Verbiage, Page 62 Table 14, Pages 66-69	January 15, 2013
10	Modification to Monitoring Schedule and associated tables-Request to remove Peaslee Creek @ Lake Rd from the monitoring plan due to no access. Added 'C' to Core sites being monitored in 2013 (Table 10), updated footnote to read "Core Monitoring was suspended April 17, 2012 and resumes in 2013. Updated typo in the site name for Highline Canal @ Lombardy Rd (Table 10). Revised Table 9 for 2013 monitoring.	December 5, 2012	Table 4, Pages 30-31 Table 5, Page 37 Table 7, Pages 46-48 Table 9, Page 50 Table 10, Pages 53-54	January 4, 2013
11	Modification to Monitoring Schedule and associated tables-Request to remove Burnett Lateral @ 28 Mile Rd due to site no longer located in ESJWQC boundary.	March 5, 2013	Table 4, Page 30-31 Table 5, Page 37 Verbiage, Page 41 Table 7, Page 46-48 Table 10, Page 51-52	March 8, 2013
12	Modification to Monitoring Schedule-Request to remove Silva Drain @ Meadow Dr from the monitoring plan.	June 4, 2013	NA	February 13, 2014
Modifications to Original ESJWQC QAPP Plan				
1	QAPP updated to consolidate all approved amendments since 9/15/2008 QAPP approval. Updates include typo corrections.	October 20, 2010	Verbiage, Page 2 Verbiage, Page 8 Figure 1, Page 11 Verbiage, Page 26 Table 5, Page 22 Table 8, Page 26 Table 15, Page 44 Table 16, Page 45 Verbiage, Page 49 Table 17, Page 51 Table 18, Page 53 Table 19, Page 55 Verbiage, Page 56 Figure 4, Page 59 Appendices: XI-XXXII and, XXXV-XXXVII	February 23, 2011

Item Number	Amendments Descriptions	Date Submitted[1]	MRP Plan Page Number	Date Approved
2	QAPP updated method validation package for analysis of pyrethroids in sediment using GC/MS-NCI SIM.	December 6, 2010	Table 2, Page 16 Table 13, Page 40 Table 15, Page 44 Table 16, Page 45	February 18, 2011
3	Request to update MRPP and associated QAPP sample preservation temperatures to be consistent with EPA method requirements, to update preservation and holding requirements for sediment chemistry and sediment Total Organic Carbon (TOC) analysis, and to update the analytical method for triazines to EPA 8141A.	November 26, 2012	Verbiage, Page 62 Table 14, Pages 66-69	January 15, 2013
4	Request to update QAPP data quality objectives and QC limits.	February 15, 2013	Verbiage, Pages 1, 7, 13, 26, 28, 52 Table 1, Page 9 Table 5, Pages 21-22 Figure 1, Page 10 Table 20, Page 59 Figure 1, Page 10 Table 10, Page 29 Table 16, Pages 47-50 Table 17, Pages 51-54 Table 18, Pages 55-56	Pending

[1] All deliverables are submitted electronically (Quarterly Data Submittal, Annual Monitoring Report and Management Plan Update Report).

NA-Not applicable

Table B. ESJWQC Management Plan Updates and Amendments Summary.

Item Number	Amendments Descriptions	Date Submitted[1]	Management Plan Page Number	Date Approved
	Original ESJWQC Management Plan Report	**October 30, 2008**		**November 25, 2008**
1	2009 Management Plan Update Report.	April 1, 2009	NA	September 28, 2009
2	Request to exchange priority sites: Hilmar Drain @ Central Ave for Bear Creek @ Kibby Rd	October 23, 2009	Table B Pages 23-25, 35-36	November 18, 2009
3	Request to modify Management Plan schedules to review status of current and the next set of high priority subwatersheds and proposed schedule for year of focused approach	June 5, 2009	Verbiage, Page 65, Table B	December 16, 2009
4	Request to exchange sites: Exchanged Mootz Drain @ Langworth Rd for Mootz Drain downstream of Langworth Pond	September 8, 2009	Table B	November 18, 2009
5	2010 Management Plan Update Report	April 1, 2010	NA	June 21, 2010
6	Request to modify Management Plan Performance Goal schedule to address the remaining site subwatersheds	June 5, 2010	Table 8, Table 9, Pages 28-31, Table 18, Pages 77-79	June 8, 2010
7	Request to exchange priority sites: Ash Slough @ Ave 21 with Lateral 2 ½ near Keyes Rd and update Management Plan Performance Goals table for 3rd priority	October 12, 2010	Table B	November 17, 2010
8	2011 Management Plan Update Report	April 1, 2011	NA	May 17, 2011
9	Request to update Management Plan Performance Goals for 4th priority	October 17, 2011	NA	November 14, 2011
10	Request to remove constituents from site specific management plans	January 6, 2012	NA	May 30, 2012
11	2012 Management Plan Update Report	April 1, 2012	NA	June 25, 2012
12	Request to extend 4th priority Management Plan Performance Goals deadlines for Performance Measures 2.1 and 2.2	July 23, 2012	NA	July 30, 2012
13	Request to update Management Plan Performance Goals for 5th priority	October 23, 2012	NA	November 1, 2012
14	Request to remove constituents from site specific management plans	November 7, 2012	NA	October 15, 2013
15	2013 Management Plan Update Report	April 1, 2013	NA	July 1, 2013
16	Request to extend 5th priority Management Plan Performance Goals deadlines for Performance Measures 2.1 and 2.2	May 30, 2013	NA	June 3, 2013
17	Second request to extend 5th priority Management Plan Performance Goals deadlines for Performance Measures 2.1 and 2.2	September 12, 2013	NA	September 23, 2013
18	Request to update Management Plan Performance Goals for 6th priority and exchange priority site Silva Drain @ Meadow Drive with Ash Slough @ Ave 21	September 23, 2013	NA	January 28, 2014
19	Request to remove Silva Drain @ Meadow Dr from monitoring and management plan.	June 4, 2013	NA	February 13, 2014
	Revised ESJWQC Management Plan Report	**May 1, 2014**		**Pending**

[1] All deliverables are submitted electronically (Quarterly Data Submittal, Annual Monitoring Report and Management Plan Update Report)
NA-Not applicable

EXECUTIVE SUMMARY

The East San Joaquin Water Quality Coalition (ESJWQC or Coalition) is submitting its Annual Monitoring Report and Management Plan Update Report (MPUR) as a single Annual Report on the status and methods used to 1) identify agriculture sources of discharges resulting in exceedances of Water Quality Trigger Limits (WQTL), 2) track implemented management practices, and 3) document progress toward meeting its performance goals as outlined in the ESJWQC Management Plan. An Annual Report is to be submitted every May 1 to report the previous Water Year's (WY) monitoring results, outreach activities, and update management plan implementation schedules and timelines for reporting to the Central Valley Regional Water Quality Control Board (CVRWQCB or Regional Board).

This is the sixth yearly update report to the Coalition's Management Plan. In this report, previous year's monitoring data are reviewed and assessed for exceedances and water quality improvements. This update includes an assessment of water quality based on January through September 2013 monitoring results, including new exceedances and new site/constituents requiring management plans.

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

The Coalition area is divided into six zones based on hydrology, crop types, land use, soil types, and precipitation. Zone names are based on the Core Monitoring location within that zone: 1) Dry Creek @ Wellsford Zone, 2) Prairie Flower Drain @ Crows Landing Zone, 3) Highline Canal @ Hwy 99 Zone, 4) Merced River @ Santa Fe Zone, 5) Duck Slough @ Gurr Rd Zone, and 6) Cottonwood Creek @ Rd 20 Zone. Descriptions of zone-specific climate, soil characteristics, land use, as well as water drainage and flow are included in the Coalition's Monitoring and Reporting Plan (submitted August 25, 2008 and approved September 15, 2008).

As required by the WDR (Page 6, Attachment B), monitoring occurred in the Coalition region from January through September 2013 according to the 2008 MRPP (approved September 15, 2008) and Management Plan (approved November 25, 2008). Based on the 2008 ESJWQC MRPP design, there are Core sites and rotating Assessment Monitoring locations in each of the six zones. Core sites establish trends in water quality and will be monitored continuously during the life of the Conditional Waiver program. There are fewer constituents monitored at Core Monitoring locations (primarily physical parameters and nutrients). Assessment Monitoring locations characterize discharge in the zone in which they are located. Assessment Monitoring includes the full suite of constituents. Assessment sites are rotated every third year to a new site. As outlined in the MRPP Table 10, Pages 52-53, Core sites receive Assessment Monitoring every third year. Sampling occurred from January through September 2013 at Assessment, Core, and Management Plan Monitoring (MPM) locations including two storm events and two sediment monitoring events. Total Maximum Daily Load (TMDL) Monitoring also occurred at the three compliance points on the San Joaquin River (SJR) for which ESJWQC is responsible for (Hills Ferry Rd, Maze Blvd, and Airport Way) during one storm event and from May through September 2013 (6 events) as outlined in the Regional Board letter sent on January, 10, 2013. The TMDL Monitoring subsection in the Monitoring Objectives and Design section of this report outlines the ESJWQC and the Westside Coalition's collaborative monitoring plan for assessing compliance with the Lower San Joaquin River concentration based loads at the six compliance points identified in the Basin Plan Amendment.

Monitoring Program Updates

Changes to the monitoring program since the last update include the removal of three monitoring sites (Peaslee Creek @ Lake Rd, Burnett Lateral @ 28 Mile Rd, and Silva Drain @ Meadow Dr), chlorpyrifos and diazinon TMDL compliance monitoring period updates, and the completion of management plan actions for sites and specific constituents.

The Coalition received approval on January 4, 2013 to remove the Assessment Monitoring location Peaslee Creek @ Lake Rd from the ESJWQC MRPP and replace the site with Mustang Creek @ East Ave as the Assessment Monitoring location in Zone 3 for 2013.

On January 10, 2013 the Coalition received a letter from the Regional Board indicating that the monitoring periods for chlorpyrifos and diazinon TMDL requirements should focus on periods of peak application and months when chlorpyrifos and diazinon have been detected above the WQTL in the San Joaquin River or its tributaries (one storm and monthly from May through September).

The Coalition received approval on March 8, 2013 to remove the Assessment Monitoring location Burnett Lateral @ 28 Mile Rd from the monitoring program and replace the site with Mootz Drain downstream of Langworth Pond as the Assessment Monitoring location in Zone 1. Monitoring occurred at Burnett Lateral @ 28 Mile Rd from January through February 2013 (results in Appendix III and IV). Monitoring at Mootz Drain downstream of Langworth Pond occurred April through September 2013.

The Coalition received approval on February 13, 2014 to remove the Zone 4 Assessment Monitoring location Silva Drain @ Meadow Dr from the ESJWQC monitoring program and high priority focused outreach schedule. The February 13, 2014 approval approved the sixth high priority site subwatershed Performance Goals and Measures.

The Coalition received approval on October 15, 2013 to remove specific site/constituent pairs from active management plans for eight site specific constituents at seven high priority subwatershed locations. Three years of monitoring at a site subwatershed with no exceedances of a specific constituent indicates improved water quality due to improved grower cognizance of the offsite movement of agricultural constituents and/or newly implemented management practices.

Monitoring Program Updates for the WDR

The Coalition's Waste Discharge Requirements General Order R5-2012-0116-R1 (Order or WDR) was adopted on December 7, 2012. Below is a list of the items the Coalition has submitted for compliance.

The Coalition submitted the third party application for Notice of Applicability (NOA) on December 14, 2012 and received approval on January 11, 2013.

The Coalition submitted templates for the Farm Evaluation Plan, Nitrogen Management Plan, and Sediment and Erosion Control Plan on April 11, 2013. The Coalition resubmitted the Farm Evaluation Template on December 6, 2013 and received approval on December 9, 2013. The Coalition resubmitted the Sediment and Erosion Control Plan on January 13, 2014. Approval for both the Nitrogen Management Plan and the Sediment and Erosion Control Plan is pending Regional Board review.

The Coalition submitted the Groundwater Quality Assessment Report (GAR) outline to the Regional Board on April 11, 2013. The GAR was submitted on January 13, 2014 and approval is pending. The Sediment and Erosion Assessment was submitted on January 13, 2014 and approval is pending.

The Coalition received approval on February 14, 2014 for the 2014 WY Monitoring Plan Update (MPU).

Monitoring Program Objectives

The primary objectives of the monitoring program are to characterize discharge from irrigated agriculture and to determine if the implementation of management practices can be effective in reducing or eliminating discharge and impairments of beneficial uses. In order to achieve the Normal Monitoring objectives, the Coalition monitored 25 sites from January through September 2013. Of these 25 sites, MPM took place at 20 sites as outlined in the 2013 ESJWQC Management Plan Update Report (MPUR). Twelve of the 20 sites received MPM only (Bear Creek @ Kibby Rd, Berenda Slough along Ave 18 ½, Black Rascal Creek @ Yosemite Rd, Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59, Hatch Drain @ Tuolumne Rd, Highline Canal @ Lombardy Rd, Hilmar Drain @ Central Ave, Howard Lateral @ Hwy 140, Lateral 2 ½ near Keyes Rd, Livingston Drain @ Robin Ave and McCoy Lateral @ Hwy 140), all six Core sites were monitored for management plan constituents, and two management plan sites were also Assessment Monitoring sites where management plan constituents were sampled on a monthly basis (Dry Creek @ Rd 18 and Miles Creek @ Reilly Rd).

Based on the prioritization of exceedances, MPM was conducted for copper, lead, chlorpyrifos, diazinon, dimethoate, diuron, and water column toxicity to *Ceriodaphnia dubia, Pimephales promelas, Selenastrum capricornutum,* and sediment toxicity to *Hyalella azteca.*

Monitoring constituents are established by the Irrigated Lands Regulatory Program (ILRP) Monitoring and Reporting Program (MRP) Order No. R5-2008-0005 (Appendix A). From January through

September, the Coalition sampled for numerous water quality parameters and constituents including 45 organic pesticides, *E. coli*, physical parameters (total dissolved solids (TDS), total suspended solids (TSS) and turbidity), nine metals, total organic carbon, five nutrients, field parameters Dissolved Oxygen (DO), pH, and Specific Conductivity (SC), water column toxicity to three test species (*C. dubia*, *P. promelas* and *S. capricornutum*). The Coalition also sampled for sediment physical parameters (grain size and total organic carbon (TOC)), sediment toxicity to *H. azteca,* and nine pesticides as needed. Constituents monitored from January through September 2013 were determined by ILRP Monitoring and Reporting Program (MRP) Order No.R5-2008-0005 (Table 12, Page 59).

On May 6, 2011 the Coalition received approval to modify its MRPP and monitoring strategy to reduce sampling for organochlorines, Group A pesticides, glyphosate and paraquat, and metals not applied by agriculture (arsenic, cadmium, lead and molybdenum). Organochlorines, Group A pesticides, glyphosate and paraquat were monitored during one storm and one irrigation event on February 20, 2013 and August 13, 2013. Metals not applied by agriculture were monitored during two storm and two irrigation events on February 20, 2013, April 2, 2013, July 9, 2013 and August 13, 2013. Monitoring for metals under current management plans continues with the original approved MPM strategy.

Monitoring Program Compliance

From January through September 2013, the Coalition was able to meet its monitoring program objectives by 1) determining the concentration and load of specific contaminants in surface waters, 2) evaluating compliance with existing narrative and numeric water quality limit triggers to determine if implementation of additional management practices is necessary to improve and/or protect water quality, and 3) assessing the impact of storm water discharges from irrigated agriculture to surface water. The Coalition uses management practice survey results to determine which practices to implement in order to reduce discharge of specific wastes that impact water quality in receiving waters of the Coalition region. Results from 2013 indicate improved water quality.

Coalition monitoring from January through September 2013 resulted in exceedances of Water Quality Trigger Limits (WQTLs) for DO, pH, SC, *E. coli*, TDS, ammonia, nitrate, copper, chlorpyrifos, diazinon, diuron, and malathion. Water column toxicity to *C. dubia*, *P. promelas*, and *S. capricornutum* as well as sediment toxicity to *H. azteca* occurred.

The exceedances of WQTLs for physical parameter included DO (48), pH (25), SC (33), TDS (23), and *E. coli* (49). Exceedances of the WQTLs also occurred for nitrate (13) and ammonia (5). Of the metals analyzed, there were 13 exceedances of the hardness based WQTL for dissolved copper. One exceedance each occurred for chlorpyrifos, diazinon, diuron, and malathion. Overall, exceedances of physical parameters and *E. coli* were much more common than exceedances of pesticides or metals.

Water column toxicity to *C. dubia* (4), *P. promelas* (1), and *S. capricornutum* (5) occurred during January through September 2013 monitoring. All toxicities had endpoints 50% or less compared to the control and therefore a Toxicity Identification Evaluations (TIEs) were initiated for all the samples to determine the cause of toxicity. Ammonia was the cause of toxicity to *C. dubia* in samples collected from Levee

Drain @ Carpenter Rd in both February and July and *P. promelas* in February. The cause of both *C. dubia* toxicities in samples collected from Duck Slough @ Gurr Rd in March and Prairie Flower Drain @ Crows Landing Rd in August was organophosphates. Of the five *S. capricornutum* toxicities, all samples collected in February lost toxicity before the TIE could be conducted and the January samples from Prairie Flower Drain @ Crows Landing Rd had elevated concentrations of DO, TSS, and ammonia, therefore; no TIE was conducted.

Sediment toxicity to *H. azteca* occurred in four of 24 samples collected during storm and irrigation sediment monitoring. The sediment toxicity occurred twice at Hatch Drain @ Tuolumne Rd, and once each at Duck Slough @ Gurr Rd and Dry Creek @ Rd 18. Only two of the four toxic sediment samples had survival less than 80% compared to the control and therefore additional chemistry analysis was required. Samples collected from Hatch Drain @ Tuolumne Rd on March 12, 2013 resulted in 72% survival compared to the control and samples collected from Duck Slough @ Gurr Rd resulted in 0% survival; chlorpyrifos and pyrethroids were detected in both samples.

As a result of January through September 2013 monitoring, several new site/constituent specific management plans are required including:

- DO
  - Merced River @ Santa Fe (reinstated management plan)
  - Unnamed Drain @ Hwy 140
- pH
  - Unnamed Drain @ Hwy 140
- SC
  - Duck Slough @ Gurr Rd (reinstated management plan)
- *E. coli*
  - Unnamed Drain @ Hwy 140
- Diazinon
  - Miles Creek @ Reilly Rd
- Water column toxicity to *C. dubia*
  - Levee Drain @ Carpenter Rd

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

The Coalition prioritized constituents and site subwatersheds to allow for focused source identification, outreach, and evaluation. The Coalition prioritized site subwatersheds based on the number, frequency, and magnitude of chlorpyrifos and diazinon exceedances. Other factors considered included size of the site subwatershed and known improvements in management practices that had already been implemented in those areas. Although the Coalition focused on chlorpyrifos and diazinon exceedances and associated applications, management practices implemented to reduce the runoff of these constituents will also reduce the runoff of other pesticides, nutrients, salts, and metals.

The Coalition developed High Priority Site Subwatershed Performance Goals (hereafter referred to as Performance Goals) for its high priority site subwatersheds. The Coalition submitted Performance Goals on November 24, 2008 in an amendment to the Management Plan. These goals were developed with coordination from Regional Board staff after evaluation of the effectiveness of the Coalition's Management Plan strategy. Performance goals are submitted for approval each time a new set of site subwatersheds rotate into high priority status and are built on the following actions essential to the Management Plan strategy:

1. Determine number/type of management practices currently in place, based on Assessor Parcel Number (APN) associated with baseline survey responses
2. Grower Group Contacts / Individual Contacts
3. Implementation of new management practices
4. Assess number/type of new management practices implemented
5. Evaluate effectiveness of new management practices

As described in the Coalition's MPM strategy, when a site subwatershed rotates into high priority status, the Coalition contacts individuals within the site subwatershed who have the potential for direct drainage and have applied constituents of concern. The purpose of grower outreach is to review current farm management practices, determine if additional management practices are applicable, and document implementation of any new practices. Individual meetings inform growers of current water quality concerns and management practices that can be implemented to reduce impairments of water quality due to agricultural discharge.

The first through fourth priority subwatersheds Performance Goals 1-5 are complete. Focused outreach began during late 2012 and early 2013 in the fifth priority site subwatersheds: Hatch Drain @ Tuolumne Rd, Highline Canal @ Lombardy Rd, Merced River @ Santa Fe, and Miles Creek @ Reilly Rd. In 2014, follow-up contacts are scheduled with growers from the fifth priority subwatersheds to document implementation of new practices. The Coalition is in the process of initiating focused outreach in the sixth priority site subwatersheds: Ash Slough @ Ave 21, Mustang Creek @ East Ave, and Westport Drain @ Vivian Rd. Further analysis of the first through sixth high priority site subwatersheds is included in Appendices I and II of this report.

Additionally, the ESJWQC established monitoring and management activities for Total Maximum Daily Load (TMDL) constituents as required in the Regional Board's Basin Plan for the Sacramento and San Joaquin River basins.

The San Joaquin River chlorpyrifos and diazinon TMDL was approved by the United States Environmental Protection Agency (US EPA) on December 20, 2006 and documented in an amendment to the Basin Plan (*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*). As dictated by the Basin Plan Amendment, a surveillance and monitoring program was developed in 2010 to collect information necessary to assess compliance with the seven monitoring objectives. The monitoring objectives are 1) determine load capacity compliance, 2) determine load allocation compliance, 3) determine degree of implemented management practices, 4) determine effectiveness of implemented management practices, 5) determine if alternative pesticides are impairing water quality, 6) determine if additive or synergistic effects of multiple pollutants are causing toxicity, and 7) demonstrate management practices achieve the lowest pesticide levels technically and economically achievable.

The ESJWQC and the Westside Coalition collaborated to develop a monitoring plan for assessing load compliance of the Lower San Joaquin River concentration based loads at the six compliance points identified in the Basin Plan Amendment (Monitoring Objective 1). There were no detections of chlorpyrifos or diazinon in any samples collected from the three San Joaquin River compliance points monitored by ESJWQC during the 2013 WY. However, there was one exceedance of the WQO for chlorpyrifos in samples collected from the Westside Coalition's compliance location at San Joaquin River at Las Palmas Avenue near Patterson in March 2013. Tributary monitoring in the ESJWQC region resulted in one exceedance each of chlorpyrifos (Dry Creek @ Wellsford Rd in September) and diazinon (Miles Creek @ Reilly Rd in February) from October 2012 through September 2013. A complete review of results from monitoring during the 2013 WY as well as an assessment of each Coalition's compliance with Monitoring Objectives 1- 7 will be reported in the San Joaquin River Chlorpyrifos and Diazinon TMDL 2014 Annual Monitoring Report (AMR, to be submitted May 1, 2014).

Conclusions

Monitoring results from January through September 2013 indicate that although there are substantial improvements in water quality in many areas, water quality is still not protective of all beneficial uses across the entire Coalition region. The most common exceedances of WQTLs involved field and physical parameters (such as DO and salts) and *E. coli* resulting in impaired Agricultural and Aquatic Life beneficial uses (BUs) and the Recreation Beneficial Use. Other constituents that impaired Aquatic Life BUs occurred as a result of ammonia and dissolved copper. Impairment to the Municipal and Domestic Supply BU elevated concentrations of diuron, nitrate/nitrite, and ammonia. The most common exceedances involve constituents for which irrigated agriculture may not be the driving factor despite the fact that the landscape consists primarily of irrigated agriculture.

Conclusions from data provided in the Management Practice Effectiveness, Coalition Wide Evaluation, Status of TMDL Constituents, and Spatial Trends analysis sections of this report include:

1. Individual grower visits continue to be an effective method of communicating with members.
2. Implementation of management practices continues to improve water quality in the Coalition region.
3. Growers across the ESJWQC region are aware of water quality impairments and are implementing management practices designed to address these impairments even if the Coalition has yet to conduct focused outreach in the site subwatershed.

4. Growers in the ESJWQC region are taking advantage of available funding resources to implement management practices that improve water quality.
5. Results from January through September 2013 monitoring indicate fewer exceedances in high priority site subwatersheds where both general and focused outreach occurred, as well as in site subwatersheds where only general outreach occurred.
6. Remaining exceedances may be difficult to eliminate because the cause/source of the problems may not be irrigated agriculture and if they are, management practices that are very effective in eliminating exceedances of pesticides are not effective in reducing exceedances of WQTLs for parameters such as DO, SC (salts), *E. coli*, ammonia/nitrates, or pH.
7. Agriculture may not be the only cause of water quality impairments that are the result of elevated concentrations of copper in the Coalition region.
8. The Coalition's focused management practice outreach and tracking strategy is effective at improving water quality. The Coalition received approval on October 15, 2013 to remove eight specific site subwatershed/ constituent pairs from the active management plan of seven site subwatersheds.
9. Continued improvements in water quality are expected based on past grower outreach efforts and upcoming focused outreach in new priority subwatersheds.
10. Lack of improvement in the future will result if there remain growers in the Coalition region who do not have to comply with discharge requirements.

Based on the information provided in the response to the programmatic questions, the Coalition will pursue the following during the 2014 WY:

1. Monitor according to the WDR adopted in December 2012 and the monitoring outline in the Monitoring Plan Update (MPU).
2. Continue to document and assess management practices implemented by Coalition growers.
3. Continue to focus outreach and education efforts around constituents applied by agriculture while also educating growers about non-conserved constituents such as dissolved oxygen and salinity.

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

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

INTRODUCTION

As outlined in the Waste Discharge Requirements General Order for Growers within the Eastern San Joaquin River Watershed (WDR or General Order; Order No. R5-2012-0116-R1), the East San Joaquin Water Quality Coalition (ESJWQC or Coalition) is submitting the Annual Report for monitoring results from January through September of the 2013 Water Year (WY). Results from October through December 2012 were included in the ESJWQC Annual Monitoring Report submitted under the previous Monitoring and Reporting Program (MRP) Order No. R5-2008-0005 on March 1, 2013.

The 2014 Annual Report is the first report submitted by the ESJWQC reporting on the monitoring activities under the WDR. The Annual Report includes sections which address the reporting requirements for the Monitoring Report (Attachment B to General Order R5-2012-0116-R1) and Management Plan Progress Report (Appendix MRP-1). The Annual Report Requirements – Section Key (page xiii) lists the required components from both reports and which section of this report they are addressed in. The Annual Report includes the previous WY monitoring results and activities as well as the status of management plan implementation schedules and timelines in order determine whether discharges from irrigated lands are protective of beneficial uses meeting water quality objectives as well as whether management practices implemented by irrigated agriculture are effective (Attachment A to Order R5-2012-0116-R1, page 10-11).

ESJWQC GEOGRAPHICAL AREA

The ESJWQC area includes the portions of Stanislaus and Merced Counties east of the San Joaquin River, Madera County, the portion of Fresno County that drains directly into the San Joaquin River and the portion of San Joaquin County that drains directly into the Stanislaus River. The eastern counties within the boundary include Tuolumne, Mariposa, and the portions of Calaveras and Alpine Counties that drain into the Stanislaus River. Drainage is determined using the CA Watershed Boundary from the United States Geological Survey (USGS). The region that drains into the Coalition area is bordered by the crest of the Sierra Nevada on the east, the San Joaquin River on the west, the Stanislaus River and its drainage areas on the north, and the San Joaquin River and its drainage areas on the south.

IRRIGATED LAND

Although exact acreage is difficult to estimate due to rapidly changing land use, the Coalition area contains approximately 5,785,945 acres of which 994,931 acres (17%) are considered irrigated (Table 1). To obtain irrigated acreages, the Coalition uses information from two California Department of Water Resources (DWR) data sources: 1) DWR Agricultural Land and Water Use data, and 2) DWR Land Use Survey.

Agricultural Land and Water Use data (DWR, http://www.water.ca.gov/landwateruse/anaglwu.cfm) estimates the acreage of irrigated crops for the entirety of each county. Land Use Survey data (http://www.water.ca.gov/landwateruse/lusrvymain.cfm) includes more detailed information regarding specific crop uses (both irrigated and non-irrigated) than the Agricultural Land and Water Use data but is updated less often. Because Land Use Survey data are available in GIS shape files, the information was mapped to the Coalition area and used for estimates of irrigated crop acreage. The data source used depends on: 1) whether or not the entire county is within the Coalition boundary, and 2) which data were developed most recently.

For San Joaquin, Stanislaus, Merced, Madera, Fresno, Alpine and Calaveras Counties, the Coalition utilized DWR Land Use Survey data to determine irrigated land area as only portions of these counties are included in the Coalition boundary or the data were more current. For Tuolumne and Mariposa Counties, data from Agricultural Land and Water Use were used since these counties are included in their entirety within the Coalition boundary (Table 1). Although the entire county of Madera is represented by the Coalition, the DWR Land Use Survey is more current. For calculations of total acreage, measurements were made using ArcGIS.

Table 1. Acreage of irrigated land in ESJWQC counties and available DWR data.

County	Total County Acreage (measured in ArcGIS)	County Irrigated Land Acreage	Data Source Year (Agricultural Land and Water Use)[1]	Data Source Year (Land Use Survey)[2]
Alpine	84,713	0		2001
Calaveras	120,256	871		2000
Fresno*	657,032	13,774		2000*
Madera*	1,377,854	351,036		2001*
Mariposa	934,860	1,300	2001	
Merced	664,635	363,225		2002
San Joaquin	9,013	6,295		1996
Stanislaus	480,493	257,130		2004
Tuolumne	1,457,089	1,300	2001	
Total	**5,785,945**	**994,931**		

[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 Fresno and Madera Counties are only described for 57% and 37% of the county, respectively.

GEOGRAPHICAL CHARACTERISTICS AND LAND USE

The Coalition area is divided into six zones to facilitate the implementation of a comprehensive monitoring program (Figure 1). These zones are based on hydrology, crop types, land use, soil types, and rainfall. Zone acreages were determined using Land Use Survey Data (Table 2). The zones are named for the Core Monitoring location within that area: 1) Dry Creek @ Wellsford Zone, 2) Prairie Flower Drain @ Crows Landing Zone, 3) Highline Canal @ Hwy 99 Zone, 4) Merced River @ Santa Fe Zone, 5) Duck Slough @ Gurr Rd Zone, and 6) Cottonwood Creek @ Rd 20 Zone. Land use maps for each zone are included in Figures 2-7.

Figure 1. ESJWQC zone boundaries and Core sites.

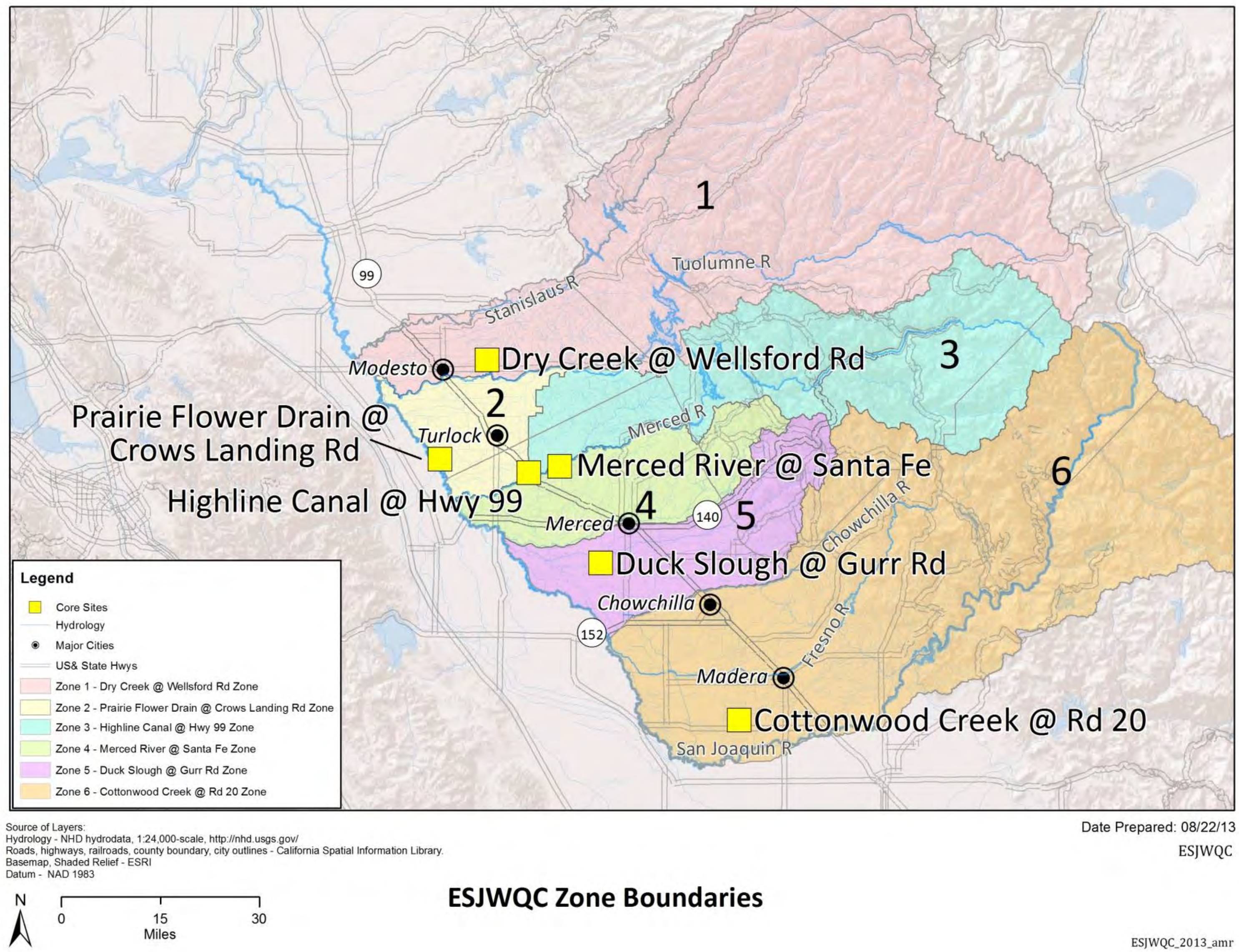


Table 2. ESJWQC 2013 total and irrigated acreages for Zones 1-6.

ZONES	TOTAL ACRES[1] (FROM ARCGIS)	IRRIGATED ACRES[2] (FROM LAND USE)
Zone 1: Dry Creek @ Wellsford Rd Zone	1,932,375	119,247
Zone 2: Prairie Flower Drain @ Crows Landing Rd Zone	196,166	145,476
Zone 3: Highline Canal @ Hwy 99 Zone	857,615	84,460
Zone 4: Merced River @ Santa Fe Zone	339,141	118,681
Zone 5: Duck Slough @ Gurr Rd Zone	396,764	159,834
Zone 6: Cottonwood Creek @ Rd 20 Zone	2,063,969	366,382
Total	**5,786,030**	**994,080**

[1]Total zone acreages calculated using ArcGIS. Total acres in Table 2 versus the amount reported elsewhere may differ.
[2]Irrigated acreage for each zone does not equal the sum of irrigated acres for all ESJWQC counties due to differences in acreage sources obtained between the county DWR Land Use layers and the Agricultural Land and Water Use estimates for 2001 .

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

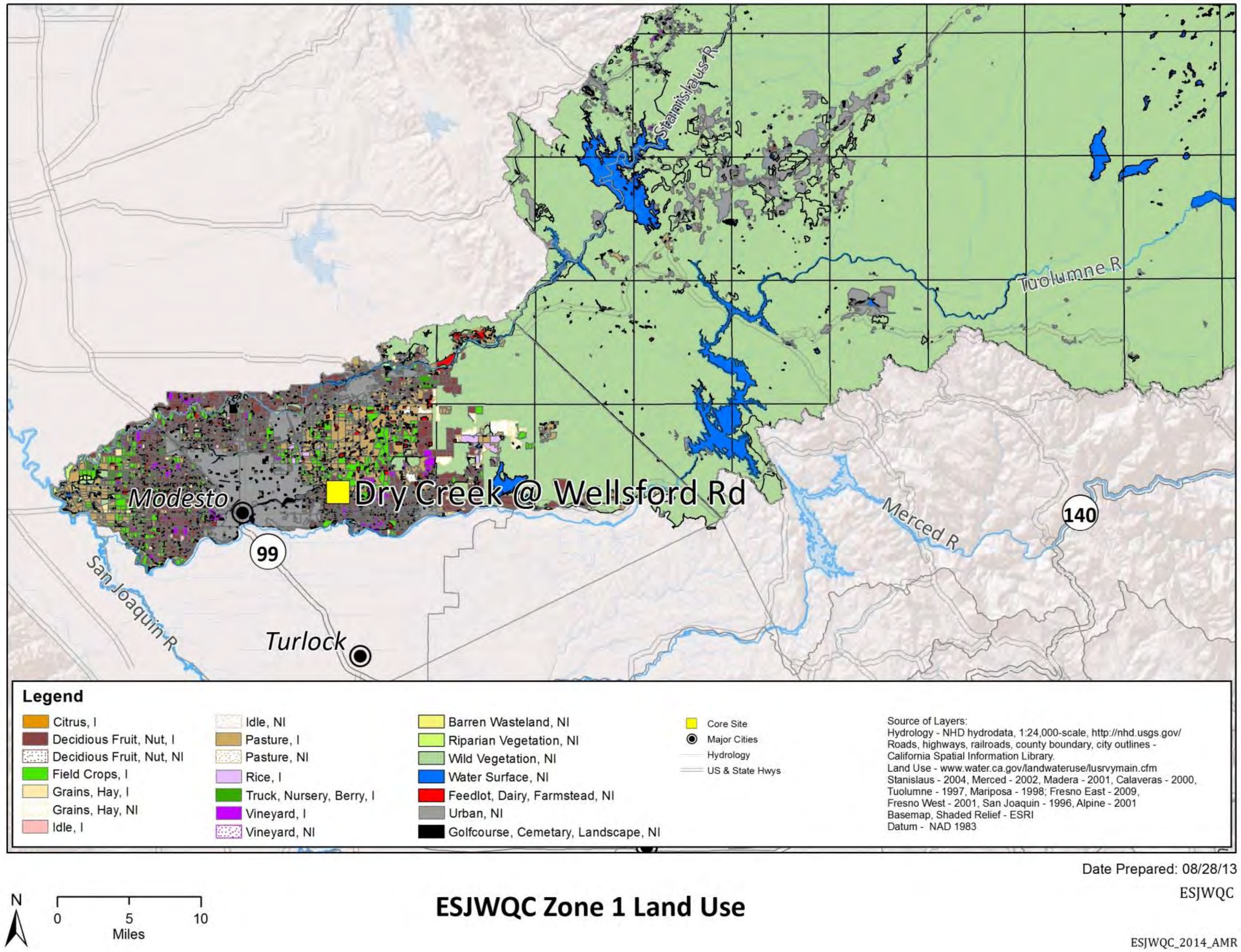


Figure 3. Prairie Flower Drain @ Crows Landing Zone (Zone 2) Land Use.

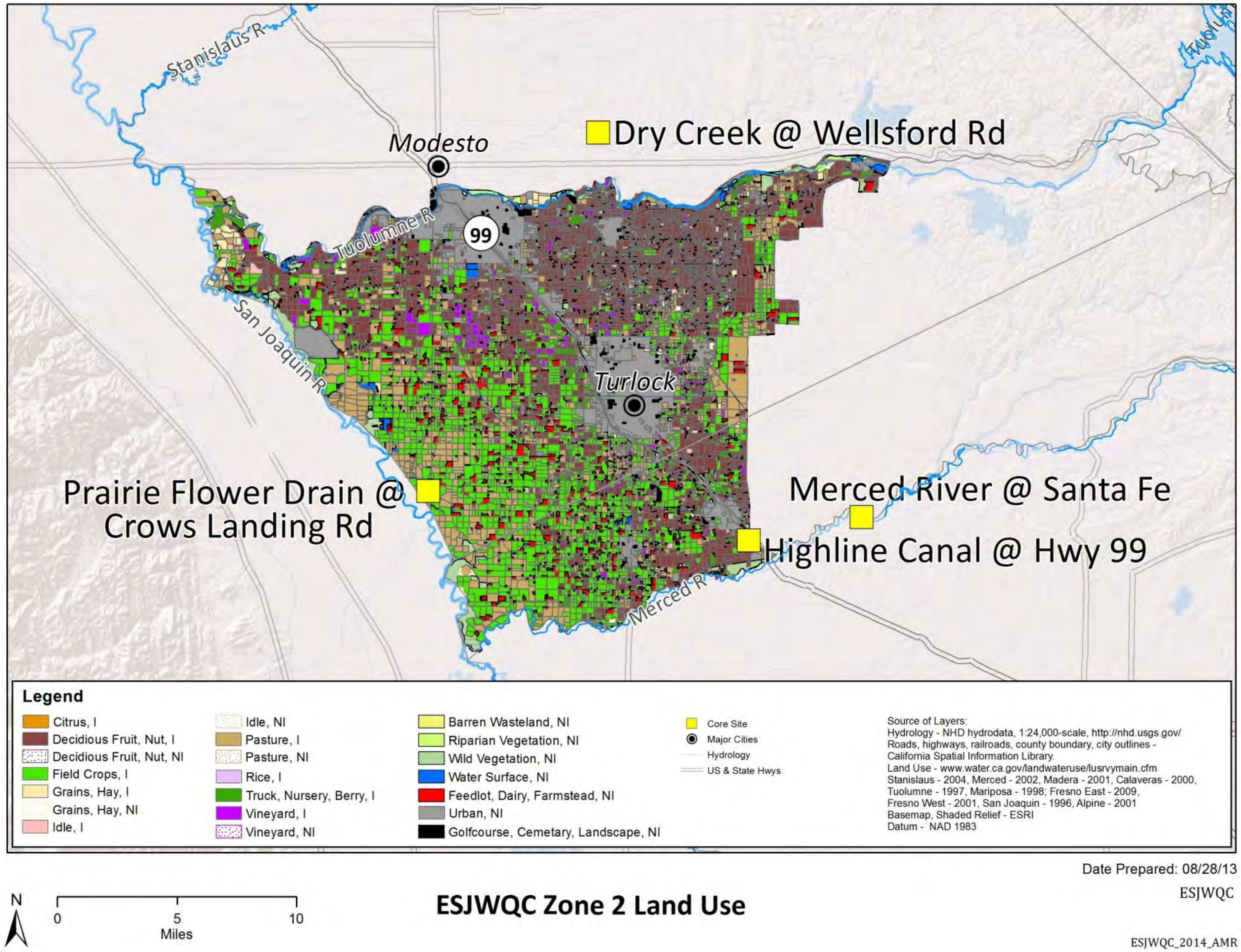


Figure 4. Highline Canal @ Hwy 99 Zone (Zone 3) Land Use.

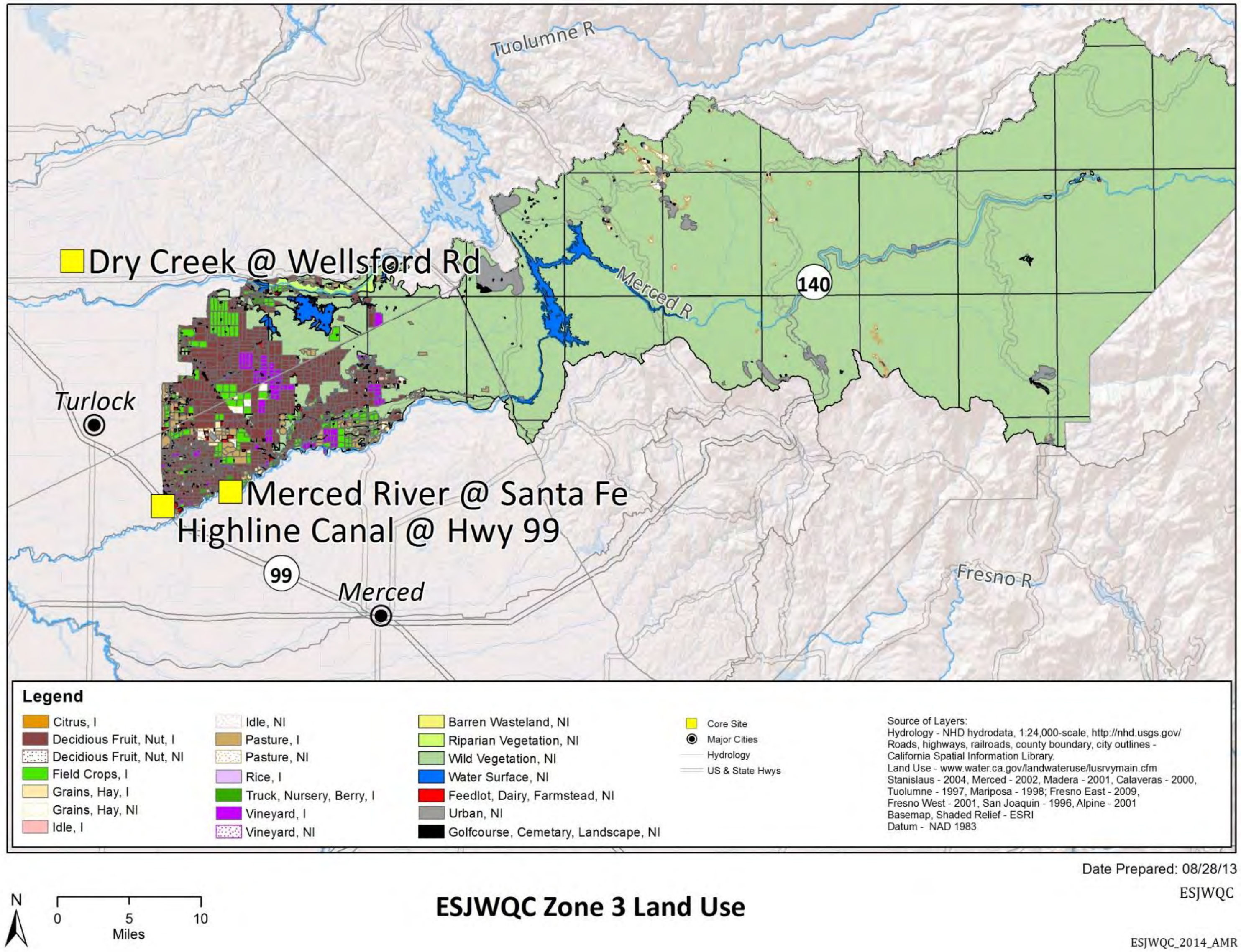


Figure 5. Merced River @ Santa Fe Zone (Zone 4) Land Use.

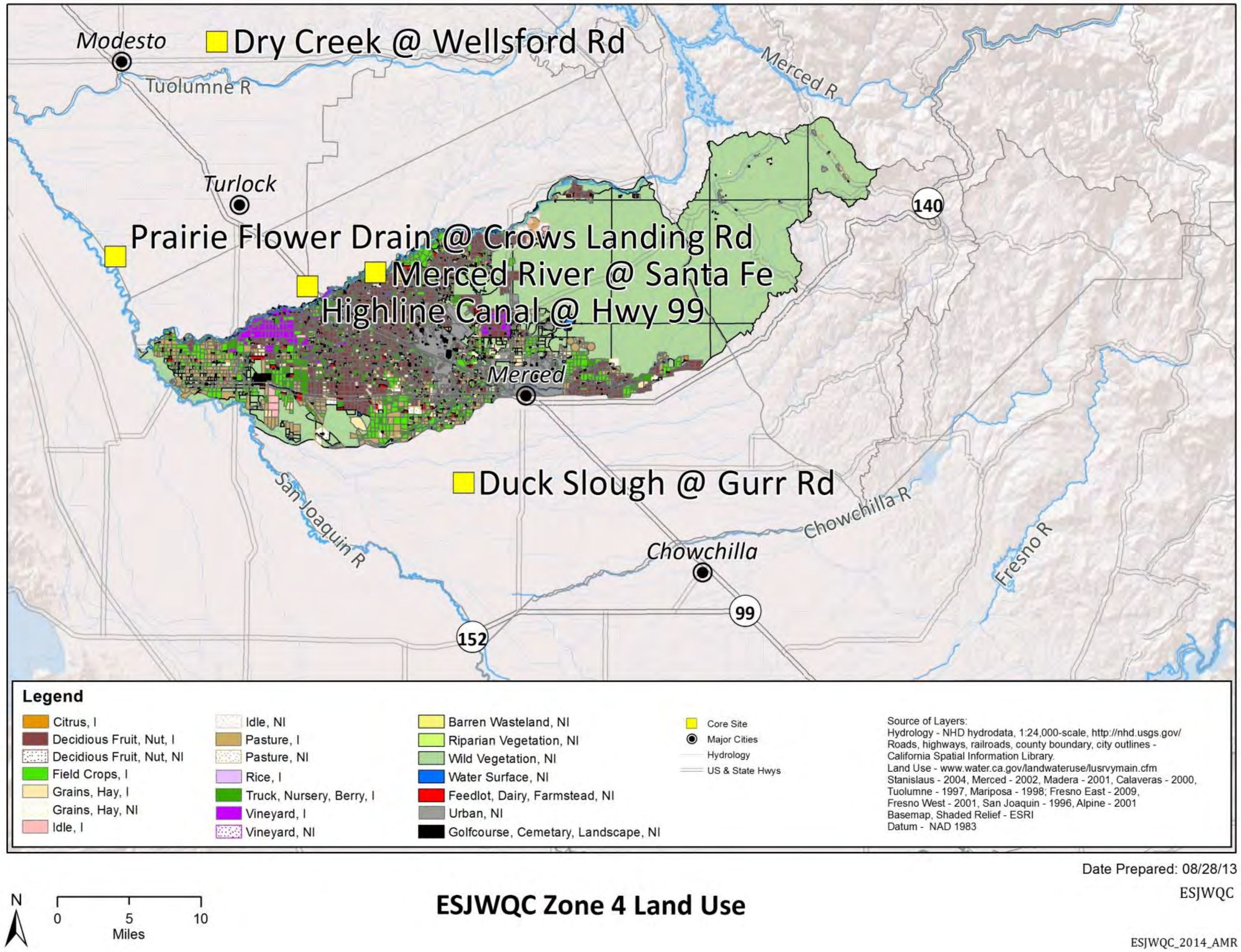


Figure 6. Duck Slough @ Gurr Rd Zone (Zone 5) Land Use.

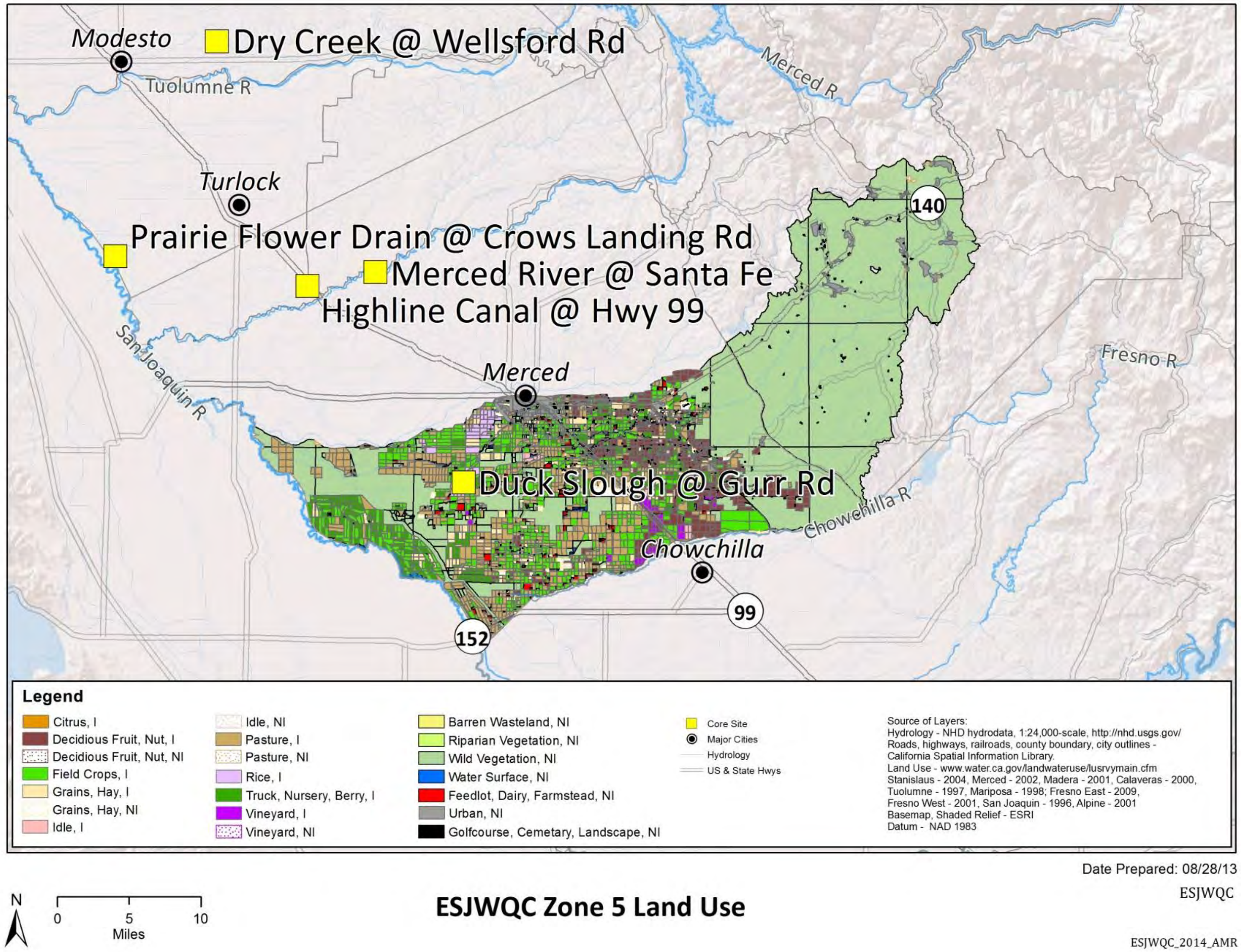
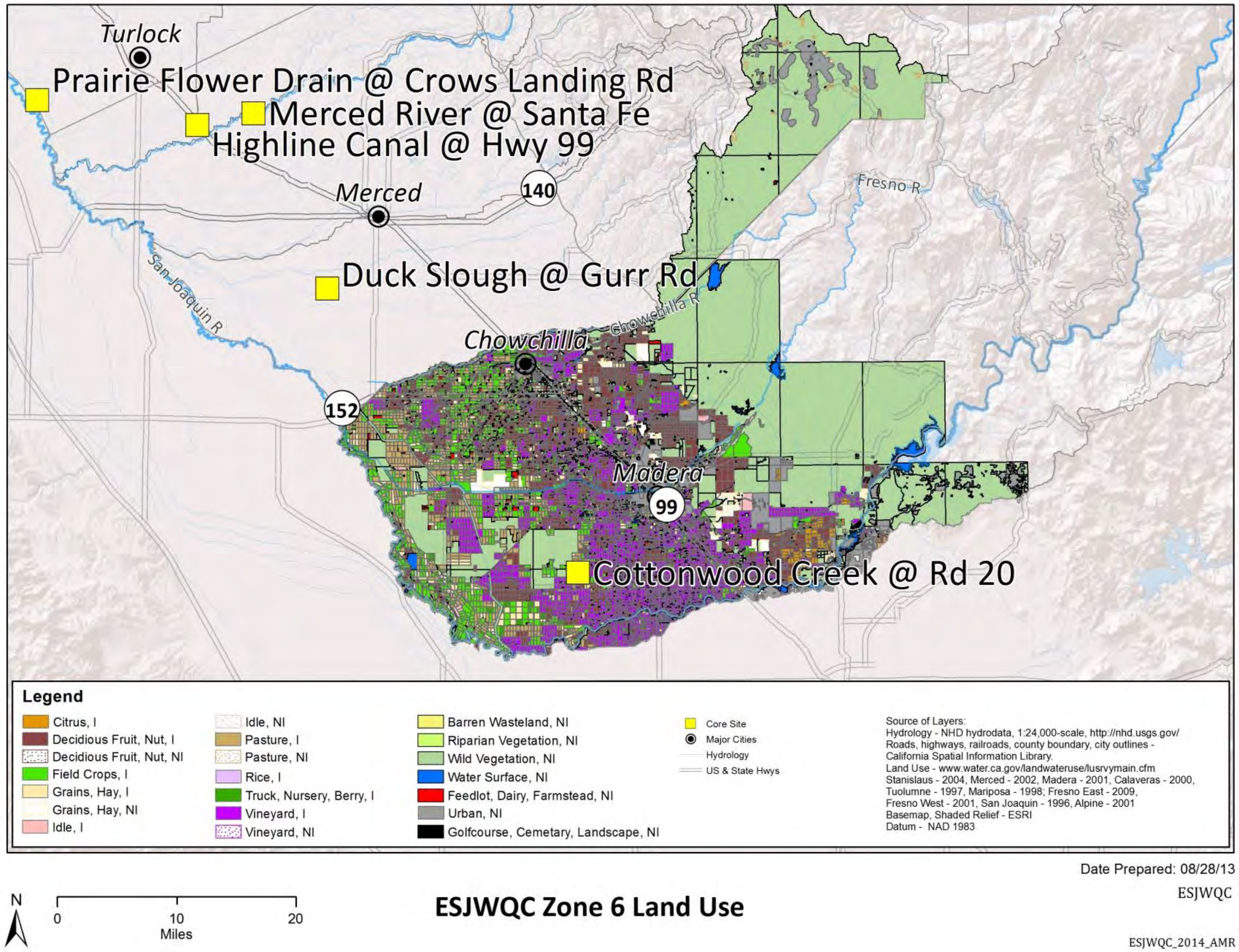


Figure 7. Cottonwood Creek @ Rd 20 Zone (Zone 6) Land Use.

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



MONITORING OBJECTIVES AND DESIGN

JANUARY THROUGH SEPTEMBER 2013 MONITORING

The Coalition conducts Normal Monitoring (NM) to characterize discharge from irrigated agriculture, Management Plan Monitoring (MPM) to monitor constituents that require a management plan and Total Maximum Daily Load (TMDL) monitoring to assess TMDL compliance as outlined in 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 (Basin Plan Amendment).

Sampling occurred from January through September 2013 for Assessment, Core, and MPM locations including two storm events and two sediment monitoring events. As required by the WDR (Page 6, Attachment B), monitoring occurred in the Coalition region from January through September 2013 according to the ESJWQC 2008 Monitoring and Reporting Project Plan (MRPP, approved September 15, 2008) and Management Plan (approved November 25, 2008). The following sections describe the Coalition's monitoring plan, and the objectives and design for NM (Core (C), Assessment (A) and Sediment Monitoring), MPM, and TMDL monitoring.

In order to achieve the Normal Monitoring objectives, the Coalition monitored 25 sites from January through September 2013. Of these 25 sites, MPM took place at 20 sites. Twelve of the 20 sites had MPM only (Bear Creek @ Kibby Rd, Berenda Slough along Ave 18 ½, Black Rascal Creek @ Yosemite Rd, Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59, Hatch Drain @ Tuolumne Rd, Highline Canal @ Lombardy Rd, Hilmar Drain @ Central Ave, Howard Lateral @ Hwy 140, Lateral 2 ½ near Keyes Rd, Livingston Drain @ Robin Ave and McCoy Lateral @ Hwy 140). All six Core sites were monitored for Core Monitoring constituents monthly and MPM based on months of past exceedances. Six Assessment Monitoring sites were monitored monthly for Assessment Monitoring constituents and two of these sites also had MPM where management plan constituents were analyzed on a monthly basis (Dry Creek @ Rd 18 and Miles Creek @ Reilly Rd)Normal Monitoring).

MRPP and QAPP Amendments in 2013

Table A (Page xv) includes an accounting of the various ESJWQC MRPP and QAPP amendments including those that occurred in 2013. The Coalition received approval on January 4, 2013 to remove the Assessment Monitoring location Peaslee Creek @ Lake Rd from the ESJWQC MRPP due to 1) no access to creek, and 2) low water levels restricting bridge sampling. The Coalition replaced the site with Mustang Creek @ East Ave as the Assessment Monitoring location in Zone 3 for 2013.

The Coalition received approval on January 15, 2013 to revise the ESJWQC MRPP/QAPP sample collection methods and quality control to reflect updated Standard Operating Procedures (SOPs).

The Coalition received approval on March 8, 2013 to remove the Assessment Monitoring location Burnett Lateral @ 28 Mile Rd from the monitoring program and replace the site with Mootz Drain downstream of Langworth Pond as the Assessment Monitoring location in Zone 1. With the WDR approval and update to the Coalition boundaries, Burnett Lateral is no longer within the ESJWQC area. Monitoring occurred at Burnett Lateral @ 28 Mile Rd from January through February 2013 before approval to replace the site occurred (results in Appendix III and IV). Monitoring at Mootz Drain downstream of Langworth Pond occurred April through September 2013.

The Coalition received approval on February 13, 2014 to remove the Zone 4 Assessment Monitoring location Silva Drain @ Meadow Dr from the ESJWQC monitoring program and high priority focused outreach schedule. The location where the Coalition has been collecting samples no longer drains upstream agriculture to a downstream waterbody.

NORMAL MONITORING

Normal Monitoring Objectives

The objectives of the ESJWQC 2014 WY monitoring program were to:

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

Normal Monitoring Design

Normal Monitoring refers to the monitoring strategy as outlined in the ESJWQC Monitoring and Reporting Program Plan (MRPP, approved September 15, 2008). Each zone within the Coalition contains a Core Monitoring location that undergoes Assessment Monitoring once every third year. In each zone there are numerous Assessment sites. A single Assessment site in each zone is monitored for two years, and then monitoring rotates to a new Assessment site within the zone. The monitoring schedule outlined in the ESJWQC MRPP (MRPP Table 10, Pages 52-53) dictates the rotation of Assessment Monitoring locations in each zone. Normal Monitoring occurred monthly at six Core and six Assessment sites from January through September 2013.

The Coalition attempts to sample two storm events per year. A storm monitoring event is defined as monitoring within three days of a rainfall event that exceeds 0.25 inches within 24 hours. Storm samples were collected at sites in the ESJWQC on February 20 and April 2, 2013. A description of the rainfall that occurred between January 1 and September 30, 2013 including when samples were collected relative to the amount of precipitation is included in the Sample Site Descriptions and Rainfall Records section. The Coalition categorizes monitoring by fall, winter, irrigation, and storm seasons (Table 3). Table 4 provides the locations and seasons of Coalition monitoring and indicates if a site was dry for one more months in a season.

Constituents monitored during the 2014 WY were established by the Irrigated Lands Regulatory Program (ILRP) Monitoring and Reporting Program (MRP) Order No. R5-2008-0005 (Appendix A). From January through September, the Coalition sampled for numerous water quality parameters and constituents including 45 organic pesticides, *E. coli*, physical parameters (total dissolved solids (TDS), total suspended solids (TSS) and turbidity), nine metals, total organic carbon, five nutrients, field parameters (Dissolved Oxygen (DO), pH, and Specific Conductivity (SC)), water column toxicity to three test species (*C. dubia*, *P. promelas* and *S. capricornutum*). The Coalition also sampled for sediment physical parameters (grain size and total organic carbon (TOC), sediment toxicity to *H. azteca,* and nine sediment pesticides as needed (Tables 4 and 6).

Monitoring from January through September 2013 followed the May 6, 2011 approval which modified the ESJWQC MRPP and its monitoring strategy to reduce sampling for organochlorines (including Group A pesticides), sediment-bound pesticides (glyphosate, paraquat), and metals not applied by agriculture (arsenic, cadmium, lead, and molybdenum). Monitoring for organochlorines, glyphosate, and paraquat is required during two monitoring events per year (one storm and one irrigation event) and monitoring for metals not applied by agriculture is required during two storm and two irrigation events (Tables 4, 5 and 6). The Coalition collected samples for high TSS event monitoring on February 20, April 2, July 9, and August 13, 2013.

Monitoring Seasons

Fall monitoring (October – December) occurs after irrigation is finished across the majority of crops in the Coalition region and generally before dormant sprays (Table 3). Winter monitoring occurs from January through March when dormant sprays and significant rainfalls are expected. Irrigation monitoring (April – September) characterizes the discharge from irrigated agriculture and irrigation return flows. A storm event can occur at any time of the year but is expected to occur during the winter season. Additional details regarding storm sampling events and their rainfall trigger are included in the Sampling Site Descriptions and Rainfall Records section of this report. Fall monitoring results from the 2014 WY were reported on in the ESJWQC 2013 Annual Monitoring Report (AMR, submitted March 1, 2013).

Table 3.Description of monitoring seasons.

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

Core Monitoring

Core Monitoring occurs at Core sites within each of the ESJWQC zones and the Core sites rotate into Assessment Monitoring every three years. There are fewer constituents (primarily physical parameters and nutrients) monitored at Core sites during Core Monitoring years (Table 4). Core Monitoring is designed to track water quality over extended periods of time and establish trends that are used 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 occurs at Assessment sites as scheduled in the MRPP and at Core sites every third year. Assessment Monitoring sites are selected in order to adequately characterize water quality of all waters of the State within the Coalition region that receive irrigated discharge. Samples collected at Assessment Monitoring locations are analyzed for a large suite of constituents to effectively characterize water quality (Table 4).

Sediment Monitoring

Sediment samples are collected twice each year at sites that are undergoing Assessment Monitoring and MPM for sediment toxicity. Sediment samples are collected after the winter rainfall events and before the height of the irrigation season (between March 1 and April 30). A second set of sediment samples are collected at the end of the irrigation season, when irrigation is mostly complete, and water levels are low and safe enough to sample sediment (between August 15 and October 15). In 2013, sediment samples were collected on March 12 and September 10.

Table 4. ESJWQC Sites monitored from October 2012 through September 2013.

	2012	2013		
STATION NAME	FALL	WINTER	STORM	IRRIGATION
Bear Creek @ Kibby Rd		x		x
Berenda Slough along Ave 18 1/2	Dry	Dry	Dry	Dry
Black Rascal Creek @ Yosemite Rd				x
Burnett Lateral @ 28 Mile Rd[1]		x	x	
Cottonwood Creek @ Rd 20		Dry	Dry	Dry
Deadman Creek @ Hwy 59	x	x	x	Dry
Deadman Creek @ Gurr Rd		x		x
Dry Creek @ Rd 18		x	Dry	x
Dry Creek @ Wellsford Rd		x	x	x
Duck Slough @ Gurr Rd		Dry	Dry	x
Hatch Drain @ Tuolumne Rd				x
Highline Canal @ Hwy 99		x	x	x
Highline Canal @ Lombardy Rd	x	x	x	x
Hilmar Drain @ Central Ave		x		x
Howard Lateral @ Hwy 140				x
Lateral 2 ½ near Keyes Rd				x
Levee Drain @ Carpenter Rd	x	x	x	x
Livingston Drain @ Robin Ave		x		Dry
McCoy Lateral @ Hwy 140	Dry	Dry		x
Merced River @ Santa Fe		x	x	x
Miles Creek @ Reilly Rd			x	x
Mootz Drain downstream of Langworth Pond[2]			x	x
Mustang Creek @ East Ave			Dry	Dry
Prairie Flower Drain @ Crows Landing Rd		x	x	x
Rodden Creek @ Rodden Rd	Dry			
Unnamed Drain @ Hwy 140		x	Dry	x

[1]Burnett Lateral @ 28 Mile Rd site was monitored from January through February then removed (approved March 8, 2013).
[2]Mootz Drain downstream of Langworth Pond replaced Burnett Lateral @ 28 Mile Rd as the Assessment Monitoring location in Zone 1; monitoring occurred at the site from April through September 2013.
Blank cells indicate no sampling occurred at that site during the specified season.

"Dry" indicates that the site was dry during one or more events during the specified monitoring season.

MANAGEMENT PLAN MONITORING

Management Plan Monitoring Objectives

The objectives of the ESJWQC Management Plan include:

1. Identification of irrigated agriculture source (general practice or specific location) that may be the cause of the water quality problem or a study design to determine the source
2. Identification of management practices to be implemented to address the exceedances
3. Development of a management practice implementation schedule designed to address the specific exceedances
4. Development of management practice performance goals with a schedule
5. Development of waste-specific monitoring schedule
6. Development of a process and schedule for evaluating management practice effectiveness

Management Plan Monitoring is conducted as part of the Coalition's management plan strategy to identify contaminant sources and evaluate effectiveness of newly implemented management practices. For details on January through September 2013 MPM results refer to the Status of Special Projects section of this report.

Management plans are required as a result of a single exceedance of the Water Quality Trigger Limit (WQTL) of a TMDL constituent (SC, boron, chlorpyrifos, and diazinon), or more than one exceedance of a WQTL for all other constituents within a three year time period. The Coalition received approval on October 15, 2013 to remove specific site/constituent pairs from active management plans for eight site specific constituents at seven high priority subwatershed locations. This request included summaries of improved water quality demonstrating no exceedances of WQTL for the specific site/constituent pairs for at least two years. Table 70 in the Status of Management Plans and Special Projects section of this report lists all of the specific site/constituent pairs approved for removal from active management plans and MPM.

Management Plan Monitoring Design

The ESJWQC Management Plan process was first outlined in the ESJWQC Management Plan submitted on September 30, 2008 and updated in the 2010 MPUR to reflect the monitoring strategy outlined in the ESJWQC MRPP (Page 33) for Core and Assessment Monitoring. Due to the extensive amount of monitoring conducted within the Coalition region, the Coalition is focusing its efforts on documenting changes in management practices and performing outreach at both an individual and group level. The ESJWQC 2008 Management Plan (approved November 25, 2008) and 2010 MPUR (approved June 21, 2010) can be referenced for further details on the Coalition's Management Plan Monitoring Strategy, Management Practice Tracking Strategy, Prioritization of Constituents with Exceedances, and Priority Site Management. A revised ESJWQC Management Plan will be submitted on May 1, 2014.

Management Plan Development Timelines

The Coalition developed a schedule (Table 5) establishing when sites become high priority and undergo a focused management plan approach. This schedule was submitted as an addendum to the ESJWQC Management Plan which was approved on November 25, 2008 (Table B includes all subsequent amendments to the original Management Plan) and is evaluated and updated each year for 1) any new sites requiring a management plan, and 2) changes to the years for focused outreach. Based on the Management Plan process, any new site that requires a management plan due to the previous year's exceedances is added to the bottom of the schedule. Changes such as time extensions, removal of sites and/or changing the year of prioritization must be approved by the Regional Board's Executive Officer.

The ESJWQC Management Plan schedule has been updated to include Unnamed Drain @ Hwy 140 due to exceedances of DO, pH, *E. coli,* and copper WQTLs which occurred in samples collected between January and September 2013 (Table 6). This site subwatershed was monitored for the first time in 2013 as a rotating Assessment site and these four constituents have been added to a new Unnamed Drain @ Hwy 140 site subwatershed management plan. There are currently 28 site subwatersheds in the ESJWQC Management Plan scheduled for high priority status between 2008 and 2018 (Table 5).

Table 5. Schedule for addressing each site subwatershed with a detailed, focused Management Plan approach.

SITE SUBWATERSHED NAME	PRIORITY SET	YEAR FOR FOCUSED APPROACH
Dry Creek @ Wellsford Rd	First Priority	2008-2010
Duck Slough @ Hwy 99		2008-2010
Prairie Flower Drain @ Crows Landing Rd		2008-2010
Bear Creek @ Kibby Rd	Second Priority	2010-2012
Cottonwood Creek @ Rd 20		2010-2012
Duck Slough @ Gurr Rd		2010-2012
Highline Canal @ Hwy 99		2010-2012
Berenda Slough along Ave 18 1/2	Third Priority	2011-2013
Dry Creek @ Rd 18		2011-2013
Lateral 2 ½ near Keyes Rd		2011-2013
Livingston Drain @ Robin Ave		2011-2013
Black Rascal Creek @ Yosemite Rd	Fourth Priority	2012-2014
Deadman Creek @ Hwy 59		2012-2014
Deadman Creek @ Gurr Rd		2012-2014
Hilmar Drain @ Central Ave		2012-2014
Hatch Drain @ Tuolumne Rd	Fifth Priority	2013-2015
Highline Canal @ Lombardy Rd		2013-2015
Merced River @ Santa Fe		2013-2015
Miles Creek @ Reilly Rd		2013-2015
Ash Slough @ Ave 21	Sixth Priority	2014-2016
Mustang Creek @ East Ave		2014-2016
Westport Drain @ Vivian Rd		2014-2016
Mootz Drain downstream of Langworth Pond[1]	Seventh Priority	2015-2017
Howard Lateral @ Hwy 140		2015-2017
Levee Drain @ Carpenter Rd		2015-2017
McCoy Lateral @ Hwy 140	Eighth Priority	2016-2018
Rodden Creek @ Rodden Rd		2016-2018
Unnamed Drain @ Hwy 140		2016-2018
RE-EVALUATE ALL SITE SUBWATERSHEDS AND REVISE SCHEDULE		ANNUALLY

[1]Mootz Drain downstream of Langworth Pond monitoring included all management plan constituents detected at the upstream location (Mootz Drain @ Langworth Rd).

The Coalition received approval to remove specific site/constituent pairs from an active management plan on May 30, 2012 and October 15, 2013. Table 70 in the Status of Management Plans and Special Projects section lists sites and constituents approved for removal from active management plans.

January through September 2013 MPM Schedule

Table 6 includes the MPM schedule for sites and constituents that were monitored from January through September 2013. Details on the process and the schedule of MPM are available in the ESJWQC 2008 Management Plan approved November 25, 2008; a revised ESJWQC Management Plan in accordance to the WDR will be submitted on May 1, 2014.

Table 6. January through September 2013 MPM schedule. Sorted by monitoring month and site name.

Site Name	High Priority Subwatershed	Month	Copper	Lead	Chlorpyrifos	Diazinon	Dimethoate	Diuron	*C. dubia*	*Hyalella*	*P. promelas*	*S. capricornutum*
Bear Creek @ Kibby Rd	2nd	January	X									
Berenda Slough along Ave 18 1/2	3rd	January	X									
Deadman Creek @ Gurr Rd	4th	January									X	
Deadman Creek @ Hwy 59	4th	January										X
Dry Creek @ Rd 18	3rd	January	X					X				X
Hatch Drain @ Tuolumne Rd	5th	January										X
Highline Canal @ Hwy 99	2nd	January	X									
Highline Canal @ Lombardy Rd	5th	January	X		X				X			
Cottonwood Creek @ Rd 20	2nd	January	X	X	X							
McCoy Lateral @ Hwy 140	8th	January	X									
Merced River @ Santa Fe	5th	January			X				X			
Prairie Flower Drain @ Crows Landing Rd	1st	January										X
Duck Slough @ Gurr Rd	2nd	January	X	X								
Livingston Drain @ Robin Ave	3rd	January	X	X	X							
Miles Creek @ Reilly Rd	5th	January	X	X					X			
Cottonwood Creek @ Rd 20	2nd	February	X	X	X							
Bear Creek @ Kibby Rd	2nd	February	X									
Berenda Slough along Ave 18 1/2	3rd	February	X									
Deadman Creek @ Gurr Rd	4th	February							X		X	X
Dry Creek @ Rd 18	3rd	February	X		X	X		X				X
Hatch Drain @ Tuolumne Rd	5th	February										X
Highline Canal @ Lombardy Rd	5th	February	X						X			X
Hilmar Drain @ Central Ave	4th	February	X									
Prairie Flower Drain @ Crows Landing Rd	1st	February										X
Duck Slough @ Gurr Rd	2nd	February	X	X					X			
Highline Canal @ Hwy 99	2nd	February	X	X								X
Livingston Drain @ Robin Ave	3rd	February	X	X								X
Miles Creek @ Reilly Rd	5th	February	X	X								
Deadman Creek @ Gurr Rd	4th	March			X				X		X	
Dry Creek @ Rd 18	3rd	March								X		
Dry Creek @ Wellsford Rd	1st	March								X		
Duck Slough @ Gurr Rd	2nd	March							X			
Hatch Drain @ Tuolumne Rd	5th	March								X		
Highline Canal @ Hwy 99	2nd	March							X	X		X
Highline Canal @ Lombardy Rd	5th	March	X		X				X	X		X
Hilmar Drain @ Central Ave	4th	March								X		
Merced River @ Santa Fe	5th	March							X			
Prairie Flower Drain @ Crows Landing Rd	1st	March							X	X		
Black Rascal Creek @ Yosemite Rd	4th	April		X								

Site Name	High Priority Subwatershed	Month	Copper	Lead	Chlorpyrifos	Diazinon	Dimethoate	Diuron	*C. dubia*	*Hyalella*	*P. promelas*	*S. capricornutum*
Berenda Slough along Ave 18 1/2	3rd	April	X		X							
Deadman Creek @ Hwy 59	4th	April			X							X
Cottonwood Creek @ Rd 20	2nd	April	X									
Miles Creek @ Reilly Rd	5th	April										X
Deadman Creek @ Gurr Rd	4th	April			X							
Dry Creek @ Rd 18	3rd	April	X		X							
Hatch Drain @ Tuolumne Rd	5th	April										X
Duck Slough @ Gurr Rd	2nd	April	X	X								
Highline Canal @ Lombardy Rd	5th	April										X
Hilmar Drain @ Central Ave	4th	April						X				X
Howard Lateral @ Hwy 140	7th	April	X									
Lateral 2 1/2 near Keyes Rd	3rd	April			X							
Livingston Drain @ Robin Ave	3rd	April										X
Prairie Flower Drain @ Crows Landing Rd	1st	April									X	X
Highline Canal @ Hwy 99	2nd	April	X	X								X
Dry Creek @ Rd 18	3rd	May	X	X								X
Berenda Slough along Ave 18 1/2	3rd	May	X									X
Black Rascal Creek @ Yosemite Rd	4th	May			X				X			
Cottonwood Creek @ Rd 20	2nd	May	X									
Deadman Creek @ Gurr Rd	4th	May									X	
Duck Slough @ Gurr Rd	2nd	May	X	X								
Hatch Drain @ Tuolumne Rd	5th	May										X
Highline Canal @ Lombardy Rd	5th	May	X									X
Livingston Drain @ Robin Ave	3rd	May	X									X
Miles Creek @ Reilly Rd	5th	May	X									
Prairie Flower Drain @ Crows Landing Rd	1st	May										X
Highline Canal @ Hwy 99	2nd	May		X					X			X
Cottonwood Creek @ Rd 20	2nd	June	X	X								
Dry Creek @ Rd 18	3rd	June	X	X								
Duck Slough @ Gurr Rd	2nd	June	X	X								
Berenda Slough along Ave 18 1/2	3rd	June	X									
Deadman Creek @ Gurr Rd	4th	June									X	
Highline Canal @ Lombardy Rd	5th	June							X			
Hilmar Drain @ Central Ave	4th	June						X				
Howard Lateral @ Hwy 140	7th	June			X							
Livingston Drain @ Robin Ave	3rd	June	X		X							
McCoy Lateral @ Hwy 140	8th	June	X									
Highline Canal @ Hwy 99	2nd	June	X	X								
Miles Creek @ Reilly Rd	5th	June	X	X								X
Duck Slough @ Gurr Rd	2nd	July	X	X								
Berenda Slough along Ave 18 1/2	3rd	July	X		X							X
Black Rascal Creek @ Yosemite Rd	4th	July			X				X			
Cottonwood Creek @ Rd 20	2nd	July	X									
Deadman Creek @ Gurr Rd	4th	July										X
Dry Creek @ Rd 18	3rd	July	X		X							
Dry Creek @ Wellsford Rd	1st	July			X							
Hatch Drain @ Tuolumne Rd	5th	July										X
Highline Canal @ Hwy 99	2nd	July	X	X								
Highline Canal @ Lombardy Rd	5th	July			X							
Hilmar Drain @ Central Ave	4th	July	X									X
Howard Lateral @ Hwy 140	7th	July	X									
Lateral 2 1/2 near Keyes Rd	3rd	July			X							
Livingston Drain @ Robin Ave	3rd	July	X		X							
Merced River @ Santa Fe	5th	July			X				X			
Prairie Flower Drain @ Crows Landing Rd	1st	July					X				X	
Miles Creek @ Reilly Rd	5th	July	X	X	X							

Site Name	High Priority Subwatershed	Month	Copper	Lead	Chlorpyrifos	Diazinon	Dimethoate	Diuron	*C. dubia*	*Hyalella*	*P. promelas*	*S. capricornutum*
Dry Creek @ Rd 18	3rd	August	X	X								
Duck Slough @ Gurr Rd	2nd	August	X	X								
Highline Canal @ Hwy 99	2nd	August	X	X								
Bear Creek @ Kibby Rd	2nd	August	X									
Berenda Slough along Ave 18 1/2	3rd	August	X									
Deadman Creek @ Hwy 59	4th	August			X							
Black Rascal Creek @ Yosemite Rd	3rd	August			X				X			
Cottonwood Creek @ Rd 20	2nd	August	X									
Deadman Creek @ Gurr Rd	4th	August			X							
Dry Creek @ Wellsford Rd	1st	August			X							
Hatch Drain @ Tuolumne Rd	5th	August										X
Highline Canal @ Lombardy Rd	5th	August	X		X							X
Livingston Drain @ Robin Ave	3rd	August			X							
Merced River @ Santa Fe	5th	August							X			
Prairie Flower Drain @ Crows Landing Rd	1st	August					X		X			
Miles Creek @ Reilly Rd	5th	August	X	X	X							
Black Rascal Creek @ Yosemite Rd	3rd	September		X	X							
Dry Creek @ Rd 18	3rd	September	X	X						X		
Duck Slough @ Gurr Rd	2nd	September	X	X						X		
Berenda Slough along Ave 18 1/2	3rd	September	X		X							
Deadman Creek @ Hwy 59	4th	September			X							
McCoy Lateral @ Hwy 140	8th	September	X									
Cottonwood Creek @ Rd 20	2nd	September	X									
Deadman Creek @ Gurr Rd	4th	September			X							
Dry Creek @ Wellsford Rd	1st	September			X					X		
Hatch Drain @ Tuolumne Rd	5th	September								X		
Highline Canal @ Hwy 99	2nd	September							X	X		
Highline Canal @ Lombardy Rd	5th	September							X	X		X
Hilmar Drain @ Central Ave	4th	September								X		X
Livingston Drain @ Robin Ave	3rd	September	X									
Miles Creek @ Reilly Rd	5th	September			X				X	X		
Prairie Flower Drain @ Crows Landing Rd	1st	September					X		X	X		

2014 WY MPM Schedule

Based on the requirements in the WDR, a monitoring schedule is submitted annually in the Monitoring Plan Update (MPU) which is due August 1 prior to the monitoring WY. The Coalition submitted the first MPU on August 1, 2013 which was amended on December 10, 2013 (approved February 13, 2014). In order to determine when, what and where MPM and Represented Site Monitoring should occur, the Coalition reviews available monitoring results and PUR data. Due to the submittal of the MPU on August 1, the Coalition is only able to review data up through June of that year. Therefore, it has been discussed with Regional Board staff that an addendum to the MPU for the current WY will be included in the Annual Report and will assess monitoring results from July through September from the previous WY.

The Coalition reviewed relevant data from July through September 2013 and has included an addendum to the 2014 WY MPU and an updated MPM schedule in Appendix IX.

TOTAL MAXIMUM DAILY LOAD MONITORING

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. In October 2005, the Regional Board finalized the Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Diazinon and Chlorpyrifos Runoff into the Lower San Joaquin River (hereafter Basin Plan Amendment) establishing a TMDL for the organophosphate pesticides (OP) chlorpyrifos and diazinon in the lower reaches of the San Joaquin River outside of the Delta. The Lower San Joaquin River is divided into seven subareas, which include agricultural drainages monitored by the ESJWQC and the Westside San Joaquin River Watershed Coalition (Westside Coalition) under the ILRP. The ESJWQC conducted TMDL monitoring in the 2013 WY to assess compliance with concentration based loads of chlorpyrifos and diazinon at three of the six compliance locations identified within the Basin Plan. The Westside Coalition conducts monitoring at the other three compliance points along the San Joaquin River and the Coalitions submit a joint report on TMDL compliance.

Results of monitoring from the 2013 WY as well as an assessment of the Coalition's compliance with Monitoring Objectives 1- 7 will be reported in the San Joaquin River Chlorpyrifos and Diazinon TMDL 2014 AMR (to be submitted May 1, 2014).

MONITORING CONSTITUENTS

The following section includes a table of the constituent groups analyzed by the Coalition (Table 7). All constituents and locations monitored from January through September 2013 are provided in Tables 8 and 9 as outlined in the ESJWQC MRPP.

On May 6, 2011 the Coalition received approval to modify its MRPP and monitoring strategy to reduce water column sampling for organochlorines, Group A pesticides, glyphosate and paraquat, and metals not applied by agriculture (arsenic, cadmium, lead and molybdenum). Glyphosate and paraquat are pesticides that have an extremely high affinity for sediments and organic material and therefore are rarely detected in the water column except for times when runoff of sediment is a concern (i.e. a high TSS event following a rain storm). The Coalition began monitoring according to this outline in July 2011. Organochlorines, Group A pesticides, glyphosate and paraquat were monitored during one storm and one irrigation event on February 20, 2013 and August 13, 2013. Metals not applied by agriculture were monitored during two storm and two irrigation events on February 20, 2013, April 2, 2013, July 9, 2013 and August 13, 2013.

Table 7. Monitoring parameters.

CONSTITUENTS, PARAMETERS, AND TESTS	MONITORING TYPE
Photo Monitoring	
Photograph of monitoring location	With every monitoring event
WATER COLUMN SAMPLING	
Physical Parameters and General Chemistry	
Flow (field measure)	Assessment and Core
pH (field measure)	Assessment and Core
Electrical Conductivity (at 25°C, field measure)	Assessment and Core
Dissolved Oxygen (DO, field measure)	Assessment and Core
Temperature (field measure)	Assessment and Core
Turbidity	Assessment and Core
Total Dissolved Solids (TDS)	Assessment and Core
Total Suspended Solids (TSS)	Assessment and Core
Hardness	Assessment and Core
Total Organic Carbon (TOC)	Assessment and Core
Bacteria	
E. coli[3]	Assessment and Core
Water Column Toxicity Test	
Algae - *Selenastrum capricornutum*	Assessment
Water Flea - *Ceriodaphnia dubia*	Assessment
Fathead Minnow - *Pimephales promelas*	Assessment
Toxicity Identification Evaluation (TIE)[1]	As needed based on criteria described in MRP Part II.E
Pesticides	
Carbamates	
Aldicarb	Assessment
Carbaryl	Assessment
Carbofuran	Assessment
Methiocarb	Assessment
Methomyl	Assessment
Oxamyl	Assessment
Organochlorines[2]	
Dichlorodiphenyldichloroethane (DDD)	Assessment
Dichlorodiphenyldichloroethylene (DDE)	Assessment
Dichlorodiphenyltrichloroethane (DDT)	Assessment

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

CONSTITUENTS, PARAMETERS, AND TESTS	MONITORING TYPE
Bifenthrin	As needed based on criteria described in MRP Part II.E
Cyfluthrin	As needed based on criteria described in MRP Part II.E
Cypermethrin	As needed based on criteria described in MRP Part II.E
Deltamethrin: Tralomethrin	As needed based on criteria described in MRP Part II.E
Esfenvalerate	As needed based on criteria described in MRP Part II.E
Lambda-Cyhalothrin	As needed based on criteria described in MRP Part II.E
Permethrin	As needed based on criteria described in MRP Part II.E
Fenpropathrin	As needed based on criteria described in MRP Part II.E
Chlorpyrifos	As needed based on criteria described in MRP Part II.E
Other sediment parameters	
Total Organic Carbon	Assessment
Grain Size	Assessment

[1] Specific TIE manipulations utilized in each test will be reported.

[2] Beginning in July 2011 monitoring for organochlorines (including Group A pesticides), glyphosate, and paraquat was reduced to two monitoring events per year (one storm and one irrigation event); monitoring for metals not applied by agriculture was reduced to two storm and two irrigation events per year, these constituents were monitored during high TTS events February 20, 2013, April 2, 2013, July 9, 2013 and August 13, 2013.

Table 8. ESJWQC January through September 2013 monitoring schedule (nutrients, bacteria, field parameters, physical parameters, metals and pesticides: organophosphates).

ESJWQC January-September 2013 Monitoring Schedule		Nutrients					Bacteria	Field Parameters				Physical Parameters				Metals										Pesticides: Organophosphates												
Zone	Site Name	Total Ammonia	Nitrate + Nitrite (as N)	Soluble Orthophosphate	Total Kjeldahl Nitrogen	Total Phosphorous	*E. coli*	Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity	TOC	Total Dissolved Solids	Suspended Solids	Arsenic (Total)	Boron (Total)	Cadmium (Dissolved/Total)	Copper (Dissolved/Total)	Lead (Dissolved/Total)	Molybdenum (Total)	Nickel (Dissolved/Total)	Selenium (Total)	Zinc (Dissolved/Total)	Hardness (Dissolved)	Azinphos-methyl	Chlorpyrifos	Diazinon	Dichlorvos	Dimethoate	Demeton-s	Disulfoton	Malathion	Methamidophos	Methidathion	Parathion, methyl	Phorate	Phosmet
	Dry Creek @ Wellsford Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C												M											
1	Mootz Drain downstream of Langworth pond	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A[4]	A	A[4]	A	A[4]	A[4]	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Levee Drain @ Carpenter Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A[4]	A	A[4]	A	A[4]	A[4]	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
2	Prairie Flower Drain @ Crows Landing Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C															M								
	Hatch Drain @ Tuolumne Rd							F	F	F	F																											
	Lateral 2 ½ nears Keyes Rd							F	F	F	F																M											
	Hilmar Drain @ Central Ave							F	F	F	F								M																			
	Highline Canal @ Hwy 99	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M	M																		
3	Highline Canal @ Lombardy Rd							F	F	F	F								M								M											
	Mustang Creek @ East Ave[5]	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A[4]	A	A[4]	A	A[4]	A[4]	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Bear Creek @ Kibby Rd							F	F	F	F								M																			
	Black Rascal Creek @ Yosemite Rd							F	F	F	F									M							M											
	Livingston Drain @ Robin Ave							F	F	F	F								M	M							M											
4	McCoy Lateral @ Hwy 140							F	F	F	F								M																			
	Howard Lateral @ Hwy 140							F	F	F	F								M								M											
	Unnamed Drain @ Hwy 140	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A[4]	A	A[4]	A	A[4]	A[4]	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											
	Miles Creek @ Reilly Rd	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A[4]	A	A[4]	M[3]	M[3]	A[4]	A	A	A	A	A	M[3]	A	A	A	A	A	A	A	A	A	A	A
5	Deadman Creek @ Hwy 59							F	F	F	F																M											
	Deadman Creek @ Gurr Rd							F	F	F	F																M											
	Duck Slough @ Gurr Rd	C	C	C	C	C	C	C	C	C	C	C	C	C	C				M	M																		
	Berenda Slough along Ave 18 1/2							F	F	F	F								M								M											
6	Dry Creek @ Rd 18	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A[4]	A	A[4]	M[3]	M[3,4]	A[4]	A	A	A	A	A	M[3]	M[3]	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	M							M											

A - Assessment Monitoring constituent

C - Core Monitoring constituent.

F - Sites with MPM collect field parameters but this does not indicate that the field parameters are under a management plan.

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

[1]Diuron and linuron analyzed as carbamates.

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

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

[4] Constituents approved for reduced monitoring on May 6, 2011 (organochlorines, Group A pesticides, paraquat, and glyphosate monitored one storm and one irrigation; arsenic, cadmium, lead, and molybdenum monitored two storms and two irrigations).

Table 9. ESJWQC January through September 2013 monitoring schedule (pesticides: organochlorines, carbamates, herbicides, Group A, water column toxicity and sediment parameters).

ESJWQC January-September 2013 Monitoring Schedule		Pesticides: Organochlorines[4]							Pesticides: Carbamates								Pesticides: Herbicides						Pesticides: Group A[4]											Pesticides: Pyrethroids	Water Column Toxicity			Sediment: Toxicity	Sediment: Physical Parameters	
Zone	Site Name	DDD	DDE	DDT	Dicofol	Dieldrin	Endrin	Methoxychlor	Aldicarb	Carbaryl	Carbofuran	Diuron	Linuron	Methiocarb	Methomyl	Oxamyl	Atrazine	Cyanazine	Simazine	Trifluralin	Paraquat[4]	Glyphosate[4]	Aldrin	Chlordane	Heptachlor	Heptachlor epoxide	HCH, alpha	HCH, beta	HCH, delta	HCH, gamma	Endosulfan I	Endosulfan II	Toxaphene	Cis/Trans-Permethrin	*C. dubia*	*P. promelas*	*S. capricornutum*	*H. azteca*[3]	TOC	Grain size
1	Dry Creek @ Wellsford Rd																																					M	M	M
1	Mootz Drain downstream of Langworth Rd	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A	A	A	A	A	A	A	A	A	A	A	A	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]		A	A	A	A	A	A
2	Levee Drain @ Carpenter Rd	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A	A	A	A	A	A	A	A	A	A	A	A	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]		A	A	A	A	A	A
2	Prairie Flower Drain @ Crows Landing Rd																																		M	M	M	M	M	M
2	Hatch Drain @ Tuolumne Rd																																				M	M	M	M
2	Hilmar Drain @ Central Ave											M																									M	M	M	M
2	Lateral 2 ½ near Keyes Rd																																							
3	Highline Canal @ Hwy 99																																		M		M	M	M	M
3	Highline Canal @ Lombardy Rd																																		M		M	M	M	M
3	Mustang Creek @ East Ave[5]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A	A	A	A	A	A	A	A	A	A	A	A	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[5]	A	A	A	A	A	A
4	Bear Creek @ Kibby Rd																																							
4	Black Rascal Creek @ Yosemite Rd																																		M					
4	Livingston Drain @ Robin Ave																																				M			
4	McCoy Lateral @ Hwy 140																																							
4	Howard Lateral @ Hwy 140																																							
4	Unnamed Drain @ Hwy 140	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A	A	A	A	A	A	A	A	A	A	A	A	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]		A	A	A	A	A	A
4	Merced River @ Santa Fe																																		M					
4	Miles Creek @ Reilly Rd	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A	A	A	A	A	A	A	A	A	A	A	A	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]		M[3]	A	M[3]	M[3]	M[3]	M[3]
5	Deadman Creek @ Hwy 59																																				M			
5	Deadman Creek @ Gurr Rd																																		M	M	M			
5	Duck Slough @ Gurr Rd																																		M			M	M	M
6	Berenda Slough along Ave 18 1/2																																				M			
6	Dry Creek @ Rd 18	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A	A	A	M[3]	A	A	A	A	A	A	A	A	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]	A[4]		A	A	M[3]	M[3]	M[3]	M[3]
6	Cottonwood Creek @ Rd 20																																							

A - Assessment Monitoring constituent
C - Core Monitoring constituent.
F - Sites with MPM collect field parameters but this does not indicate that the field parameters are under a management plan.
M - Management Plan Monitoring conducted for Priority A-D constituents during months of past exceedances.
[1]Diuron and linuron analyzed as carbamates.
[2]If *Hyalella* survival is less than 80% compared to the control, the following pesticides will be analyzed for: bifenthrin, cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, permethrin, fenpropathrin and chlorpyrifos
[3]MPM at sites under Assessment Monitoring in 2013.
[4] Constituents approved for reduced monitoring on May 6, 2011 (organochlorines, Group A pesticides, paraquat, and glyphosate monitored one storm and one irrigation; arsenic, cadmium, lead, and molybdenum monitored two storms and two irrigations).
[5]Mustang Creek @ East Ave was monitored from January through September 2013 for cis/trans-permethrin as part of additional monitoring for the 303(d) listed waterbody.

SAMPLE SITE DESCRIPTIONS AND RAINFALL RECORDS

The site names, zones, sample types, station codes, and locations of all sites monitored from January through September 2013 are provided in Tables 10 and 11. Table 10 and Figure 8 include the monitoring locations for sites monitored from January through September. Land use for each subwatershed monitored from January through September 2013 is listed in Table 11.

The next section includes a narrative description of each site subwatershed with respect to hydrology and agricultural production. Location maps of sampling sites, crops, and land uses are provided in the Land Use Maps 2013 Appendix VIII. Site summaries include information on monitoring and focused outreach activities for each site subwatershed.

Rainfall data in the Coalition region for the months January through September 2013 are described in the section "Rainfall Records".

SAMPLE SITE LOCATIONS

Figure 8 is a map of all site subwatersheds (Assessment, Core, and MPM) monitored from January through September 2013. Zone boundaries are also provided for reference. Figure 9 is a map of the three chlorpyrifos and diazinon TMDL sites monitored by the ESJWQC for load capacity compliance.

Figure 8. ESJWQC January through September 2013 monitoring sites relative to zone boundaries.

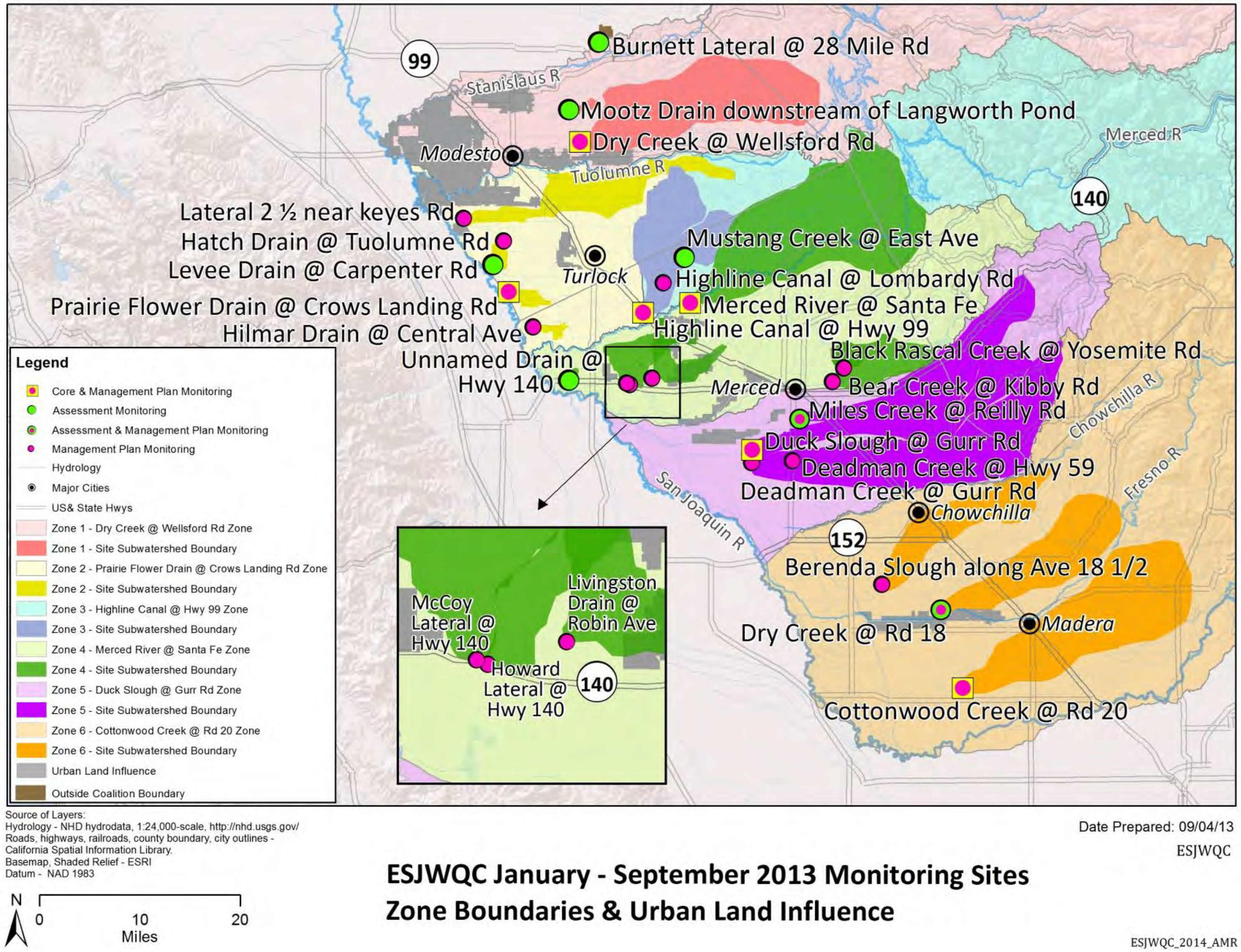


Figure 9. ESJWQC 2013 Water Year chlorpyrifos and diazinon TMDL compliance locations.

The three TMDL sites are part of six TMDL compliance monitoring locations. Land use information and drainage maps will be submitted in the 2014 TMDL AMR.

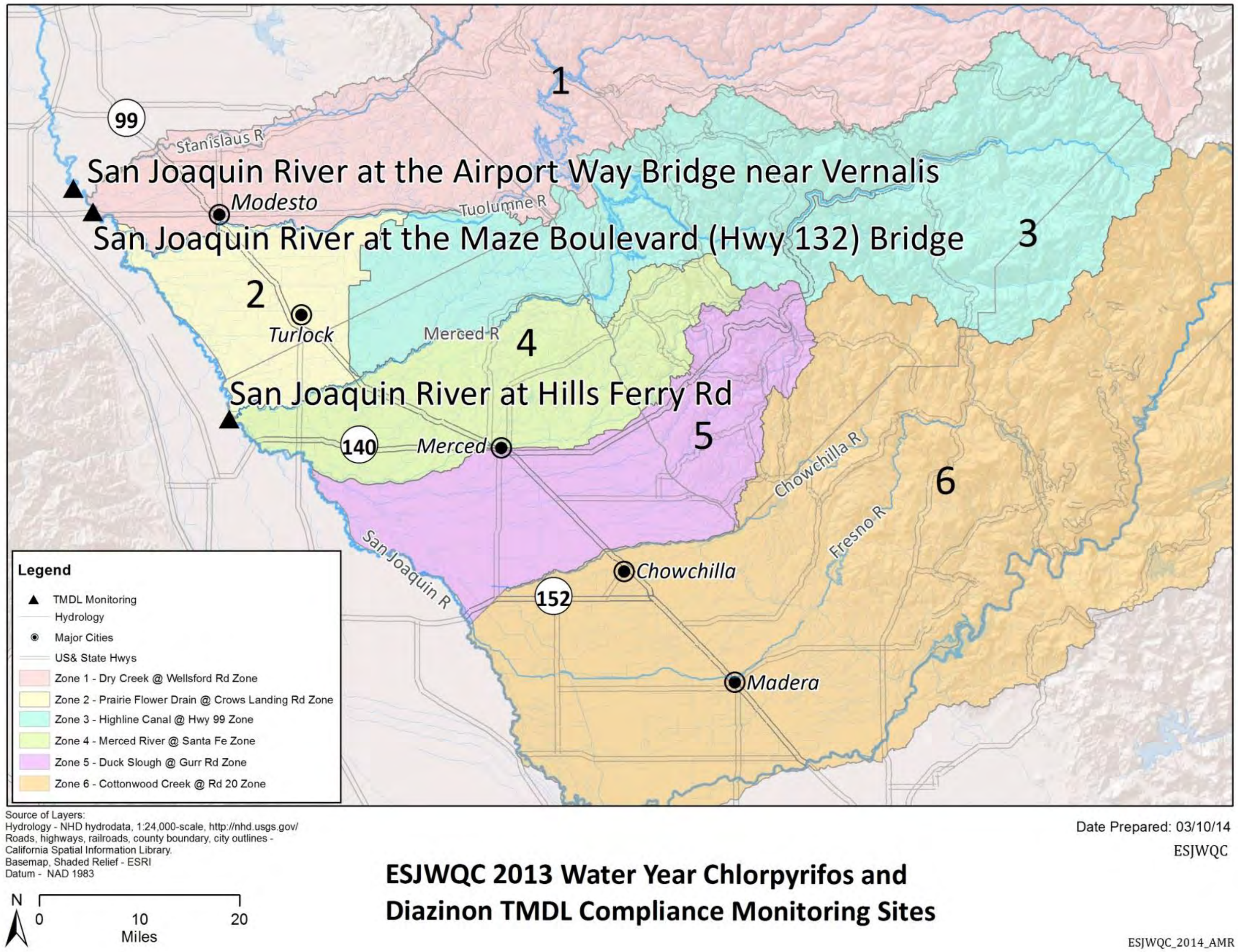


Table 10. ESJWQC tributary and TMDL monitoring locations (January through September 2013).

Zone	Site Type[1]	January-September 2013 Monitoring	Site Name	Station Code	Latitude	Longitude
Zone 1	Core	C, MPM	Dry Creek @ Wellsford Rd	535XDCAWR	37.66000	-120.87526
	Assessment	A	Burnett Lateral @ 28 Mile Rd[2]	535BLATMR	37.80336	-120.84071
	Assessment	A	Mootz Drain downstream of Langworth Pond	535XMDDLP	37.70539	-120.89569
Zone 2	Assessment	MPM	Hilmar Drain @ Central Ave	535XHDACA	37.39058	-120.95820
	Core	C, MPM	Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	37.44187	-121.00331
	Assessment	MPM	Lateral 2 ½ near Keyes Rd	535LTHNKR	37.54766	-121.08509
	Assessment	MPM	Hatch Drain @ Tuolumne Rd	535XHDATR	37.51498	-121.01229
	Assessment	A	Levee Drain @ Carpenter Rd	535XLDACR	37.48062	-121.03106
Zone 3	Core	C, MPM	Highline Canal @ Hwy 99	535XHCHNN	37.41254	-120.75941
	Assessment	MPM	Highline Canal @ Lombardy Rd	535XHCALR	37.45547	-120.72181
	Assessment	A	Mustang Creek @ East Ave	535XMCAEA	37.49180	-120.68390
Zone 4	Assessment	MPM	Bear Creek @ Kibby Rd	535XBCAKR	37.31230	-120.41535
	Assessment	MPM	Livingston Drain @ Robin Ave	535XLDARA	37.31693	-120.74229
	Core	C, MPM	Merced River @ Santa Fe	535XMRSFD	37.42705	-120.67353
	Assessment	MPM	Howard Lateral @ Hwy 140	535XHLAHO	37.30790	-120.78200
	Assessment	A	Unnamed Drain @ Hwy 140	535XUDAHO	37.31331	-120.89218
	Assessment	MPM	Black Rascal Creek @ Yosemite Rd	535BRCAYR	37.33202	-120.39435
	Assessment	MPM	McCoy Lateral @ Hwy 140	535XMLAHO	37.30968	-120.78771
Zone 5	Assessment	MPM	Deadman Creek @ Gurr Rd	535XDCAGR	37.19514	-120.56147
	Assessment	A, MPM	Miles Creek @ Reilly Rd	535XMCARR	37.25830	-120.47524
	Assessment	MPM	Deadman Creek @ Hwy 59	535DMCAHF	37.19755	-120.48763
	Core	C, MPM	Duck Slough @ Gurr Rd	535XDSAGR	37.21408	-120.56126
Zone 6	Assessment	MPM	Berenda Slough along Ave 18 1/2	545XBSAAE	37.01820	-120.32650
	Core	C, MPM	Cottonwood Creek @ Rd 20	545XCCART	36.86860	-120.18180
	Assessment	A, MPM	Dry Creek @ Rd 18	545XDCARE	36.98180	-120.22056
NA	TMDL	TMDL	San Joaquin River at Hills Ferry Rd	541STC5123	37.34250	-120.97722
NA	TMDL	TMDL	San Joaquin River at the Maze Boulevard (Hwy 132) Bridge	541STC510	37.64194	-121.22778
NA	TMDL	TMDL	San Joaquin River at the Airport Way Bridge near Vernalis	541SJC501	37.67556	-121.26417

A – Assessment Monitoring
C – Core Monitoring
MPM – Management Plan Monitoring
NA-Not Applicable
TMDL-Total Maximum Daily Load
[1] Site types are either Assessment or Core based on the ESJWQC MRPP (Page 33), monitoring depends on the rotation schedule outlined in the ESJWQC MRPP (Table 10, Pages 52-53).
[2] Burnett Lateral @ 28 Mile Rd is no longer in ESJWQC boundary; site was monitored January-February 2013 then replaced by Mootz Drain downstream of Langworth Pond (approval March 8, 2013).

Table 11. ESJWQC land use acreage of site subwatersheds, January through September 2013.

Land uses designated as irrigated/non-irrigated (I/NI), sites listed alphabetically from Bear Creek @ Kibby Rd to Unnamed Drain @ Hwy 140; numbers are rounded to nearest whole number.

Land Use	I/NI	Bear Creek @ Kibby Rd	Berenda Slough along Ave 18 1/2	Black Rascal Creek @ Yosemite Rd	Burnett Lateral @ 28 Mile Rd	Cottonwood Creek @ Rd 20	Deadman Creek @ Gurr Rd	Deadman Creek @ Hwy 59	Dry Creek @ Rd 18	Dry Creek @ Wellsford Rd	Duck Slough @ Gurr Rd	Hatch Drain @ Tuolumne Rd	Highline Canal @ Hwy 99	Highline Canal @ Lombardy Rd	Hilmar Drain @ Central Ave	Howard Lateral @ Hwy 140	Lateral 2 ½ near Keyes Rd	Levee Drain @ Carpenter Rd	Livingston drain @ Robin Ave	McCoy Lateral @ Hwy 140	Merced River @ Santa Fe	Miles Creek @ Reilly Rd	Mootz Drain downstream of Langworth Pond	Mustang Creek @ East Ave	Prairie Flower Drain @ Crows Landing Rd	Unnamed Drain @ Hwy 140
Citrus	I	48	58			580	7	7	418				76	76			36				45	3				
Citrus	NI									7						4	7		4	4						
Deciduous nut and fruit	I	3424	13937	85	450	9222	10609	10598	11084	8118	7010		20941	17091		3585	23297		7647	3670	20681	2372		5625		
Field crop	I	1943	3046	377		3516	11876	10400	954	4674	4799	160	7152	6899	1288	440	3854	1362	773	1573	5527	4073	111	2109	1951	50
Field crop	NI					314															140					
Grain and hay	I	233	1855	39		837	2622	2425	439	215	603		583	583		262	100		484	524	701	461		32		
Grain and hay	NI	195	1414		116	1893	1166	1161	1212	2169	226		11	11			24			35	226	512		702		
Idle	I		237		15	1259	587	587	512	238	807		181	80		130	434		112	251	141	145				
Idle	NI																				292					
Riparian Vegetation	NI		322			22				704							102									
Wild vegetation	NI	16142	8979	3711	28	35881	55864	52589	12569	57835	27490		572	499		357	2325	23	559	378	87838	35993		275		95
Water surface	NI	70	272		16	717	359	335	264	316	158		184	184	22	6	435	31	13	34	671	117		8	30	
Pasture	I	1501	1549	439	694	954	9958	8714	552	7599	5155	84	4949	4892	398	457	2697	621	298	335	4543	2120	1201	79	763	366
Pasture	NI				19		39	18		1142	53		353	353		9	12		106	9	69					
Rice	I						8			1186	340					25			25	25						
Feedlot, dairy, farmstead	NI	93	1018		35	559	839	655	412	1479	728	25	1391	1273	147	126	1352	219	316	375	1042	610		131	383	10
Truck, nursery, berry	I	636	141	96		73	3371	3348	119		1699		283	107			675		2082	1525	291	1010				
Urban	NI		2191		2	10307	596	544	4538	530	406	6	678	423		892	4335	5	1330	806	3498	1649	49	5		
Golf Course, cemetery, landscape	NI		233			29			280				1	1		38	186		90	42	203	17	124			
Vineyard	I		3630			20465	1379	1321	6702	1764			1311	975		206	717		249	2206	3002			2538		
Total acres		**24283**	**38881**	**4747**	**1376**	**86630**	**99282**	**92702**	**40054**	**87976**	**49475**	**275**	**38667**	**33447**	**1855**	**8749**	**40587**	**2260**	**14088**	**11792**	**128911**	**49081**	**1485**	**11504**	**3126**	**521**
Irrigated acres		**7784**	**24452**	**997**	**1160**	**36906**	**40418**	**37400**	**20779**	**23794**	**20414**	**244**	**35476**	**30704**	**1686**	**7317**	**31810**	**1983**	**11670**	**10109**	**34931**	**10183**	**1312**	**10383**	**2714**	**416**

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

SITE SUBWATERSHED DESCRIPTIONS

Site descriptions, irrigated acreages and monitoring histories of ESJWQC sites monitored from January through September 2013 are listed alphabetically below. Water was not present at all sites during every event and some sites were not scheduled to be sampled every month. Irrigated acres are included in the site subwatershed descriptions; however, tally of these acreages are subject to change due to updated GIS layers and subwatershed boundary modifications. Maps of land use in each site subwatershed are included in Appendix VIII.

Bear Creek @ Kibby Rd (7,784 irrigated acres) – Bear Creek @ Kibby Rd is located in the Merced River @ Santa Fe Zone (Zone 4). This site subwatershed drains an eastern portion of the Coalition region in Merced County. Bear Creek originates in the foothills of the Sierras with Burn's Creek as one of the major tributaries. Bear Creek drains to the east just north of the town of Planada, through Merced and eventually to the San Joaquin River. The primary irrigated agriculture in the site subwatershed includes deciduous fruits and nuts, field crops, truck crops, and irrigated pasture.

Berenda Slough along Ave 18 ½ (24,452 irrigated acres) – Berenda Slough along Ave 18 ½ is located in the Cottonwood Creek @ Rd 20 Zone (Zone 6). This site subwatershed flows from Berenda Reservoir southwest through northern Madera County and is located southwest of the city of Chowchilla. When flows are sufficient, Berenda Slough empties into the Eastside Bypass. However, this waterway does not normally connect with the Bypass due to insufficient flow. The primary agriculture consists of deciduous fruits and nut orchards, vineyards, grain and hay, pasture, and field crops.

Black Rascal Creek @ Yosemite Rd (997 irrigated acres) – Black Rascal Creek @ Yosemite Rd is located in the Merced River @ Santa Fe Zone (Zone 4). Black Rascal Creek originates from Le Grand Canal and drains into Bear Creek. The eastern portion of this subwatershed is dominated by native vegetation with some irrigated corn and mixed pastureland in the southern and western portions.

Cottonwood Creek @ Rd 20 (36,906 irrigated acres) – Cottonwood Creek @ Rd 20 is one of the Core Sites in the Cottonwood Creek @ Rd 20 Zone (Zone 6). This site subwatershed is at the very southern edge of the Coalition region in Madera County and drains into the Eastside Bypass when flow is sufficient. The immediate upstream agriculture is vineyards with deciduous nuts farther to the east. The eastern portion of the subwatershed is dominated by wild vegetation as the subwatershed extends into the foothills.

Deadman Creek @ Gurr Rd (40,418 irrigated acres) – Deadman Creek @ Gurr Rd is located in the Duck Slough @ Gurr Rd Zone (Zone 5). This site subwatershed is a downstream site from Deadman Creek @ Hwy 59. The primary agriculture in the site subwatershed includes deciduous nuts and fruits, field crops and irrigated pastureland.

Deadman Creek @ Hwy 59 (37,400 irrigated acres) – Deadman Creek @ Hwy 59 is located in the Duck Slough @ Gurr Rd Zone (Zone 5) and is upstream of Deadman Creek @ Gurr Rd. Deadman Creek flows out of the Sierra foothills and confluences with Dutchman's Creek in the vicinity of Highway 59. The primary agriculture in the site subwatershed includes orchards, irrigated pasture and field crops. A large portion of the subwatershed is wild vegetation.

Dry Creek @ Rd 18 (20,779 irrigated acres) – Dry Creek @ Rd 18 is located within the Cottonwood Creek @ Rd 20 Zone (Zone 6). This site subwatershed originates in the Sierra foothills and flows just north of the city of Madera. Although rare, if flow is sufficient Dry Creek eventually drains into the San Joaquin River through various channels and irrigation ditches. The primary irrigated agriculture within the subwatershed is deciduous orchards and vineyards with some scattered field crops.

Dry Creek @ Wellsford Rd (23,794 irrigated acres) – Dry Creek @ Wellsford Rd is a Core Monitoring location in the Dry Creek @ Wellsford Rd Zone (Zone 1). This site subwatershed is in the northern part of the Coalition region and drains field crops, deciduous nuts, mixed pasture, and vineyards. Dry Creek originates to the east of Modesto, flows through Modesto to confluence with the Tuolumne River. Dairies are located upstream of this site and the town of Waterford may contribute an urban signal. The subwatershed extends into the foothills and is dominated in the east by wild vegetation with some rice, row crops and irrigated pasture.

Duck Slough @ Gurr Rd (20,414 irrigated acres) – Duck Slough @ Gurr Rd is a Core Site located in the Duck Slough @ Gurr Rd Zone (Zone 5). This site subwatershed is located downstream from the Duck Slough @ Hwy 99 site subwatershed. Duck Slough originates in the Sierra foothills and flows west (becoming the Duck Slough @ Gurr Rd site subwatershed) eventually joining with Deadman Creek in the western portion of the Coalition region. The slough eventually flows into the San Joaquin River via Deadman Creek and Deep Slough. Located to the southwest of Merced, this site drains field crops, deciduous nuts and pastureland. Treated wastewater from the city of Madera enters Duck Slough a few miles upstream of the Gurr Rd site.

Hatch Drain @ Tuolumne Rd (244 irrigated acres) – Hatch Drain @ Tuolumne Rd is located in the Prairie Flower Drain @ Crows Landing Rd Zone (Zone 2). This small site subwatershed is located in the western portion of the Coalition region in Stanislaus County. The subwatershed drains field crops and pastureland.

Highline Canal @ Hwy 99 (35,476 irrigated acres) – Highline Canal @ Hwy 99 is a Core Site located in the Highline Canal @ Hwy 99 Zone (Zone 3). The Highline Canal is a conveyance structure of the Turlock Irrigation District (TID) and carries both clean irrigation water and irrigation return flow during the summer, and urban and agricultural storm water runoff during the winter. This site was selected as a downstream companion site to the Highline Canal @ Lombardy Rd site. The sampling site is located just south of Delhi as the canal crosses Highway 99. Irrigated agriculture above this location is primarily deciduous nuts with small amounts of field crops, pastureland, and vineyards.

Highline Canal @ Lombardy Rd (30,704 irrigated acres) – Highline Canal @ Lombardy Rd is located in the Highline Canal @ Hwy 99 Zone (Zone 3) and is upstream of the Highline Canal @ Hwy 99 site. The Highline Canal is a Turlock Irrigation District (TID) conveyance structure and carries both clean irrigation water and irrigation return flow during the summer and storm water runoff during the winter. The Highline Canal flows west and eventually drains into the Merced River. The main upstream tributary of the Highline Canal is Mustang Creek which is a major tributary during the dormant season and passes immediately to the southeast of the Turlock Airport. The predominant crop in this site subwatershed is deciduous nuts with some dairies located upstream.

Hilmar Drain @ Central Ave (1,686 irrigated acres) – Hilmar Drain @ Central Ave is located in the Prairie Flower Drain @ Crows Landing Rd Zone (Zone 2). This site subwatershed is located toward the western edge of the Coalition region near the San Joaquin River. This is a small site subwatershed containing primarily field crops and a large number of dairies with irrigated pasture. Hilmar Drain originates at Williams Ave and Washington Rd and eventually drains into the San Joaquin River. At this location, TID refers to the Hilmar Drain waterbody as "Reclamation Drain."

Howard Lateral @ Hwy 140 (7,317 irrigated acres) – Howard Lateral @ Hwy 140 is located in the Merced River @ Santa Fe Zone (Zone 4). The lateral is located just south and west of Livingston Drain, in the central portion of the Coalition region in Merced County. Agricultural land use is predominantly deciduous nut and fruit orchards, but also includes field crops, pastureland, grains/hay, vineyard and dairy.

Lateral 2 ½ near Keyes Rd (31,810 Irrigated acres) – Lateral 2 ½ near Keyes Rd is located in the Prairie Flower Drain @ Crows Landing Rd Zone (Zone 2). 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 crop types and land use found in the Coalition region.

Levee Drain @ Carpenter Rd (1,983 irrigated acres) – Levee Drain @ Carpenter Rd is located in the Prairie Flower Drain @ Crows Landing Rd Zone (Zone 2). This site subwatershed is located north of Prairie Flower and originates at West Fulkerth Rd and South Carpenter Rd and drains into the San Joaquin River. This is a small subwatershed containing mainly deciduous nut and fruit orchards with some irrigated pastureland.

Livingston Drain @ Robin Ave (11,670 irrigated acres) – Livingston Drain @ Robin Ave is located in the Merced River @ Santa Fe Zone (Zone 4). This site subwatershed is located in the west central portion of the Coalition region in Merced County, east of Howard Lateral. It is located west of Atwater and Livingston. The water from Hammatt Lateral and Arena Canal drains into Livingston Drain. Arena Canal receives storm water from the city of Livingston as well as water from the Livingston Canal. The agriculture is almost entirely orchards with some truck crops. Several dairies are also present in the watershed.

McCoy Lateral @ Hwy 140 (10,109 irrigated acres) – McCoy Lateral @ Hwy 140 is located in the Merced River @ Santa Fe Zone (Zone 4). This site subwatershed is located immediately west of Howard Lateral. The water from Hammatt Lateral and Arena Canal drains into McCoy Lateral. Arena Canal receives storm water from the city of Livingston as well as water from Livingston Canal. The agriculture of the McCoy Lateral @ Hwy 140 site subwatershed is a mixture of deciduous fruit and nut orchards, vineyards, truck/nursery/berries, and field crops.

Merced River @ Santa Fe (34,931 irrigated acres) – Merced River @ Santa Fe is a Core Site located within the Merced River @ Santa Fe Zone (Zone 4). This site subwatershed contains a major waterbody which is 303d listed. It was selected as an integrator site for several of the drains and tributaries in the vicinity. The Merced River originates in the high Sierra encountering several dams and impoundments as it flows west eventually draining into the San Joaquin River near Hatfield State Park. Upstream agriculture in the immediate vicinity of the river includes some field crops and deciduous nuts (primarily almonds). Irrigated pasture and vineyards are also present within the Merced River @ Santa Fe site subwatershed.

Miles Creek @ Reilly Rd (10,183 irrigated acres) – Miles Creek @ Reilly Rd is located in the Duck Slough @ Gurr Rd Zone (Zone 5). Miles Creek is located just north of Duck Slough and drains into Owen's Creek. The primary agriculture within the Miles Creek @ Reilly Rd site subwatershed is field crops in addition to deciduous nuts and fruit, pasture, and truck/nursery/berry production. Urban drainages, dairies and hay, and pasturelands are also present within the subwatershed.

Mootz Drain downstream of Langworth Pond (1,312 irrigated acres) – Mootz Drain downstream of Langworth Pond is located in the Dry Creek @ Wellsford Rd Zone (Zone 1). This site subwatershed is located just downstream of Mootz Drain @ Langworth in the northern portion of the Coalition region. The drain originates to the east of Modesto and drains through Lateral 6 into the Stanislaus River. Land use upstream of the site is predominantly pastures and dairies. A small portion of land is allocated as field crops.

Mustang Creek @ East Ave (10,383 irrigated acres) – Mustang Creek @ East Ave is located in the Highline Canal @ Hwy 99 Zone (Zone 3). 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 rare and intermittent as the upstream orchards utilize microspray irrigation. Citrus and deciduous nut crops are the main agriculture with smaller amounts of field crops and vineyards.

Prairie Flower Drain @ Crows Landing Rd (2,714 irrigated acres) – Prairie Flower Drain @ Crows Landing Rd is a Core Site located in the Prairie Flower Drain @ Crows Landing Rd Zone (Zone 2). Relative to other drains in the western portion of the Coalition region, Prairie Flower Drain is longer and drains mostly irrigated agriculture. Dairies and feedlots are common in this part of the Coalition region and this drain receives runoff from farmland managed by dairies immediately upstream. Agriculture in the upstream vicinity is primarily field crops and pasture. The water table in this site subwatershed is very shallow and the groundwater is high in salinity; as Prairie Flower Drain intercepts this groundwater supply it moves it to Harding Drain.

Rodden Creek @ Rodden Rd (311 irrigated acres)- Rodden Creek @ Rodden Rd is located in the Dry Creek @ Wellsford Zone (Zone 1). Rodden Creek, fed by Rodden Lake, is located in the northern portion of Stanislaus County and drains into the Stanislaus River. The subwatershed is comprised of a majority of natural vegetation but also includes walnut orchards, irrigated and non-irrigated pasture, and a few row crops. There is a small residential area to the east of the sampling location along Rodden Road.

San Joaquin River at Airport Way Bridge near Vernalis (82,611 irrigated acres) – San Joaquin River at Airport Way Bridge near Vernalis is monitored for chlorpyrifos and diazinon TMDL compliance. This area drains lands from Airport Way Bridge upstream to Maze Blvd into the San Joaquin River including the northern portion of Stanislaus County with a small portion west of San Joaquin River from Stanislaus and San Joaquin Counties. Agriculture in the area is primarily deciduous nuts and fruits with some field crops, pastureland, truck, nursery, and berry crops.

San Joaquin River at Hills Ferry Rd (348,080 irrigated acres) – San Joaquin River at Hills Ferry Rd is monitored for chlorpyrifos and diazinon TMDL compliance. This area drains lands west of the San Joaquin River upstream from Hills Ferry Rd to Fremont Ford and includes the region west of San Joaquin River for Merced and the northern part of Fresno County. Approximately 50% of the land is native vegetation with some field crops, deciduous nuts, fruit, truck, nursery, and berry crops.

San Joaquin River at the Maze Boulevard (Highway 132) Bridge (170,673 irrigated acres) – San Joaquin River at the Maze Boulevard (Highway 132) Bridge is monitored for chlorpyrifos and diazinon TMDL compliance. This area drains lands east and west of the San Joaquin River between Maze Blvd and Las Palmas Ave. Approximately 44% of the land is native vegetation along with some field crops, some deciduous nuts, fruit, truck, nursery and berry crops.

Unnamed Drain @ Hwy 140 (416 irrigated acres) – Unnamed Drain @ Hwy 140 is located in the Merced River @ Santa Fe Zone (Zone 4). This waterbody originates from the East Side Irrigation Canal and flows into Old Channel which flows into San Joaquin River. The irrigated agriculture is primarily mixed pastureland with a small amount of corn crops.

RAINFALL RECORDS

A storm monitoring event is defined as monitoring within three days of a rainfall event that exceeds 0.25 inches within 24 hours. If a storm is forecasted within a week before a scheduled sampling event, or predicted within two days after the scheduled sampling event, the Coalition moves its sampling date to capture the storm. Storm monitoring events must be captured at least twice per year, except where a different frequency has been required or approved by the Regional Board. Stormwater runoff monitoring criteria must be identified based on precipitation levels and knowledge of soils or other factors affecting when stormwater runoff is expected to occur. The collection of storm samples is not contingent on the timing of other prescheduled sampling events and may result in monitoring more than once during a month.

The Coalition sampled two storms from January through September 2013 (February 20, 2013 and April 2, 2013). Below is a description of all the storms that occurred from January through September 2013, and whether or not storm monitoring occurred (further described in the Monitoring Results and Sample Details section of this report).

Daily rainfall records are provided for the three major cities in the Coalition region: Modesto, Merced, and Madera (Figure 10, January through March 2013, Figure 11, April through June 2013, and Figure 12, July through September).

January through March 2013

One storm event meeting the trigger limit was monitored from January through March 2013.

The first substantial storm system occurred over a two day period lasting from January 5 through January 6, 2013. During the two days, 0.9 inches of precipitation was reported in Merced, 1.13 inches in Modesto, and 0.87 inches in Madera (Figure 9). Although the January 5 through January 6 storm met the trigger limit in all three cities, sampling did not occur because the storm was not predicted to be large. Although sampling occurred on January 8, 2013 which was within 3 days of meeting the trigger limit for a storm, this was the first rain event since early December. Due to the lack of moisture in soils, there was no evident surface water runoff as a result of the rain that occurred over the weekend on January 5 and 6 and therefore the January 8 monitoring event was not classified as a storm event.

Two storm systems brought measurable amounts of precipitation to the ESJWQC area in late January and early February. The first storm occurred on January 24 and lasted until January 25, 2013; during this time-frame Merced reported 0.14 inches, Modesto 0.03 inches, and Madera 0.19 inches (Figure 10). The second storm event occurred between February 6 and February 8, 2013. During this event Merced reported a total rainfall of 0.06 inches, Modesto 0.02 inches and Madera 0.29 inches (Figure 10). Neither storm was substantial enough to meet the trigger limit of 0.25 inches within a twenty-four hour period.

The trigger limit was exceeded during a storm system that occurred February 18 through February 19, 2013 (Figure 10). Regular monitoring occurred in the Coalition region on February 12, 2013 and a second sampling event was scheduled to capture the storm on February 20, 2013. Merced reported a total of 0.34 inches, Modesto 0.3 inches, and Madera 0.62 inches (Figure 10) during the February 18-19, 2013 storm event.

During the month of March there were a total of three storm systems in the ESJWQC area. During the first storm event, which occurred March 6 through March 8, 2013, Merced reported a total rainfall of 0.25 inches, Modesto 0.06 inches and Madera 0.1 inches (Figure 10). The second storm in March (March 19-20, 2013) resulted in a total rainfall of 0.02 inches in Merced, 0.09 inches in Modesto and

0.02 inches in Madera. The final storm occurred from March 30 through April 1, 2013; during this time-frame Merced reported 0.48 inches of precipitation, Modesto 0.49 inches and Madera 0.63 inches (Figures 10 and 11). As described in the next section, the Coalition sampled this storm event as the second storm of 2013.

April through June 2013

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

A storm system occurred from March 30 through April 1, 2013; during this time-frame Merced reported 0.48 inches of precipitation, Modesto 0.49 inches and Madera 0.63 inches (Figures 10 and 11). All three cities met the trigger limit and storm sampling was conducted on April 2, 2013 to capture the storm event. From April 3 through April 4, a storm system brought measureable precipitation to the ESJWQC area; during this storm, Merced reported a total rainfall of 0.41 inches, Modesto 0.34 inches and Madera 0.56 inches (Figure 11). Even though this storm met the trigger limit in all three cities, sampling did not occur after this event because storm monitoring had already taken place on April 2.

A small storm system on April 8, 2013 produced 0.02 inches in Merced, 0.0 inches in Modesto, and 0.02 inches in Madera (Figure 11). This was the last storm event with recordable precipitation during the month of April, 2013.

During the month of May, there was only one measurable storm event which occurred May 6 through May 8, 2013. During this time-frame Merced reported 0.1 inches, Modesto 0.11 inches, and Madera 0.06 inches (Figure 11).

June received two days of rainfall. The first event occurred on June 10, 2013 and produced 0.08 inches of precipitation in Merced and 0.0 inches in both Modesto and Madera. The second event occurred on June 24, 2013 and produced 0.01 inches in Merced, 0.04 inches in Modesto, and 0.0 inches in Madera (Figure 11).

July through September 2013

No storm events meeting the trigger limit were monitored July through September 2013.

The East San Joaquin area had typical Mediterranean climate conditions in July through September with hot and dry weather and no precipitation. The only storm event with measureable precipitation occurred September 21 through 22, 2013, with zero inches reported in Merced, 0.12 inches in Modesto, and 0.22 inches reported in Madera (Figure 12).

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

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

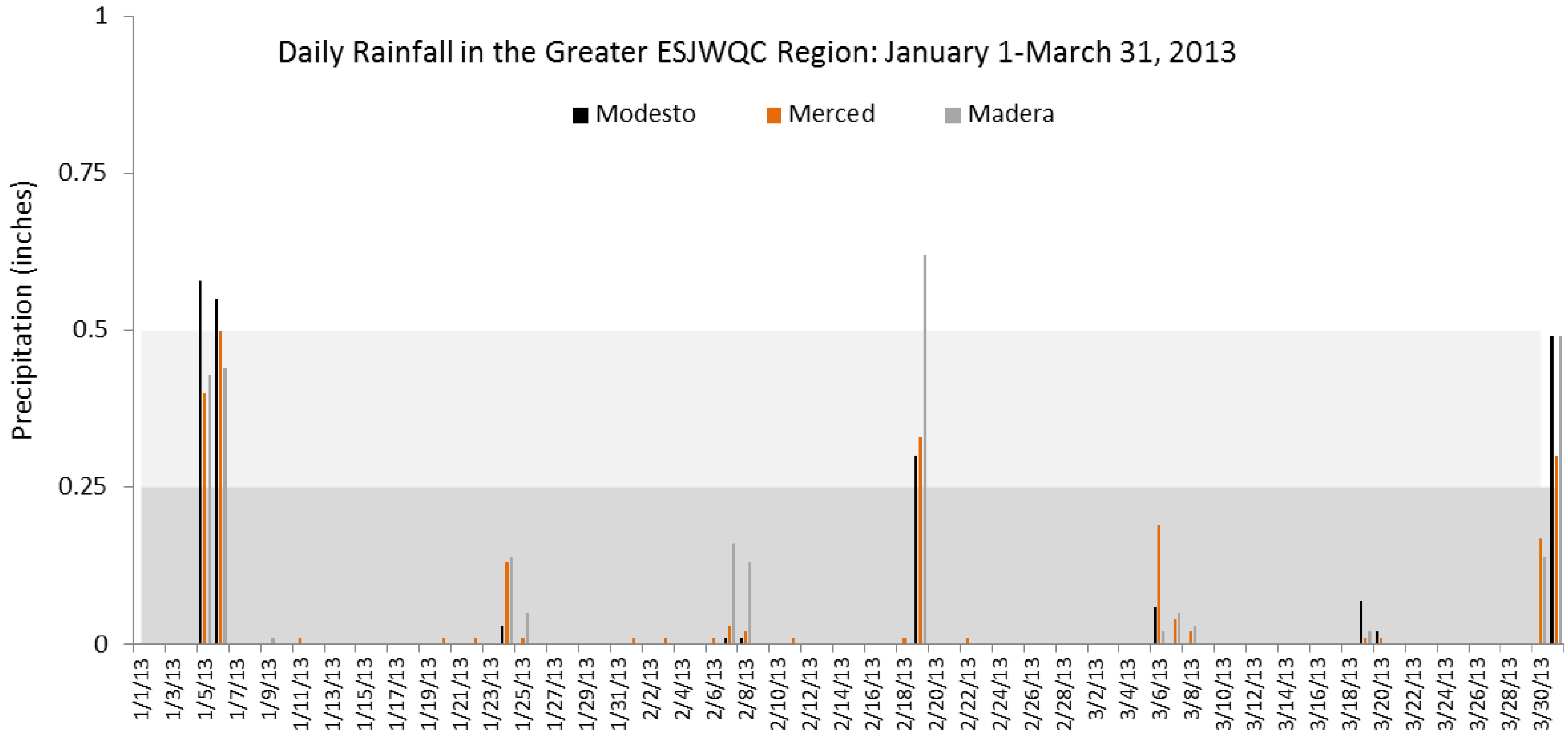


Figure 11. Precipitation history for Modesto, Merced, and Madera, April through June 2013.

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

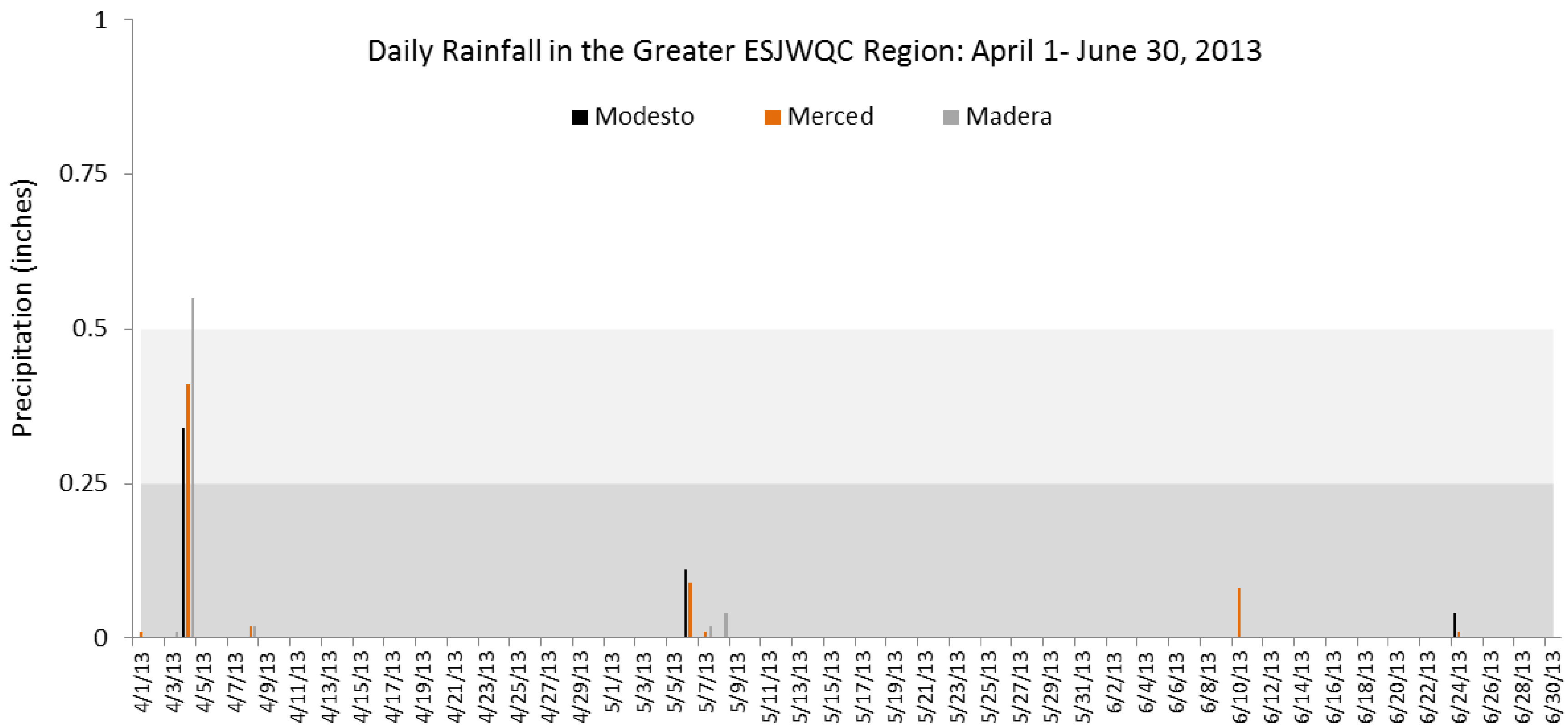
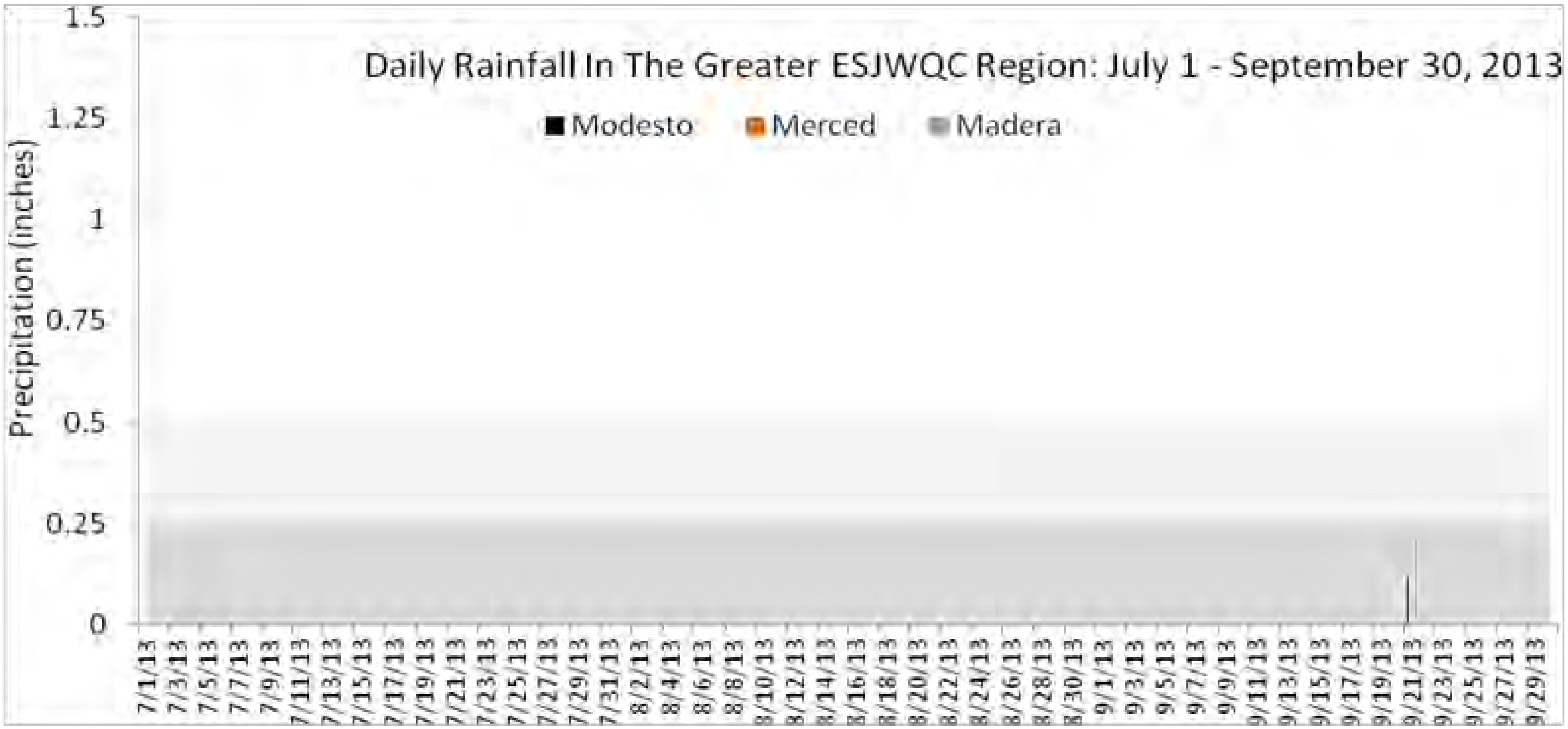


Figure 12. Precipitation history for Modesto, Merced, and Madera, July through September 2013.

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



MONITORING RESULTS AND SAMPLE DETAILS

Monitoring occurred at sites in the ESJWQC from January through September 2013 (Table 12). On March 5, 2013 the Coalition requested to remove Burnett lateral @ 28 Mile Rd from its monitoring program because the site is no longer located within the ESJWQC boundary as outlined in the WDR. Samples were collected and analyzed from Burnett Lateral @ 28 Mile Rd in January and February 2013. Samples were also collected from the site during the March 12, 2013 monitoring event; however, the letter from the Regional Board approving the removal of the site was received in the mail on March 13, 2013 (approval date March 8, 2013). Therefore the Coalition did not have the samples analyzed because the site is not representative of water quality within the Coalition boundary. Assessment Monitoring resumed in Zone 1 at Mootz Drain downstream of Langworth Pond April 2013.

Original Chain of Custody (COC) forms associated with samples collected for analysis and documentation of any anomalies were scanned and converted to pdf files and submitted quarterly. 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 were 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.

There were two instances of sample failure during ESJWQC monitoring from January through September 2013; failures were resolved by recollecting samples as needed to ensure overall compliance with monthly monitoring requirements. Toxicity samples collected during March 12, 2013 for NM at Unnamed Drain @ Hwy 140 were recollected on March 15, 2013 as soon as the laboratory notified the Coalition that the toxicity tests for *P. promelas* had not been started on time, and samples collected on May 14, 2013 were taken from the wrong site and were recollected on May 21, 2013 from the correct location at Livingston Drain @ Robin Ave.

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

$$\text{Instantaneous Load } (\mu g/sec) = \text{Discharge (cfs) X } 28.317 L/ft^3 \text{ X Concentration } (\mu g/L).$$

To convert a concentration measured in mg/L to µg/L, multiply by 1000. The load values calculated for pesticides or other constituents represent instantaneous loads only. These values should not be used to extrapolate loading over any period of time (e.g. weekly, monthly, seasonal, or annual). The primary purpose for reporting instantaneous loads is to provide the Regional Water Board with a context for the concentrations of various constituents at the time that samples were collected.

Complete monitoring results from sampling that occurred from January through September 2013 are included in Appendix III and Appendix IV. Results are provided for field parameters, organics (pesticides), inorganic constituents including metals and *E. coli*, toxicity (water and sediment), sediment chemistry, and loads for any detectable analytes with corresponding flow data from the site. Monitoring data include results from samples taken for MPM, NM, sediment monitoring, and TMDL compliance monitoring. Each sampling location, sampling date, sampling time, and type of monitoring is listed in Table 12 and all field data sheets were submitted quarterly. All laboratory reports including electronic Level III data packages for January through September 2013 were submitted quarterly.

From January through September 2013, the following sites were not sampled due to lack of water on the specified sample date (Table 12):

- Berenda Slough along Ave 18 ½ (Dry: 1/8/13, 2/12/13, 4/9/13, 5/14/13, 6/11/13, 8/13/13, 9/10/13)
- Cottonwood Creek @ Rd 20 (Dry: 2/12/13, 2/20/13, 3/12/13, 4/2/13, 5/14/13, 6/11/13, 8/13/13)
- Deadman Creek @ Hwy 59 (Dry: 8/13/13, 9/10/13)
- Dry Creek @ Rd 18 (Dry: 2/20/13)
- Duck Slough @ Gurr Rd (Dry: 2/12/13, 2/20/13)
- Livingston Drain @ Robin Ave (Dry: 2/12/13, 9/10/13)
- Mustang Creek @East Ave (Dry: 2/20/13, 3/12/13, 4/2/13, 5/14/13, 6/11/13, 7/10/13, 8/13/13, 9/10/13)
- Unnamed Drain @ Hwy 140 (Dry: 2/20/13)

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

From January through September 2013, the following sites were sampled as non-contiguous waterbodies (Table 13):

- Berenda Slough along Ave 18 ½ (7/9/13)
- Cottonwood Creek @ Rd 20 (9/10/13)
- Dry Creek @ Rd 18 (2/12/13)
- Highline Canal @ Hwy 99 (2/12/13, 2/20/13)
- Highline Canal @ Lombardy Rd (2/12/13)
- Livingston Drain @ Robin Ave (4/9/13, 8/13/13)

Table 12. Sample details for January through September 2013 (by station name, sample date, and monitoring event).
Season/Group codes are explained at the bottom of the table.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Bear Creek @ Kibby Rd	535XBCAKR	MPM	Management Plan Monitoring; Winter1	1/8/2013	16:00		January Management Plan Monitoring for copper only. Too deep to measure discharge.
Berenda Slough along Ave 18 1/2	545XBSAAE	MPM	Management Plan Monitoring; Winter1	1/8/2013	16:45	Dry	Dry site, no samples collected. January Management Plan Monitoring for copper only.
Burnett Lateral @ 28 Mile Rd	535BLATMR	NM	Winter1	1/8/2013	8:20		Discharge recorded as zero due to no measurable flow.
Cottonwood Creek @ Rd 20	545XCCART	MPM, NM	Management Plan Monitoring; Winter1	1/8/2013	18:30		January Management Plan Monitoring for copper, lead, and chlorpyrifos.
Deadman Creek @ Gurr Rd	535XDCAGR	MPM	Management Plan Monitoring; Winter1	1/8/2013	12:20		January Management Plan Monitoring for *P. promelas* toxicity. Discharge not measured due to toxicity monitoring only.
Deadman Creek @ Hwy 59	535DMCAHF	MPM	Management Plan Monitoring; Winter1	1/8/2013	12:40		January Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Dry Creek @ Rd 18	545XDCARE	MPM, NM	Management Plan Monitoring; Winter1	1/8/2013	17:20		January Management Plan Monitoring for copper, diuron and *S. capricornutum* toxicity.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Winter1	1/8/2013	9:30		Too deep to measure discharge.
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Management Plan Monitoring; Winter1	1/8/2013	11:40		January Management Plan Monitoring for copper and lead.
Hatch Drain @ Tuolumne Rd	535XHDATR	MPM	Management Plan Monitoring; Winter1	1/8/2013	11:50		January Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM	Management Plan Monitoring; Winter1	1/8/2013	17:20		January Management Plan Monitoring for copper.
Highline Canal @ Lombardy Rd	535XHCALR	MPM	Management Plan Monitoring; Winter1	1/8/2013	16:20		January Management Plan Monitoring for copper, chlorpyrifos and *C. dubia* toxicity.
Levee Drain @ Carpenter Rd	535XLDACR	NM	Winter1	1/8/2013	12:20		
Livingston Drain @ Robin Ave	535XLDARA	MPM	Management Plan Monitoring; Winter1	1/8/2013	10:30		January Management Plan Monitoring for copper, lead, and chlorpyrifos. Discharge recorded as zero due to no measurable flow.
McCoy Lateral @ Hwy 140	535XMLAHO	MPM	Management Plan Monitoring; Winter1	1/8/2013	9:50		January Management Plan Monitoring for copper.
Merced River @ Santa Fe	535XMRSFD	MPM, NM	Management Plan Monitoring; Winter1	1/8/2013	15:40		January Management Plan Monitoring for chlorpyrifos and *C. dubia* toxicity.
Miles Creek @ Reilly Rd	535XMCARR	MPM, NM	Management Plan Monitoring; Winter1	1/8/2013	13:50		January Management Plan Monitoring for copper, lead, and *C. dubia* toxicity.
Mustang Creek @ East Ave	535XMCAEA	NM	Winter1	1/8/2013	14:40		
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM, NM	Management Plan Monitoring; Winter1	1/8/2013	13:20		January Management Plan Monitoring for *S. capricornutum* toxicity.
Unnamed Drain @ Hwy 140	535XUDAHO	NM	Winter1	1/8/2013	8:50		

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Bear Creek @ Kibby Rd	535XBCAKR	MPM	Management Plan Monitoring; Winter2	2/12/2013	12:40		February Management Plan Monitoring for copper.
Berenda Slough along Ave 18 1/2	545XBSAAE	MPM	Management Plan Monitoring; Winter2	2/12/2013	10:55		February Management Plan Monitoring for copper only.
Burnett Lateral @ 28 Mile Rd	535BLATMR	NM	Non-Contiguous; Winter2	2/12/2013	8:30		Discharge recorded as zero due to non-contiguous waterbody.
Cottonwood Creek @ Rd 20	545XCCART	MPM, NM	Management Plan Monitoring; Winter2	2/12/2013	9:15	Dry	Dry site, no samples collected. February Management Plan Monitoring for copper, lead and chlorpyrifos.
Deadman Creek @ Gurr Rd	535XDCAGR	MPM	Management Plan Monitoring; Winter2	2/12/2013	14:00		February Management Plan Monitoring for *C. dubia*, *S. capricornutum* and *P. promelas* toxicity. Discharge not measured due to toxicity monitoring only.
Dry Creek @ Rd 18	545XDCARE	MPM, NM	Management Plan Monitoring; Non-Contiguous; Winter2	2/12/2013	10:00		February Management Plan Monitoring for copper, chlorpyrifos, diazinon, diuron, and *S. capricornutum* toxicity. Discharge recorded as zero due to non-contiguous waterbody.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Winter2	2/12/2013	9:40		
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Management Plan Monitoring; Winter2	2/12/2013	14:30	Dry	Dry site, no samples collected. February Management Plan Monitoring for copper, lead and *C. dubia* toxicity.
Hatch Drain @ Tuolumne Rd	535XHDATR	MPM	Management Plan Monitoring; Winter2	2/12/2013	8:20		February Management Plan Monitoring for *S. capricornutum* toxicity. Discharge recorded as zero due to no measurable flow.
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM	Management Plan Monitoring; Non-Contiguous; Winter2	2/12/2013	13:40		February Management Plan Monitoring for copper, lead, and *S. capricornutum* toxicity. Discharge recorded as zero due to non-contiguous waterbody.
Highline Canal @ Lombardy Rd	535XHCALR	MPM	Management Plan Monitoring; Non-Contiguous; Winter2	2/12/2013	12:10		February Management Plan Monitoring for copper, *C. dubia*, *S. capricornutum* toxicity. Discharge recorded as zero due to non-contiguous waterbody.
Hilmar Drain @ Central Ave	535XHDACA	MPM	Management Plan Monitoring; Winter2	2/12/2013	11:10		February Management Plan Monitoring for copper.
Levee Drain @ Carpenter Rd	535XLDACR	NM	Winter2	2/12/2013	8:50		
Livingston Drain @ Robin Ave	535XLDARA	MPM	Management Plan Monitoring; Winter2	2/12/2013	14:55	Dry	February Management Plan Monitoring for copper, lead, and *S. capricornutum* toxicity.
Merced River @ Santa Fe	535XMRSFD	NM	Winter2	2/12/2013	12:50		
Miles Creek @ Reilly Rd	535XMCARR	MPM, NM	Management Plan Monitoring; Winter2	2/12/2013	12:00		February Management Plan Monitoring for copper and lead. Discharge recorded as zero due to no measurable flow.
Mustang Creek @ East Ave	535XMCAEA	NM	Winter2	2/12/2013	11:00		Too shallow to measure discharge.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM, NM	Management Plan Monitoring; Winter2	2/12/2013	10:00		February Management Plan Monitoring for *S. capricornutum* toxicity.
Unnamed Drain @ Hwy 140	535XUDAHO	NM	Winter2	2/12/2013	14:20	Dry	Dry site, no samples collected.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Burnett Lateral @ 28 Mile Rd	535BLATMR	NM	High TSS 1-M ; High TSS 1-P; Non-Contiguous; Storm1	2/20/2013	9:40		Non-contiguous waterbody. Discharge recorded as zero due to non-contiguous waterbody.
Cottonwood Creek @ Rd 20	545XCCART	NM	Storm1	2/20/2013	9:04	Dry	Dry site, no samples collected.
Dry Creek @ Rd 18	545XDCARE	NM	High TSS 1-M ; High TSS 1-P; Storm1	2/20/2013	9:29	Dry	Dry site, no samples collected.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Storm1	2/20/2013	11:00		
Duck Slough @ Gurr Rd	535XDSAGR	NM	Storm1	2/20/2013	14:08	Dry	Dry site, no samples collected.
Highline Canal @ Hwy 99	535XHCHNN	NM	Non-Contiguous; Storm1	2/20/2013	15:20		Non-contiguous waterbody. Discharge recorded as zero due to non-contiguous waterbody.
Levee Drain @ Carpenter Rd	535XLDACR	NM	High TSS 1-M ; High TSS 1-P; Storm1	2/20/2013	12:20		
Merced River @ Santa Fe	535XMRSFD	NM	Storm1	2/20/2013	15:40		
Miles Creek @ Reilly Rd	535XMCARR	NM	High TSS 1-M ; High TSS 1-P; Storm1	2/20/2013	11:50		
Mustang Creek @ East Ave	535XMCAEA	NM	High TSS 1-M ; High TSS 1-P; Storm1	2/20/2013	15:10	Dry	Dry site, no samples collected.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Storm1	2/20/2013	13:10		
Unnamed Drain @ Hwy 140	535XUDAHO	NM	High TSS 1-M ; High TSS 1-P; Storm1	2/20/2013	14:44	Dry	Dry site, no samples collected.
San Joaquin River above Maze Boulevard	541STC510	TMDL	Storm1	2/20/2013	7:50		
San Joaquin River at Airport Way near Vernalis	541SJC501	TMDL	Storm1	2/20/2013	8:20		
SJR @ Hills Ferry	541STC512	TMDL	Storm1	2/20/2013	14:10		
Cottonwood Creek @ Rd 20	545XCCART	NM	Winter3	3/12/2013	9:10	Dry	Dry site, no samples collected.
Deadman Creek @ Gurr Rd	535XDCAGR	MPM	Management Plan Monitoring; Winter3	3/12/2013	12:50		March Management Plan Monitoring for chlorpyrifos, *C. dubia* and *P. promelas toxicity.*
Dry Creek @ Rd 18	545XDCARE	MPM, NM	Management Plan Monitoring; Winter3	3/12/2013	10:00		March Management Plan Monitoring for *H. azteca* toxicity. Discharge recorded as zero due to no measurable flow.
Dry Creek @ Wellsford Rd	535XDCAWR	MPM, NM	Management Plan Monitoring; Winter3	3/12/2013	8:40		March Management Plan Monitoring for *H. azteca* toxicity. Pesticides analyzed for in toxic sediment only.
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Management Plan Monitoring; Winter3	3/12/2013	14:00		March Management Plan Monitoring for *C. dubia* toxicity
Hatch Drain @ Tuolumne Rd	535XHDATR	MPM	Management Plan Monitoring; Winter3	3/12/2013	9:50		March Management Plan Monitoring for *H. azteca* toxicity. Discharge not measured due to toxicity monitoring only.
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM	Management Plan Monitoring; Winter3	3/12/2013	17:00		March Management Plan Monitoring for *H. azteca, C. dubia* and *S. capricornutum* toxicity.
Highline Canal @ Lombardy Rd	535XHCALR	MPM	Management Plan Monitoring; Winter3	3/12/2013	17:50		March Management Plan Monitoring for copper, chlorpyrifos, *H. azteca, C. dubia* and *S. capricornutum* toxicity.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Hilmar Drain @ Central Ave	535XHDACA	MPM	Management Plan Monitoring; Winter3	3/12/2013	13:50		March Management Plan Monitoring for *H. azteca* toxicity. Discharge not measured due to toxicity monitoring only.
Levee Drain @ Carpenter Rd	535XLDACR	NM, Sediment	Winter3	3/12/2013	11:20		
Merced River @ Santa Fe	535XMRSFD	MPM, NM	Management Plan Monitoring; Winter3	3/12/2013	15:20		March Management Plan Monitoring for *C. dubia* toxicity.
Miles Creek @ Reilly Rd	535XMCARR	NM, Sediment	Winter3	3/12/2013	11:40		
Mustang Creek @ East Ave	535XMCAEA	NM, Sediment	Winter3	3/12/2013	14:53	Dry	Dry site, no samples collected.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM, NM	Management Plan Monitoring; Winter3	3/12/2013	13:10		March Management Plan Monitoring for *H. azteca* and *C. dubia* toxicity. Discharge recorded as zero due to no measurable flow.
Unnamed Drain @ Hwy 140	535XUDAHO	NM, Sediment	Winter3	3/12/2013	15:20		Discharge recorded as zero due to no measurable flow.
Unnamed Drain @ Hwy 140	535XUDAHO	NM	Winter3	3/15/2013	14:50		
Cottonwood Creek @ Rd 20	545XCCART	MPM, NM	Management Plan Monitoring; Storm2	4/2/2013	9:00	Dry	Dry site, no samples collected. April Management Plan Monitoring for copper.
Dry Creek @ Rd 18	545XDCARE	MPM, NM	Management Plan Monitoring; Storm2	4/2/2013	9:50		April Management Plan Monitoring for copper and chlorpyrifos. Discharge recorded as zero due to no measurable flow.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Storm2	4/2/2013	9:20		
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Management Plan Monitoring; Storm2	4/2/2013	12:10		April Management Plan Monitoring for copper and lead.
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM	Management Plan Monitoring; Storm2	4/2/2013	16:10		April Management Plan Monitoring for copper, lead and *S. capricornutum* toxicity. Too deep to measure discharge.
Levee Drain @ Carpenter Rd	535XLDACR	NM	Storm2	4/2/2013	12:30		
Merced River @ Santa Fe	535XMRSFD	NM	Storm2	4/2/2013	16:40		
Miles Creek @ Reilly Rd	535XMCARR	MPM, NM	Management Plan Monitoring; Storm2	4/2/2013	11:00		April Management Plan Monitoring for *S. capricornutum* toxicity.
Mootz Drain downstream of Langworth Pond	535XMDDLP	NM	Storm2	4/2/2013	8:30		
Mustang Creek @ East Ave	535XMCAEA	NM	Storm2	4/2/2013	17:15	Dry	Dry site, no samples collected.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM, NM	Management Plan Monitoring; Storm2	4/2/2013	15:00		April Management Plan Monitoring for *P. promelas* and *S. capricornutum* toxicity. Discharge recorded as zero due to no measurable flow.
Unnamed Drain @ Hwy 140	535XUDAHO	NM	Storm2	4/2/2013	13:20		
Berenda Slough along Ave 18 1/2	545XBSAAE	MPM	Irrigation1; Management Plan Monitoring	4/9/2013	10:40	Dry	April Management Plan Monitoring for copper and chlorpyrifos only. Dry site, no samples collected.
Black Rascal Creek @ Yosemite Rd	535BRCAYR	MPM	Irrigation1; Management Plan Monitoring	4/9/2013	9:30		April Management Plan Monitoring for lead.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Deadman Creek @ Gurr Rd	535XDCAGR	MPM	Irrigation1; Management Plan Monitoring	4/9/2013	11:40		April Management Plan Monitoring for chlorpyrifos only.
Deadman Creek @ Hwy 59	535DMCAHF	MPM	Irrigation1; Management Plan Monitoring	4/9/2013	11:20		April Management Plan Monitoring for chlorpyrifos and *S. capricornutum* toxicity.
Hatch Drain @ Tuolumne Rd	535XHDATR	MPM	Irrigation1; Management Plan Monitoring	4/9/2013	10:10		April Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Highline Canal @ Lombardy Rd	535XHCALR	MPM	Irrigation1; Management Plan Monitoring	4/9/2013	12:00		April Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Hilmar Drain @ Central Ave	535XHDACA	MPM	Irrigation1; Management Plan Monitoring	4/9/2013	11:00		April Management Plan Monitoring for diuron and *S. capricornutum* toxicity.
Howard Lateral @ Hwy 140	535XHLAHO	MPM	Irrigation1; Management Plan Monitoring	4/9/2013	12:40		April Management Plan Monitoring for copper only.
Lateral 2 1/2 near Keyes Rd	535LTHNKR	MPM	Irrigation1; Management Plan Monitoring	4/9/2013	9:20		April Management Plan Monitoring for chlorpyrifos.
Livingston Drain @ Robin Ave	535XLDARA	MPM	Irrigation1; Management Plan Monitoring; Non-Contiguous	4/9/2013	13:30		April Management Plan Monitoring for *S. capricornutum* toxicity. Non-contiguous waterbody. Discharge not measured due to toxicity monitoring only.
Berenda Slough along Ave 18 1/2	545XBSAAE	MPM	Irrigation2; Management Plan Monitoring	5/14/2013	13:20	Dry	May Management Plan Monitoring for copper and *S. capricornutum* toxicity. Dry site, no samples collected.
Black Rascal Creek @ Yosemite Rd	535BRCAYR	MPM	Irrigation2; Management Plan Monitoring	5/14/2013	9:00		May Management Plan Monitoring for chlorpyrifos and *C. dubia* toxicity. Too deep to measure discharge.
Cottonwood Creek @ Rd 20	545XCCART	MPM, NM	Irrigation2; Management Plan Monitoring	5/14/2013	10:30	Dry	May Management Plan Monitoring for copper. Dry site, no samples collected.
Deadman Creek @ Gurr Rd	535XDCAGR	MPM	Irrigation2; Management Plan Monitoring	5/14/2013	16:30		May Management Plan Monitoring for *P. promelas* toxicity. Discharge not measured due to toxicity monitoring only.
Dry Creek @ Rd 18	545XDCARE	MPM, NM	Irrigation2; Management Plan Monitoring	5/14/2013	12:00		May Management Plan Monitoring for copper, lead, and *S. capricornutum* toxicity.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Irrigation2	5/14/2013	10:25		
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Irrigation2; Management Plan Monitoring	5/14/2013	15:40		May Management Plan Monitoring for copper and lead.
Hatch Drain @ Tuolumne Rd	535XHDATR	MPM	Irrigation2; Management Plan Monitoring	5/14/2013	9:50		May Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM	Irrigation2; Management Plan Monitoring	5/14/2013	13:30		May Management Plan Monitoring for lead, *C. dubia* and *S. capricornutum* toxicity.
Highline Canal @ Lombardy Rd	535XHCALR	MPM	Irrigation2; Management Plan Monitoring	5/14/2013	12:10		May Management Plan Monitoring for copper and *S. capricornutum* toxicity.
Levee Drain @ Carpenter Rd	535XLDACR	NM	Irrigation2	5/14/2013	10:30		

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Merced River @ Santa Fe	535XMRSFD	NM	Irrigation2	5/14/2013	13:20		
Miles Creek @ Reilly Rd	535XMCARR	MPM, NM	Irrigation2; Management Plan Monitoring	5/14/2013	14:10		May Management Plan Monitoring for copper.
Mootz Drain downstream of Langworth Pond	535XMDDLP	NM	Irrigation2	5/14/2013	9:30		
Mustang Creek @ East Ave	535XMCAEA	NM	Irrigation2	5/14/2013	11:44	Dry	Dry site, no samples collected.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM, NM	Irrigation2; Management Plan Monitoring	5/14/2013	11:10		May Management Plan Monitoring for *S. capricornutum* toxicity. Discharge recorded as zero due to no measurable flow.
Unnamed Drain @ Hwy 140	535XUDAHO	NM	Irrigation2	5/14/2013	15:40		
San Joaquin River above Maze Boulevard	541STC510	TMDL	Irrigation2	5/14/2013	9:00		
San Joaquin River at Airport Way near Vernalis	541SJC501	TMDL	Irrigation2	5/14/2013	8:20		
SJR @ Hills Ferry	541STC512	TMDL	Irrigation2	5/14/2013	12:00		
Livingston Drain @ Robin Ave	535XLDARA	MPM	Irrigation2; Management Plan Monitoring	5/21/2013	9:10		May Management Plan Monitoring for copper and *S. capricornutum* toxicity. Discharge recorded as zero due to flow moving in upstream direction.
Berenda Slough along Ave 18 1/2	545XBSAAE	MPM	Irrigation3; Management Plan Monitoring	6/11/2013	12:00	Dry	Dry site, no samples collected. June Management Plan Monitoring for copper.
Cottonwood Creek @ Rd 20	545XCCART	MPM, NM	Irrigation3; Management Plan Monitoring	6/11/2013	9:15	Dry	Dry site, no samples collected. June Management Plan Monitoring for copper and lead.
Deadman Creek @ Gurr Rd	535XDCAGR	MPM	Irrigation3; Management Plan Monitoring	6/11/2013	14:30		June Management Plan Monitoring for *P. promelas* toxicity. Discharge not measured due to toxicity monitoring only.
Dry Creek @ Rd 18	545XDCARE	MPM, NM	Irrigation3; Management Plan Monitoring	6/11/2013	11:00		June Management Plan Monitoring for copper and lead.
Dry Creek @ Wellsford Rd	535XDCAWR	NM	Irrigation3	6/11/2013	9:20		
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Irrigation3; Management Plan Monitoring	6/11/2013	13:50		June Management Plan Monitoring for copper and lead.
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM	Irrigation3; Management Plan Monitoring	6/11/2013	15:40		June Management Plan Monitoring for copper and lead.
Highline Canal @ Lombardy Rd	535XHCALR	MPM	Irrigation3; Management Plan Monitoring	6/11/2013	15:10		June Management Plan Monitoring for *C. dubia* toxicity. Discharge not measured due to toxicity monitoring only.
Hilmar Drain @ Central Ave	535XHDACA	MPM	Irrigation3; Management Plan Monitoring	6/11/2013	13:00		June Management Plan Monitoring for diuron.
Howard Lateral @ Hwy 140	535XHLAHO	MPM	Irrigation3; Management Plan Monitoring	6/11/2013	15:50		June Management Plan Monitoring for chlorpyrifos.
Levee Drain @ Carpenter Rd	535XLDACR	NM	Irrigation3	6/11/2013	11:30		
Livingston Drain @ Robin Ave	535XLDARA	MPM	Irrigation3; Management Plan Monitoring	6/11/2013	15:20		June Management Plan Monitoring for copper and chlorpyrifos.
McCoy Lateral @ Hwy 140	535XMLAHO	MPM	Irrigation3; Management Plan Monitoring	6/11/2013	16:20		June Management Plan Monitoring for copper.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Merced River @ Santa Fe	535XMRSFD	NM	Irrigation3	6/11/2013	14:40		
Miles Creek @ Reilly Rd	535XMCARR	MPM, NM	Irrigation3; Management Plan Monitoring	6/11/2013	12:50		June Management Plan Monitoring for copper, lead and *S. capricornutum* toxicity.
Mootz Drain downstream of Langworth Pond	535XMDDLP	NM	Irrigation3	6/11/2013	10:00		
Mustang Creek @ East Ave	535XMCAEA	NM	Irrigation3	6/11/2013	14:19	Dry	Dry site, no samples collected.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	NM	Irrigation3	6/11/2013	12:20		
Unnamed Drain @ Hwy 140	535XUDAHO	NM	Irrigation3	6/11/2013	16:30		
San Joaquin River above Maze Boulevard	541STC510	TMDL	Irrigation3	6/11/2013	8:20		
San Joaquin River at Airport Way near Vernalis	541SJC501	TMDL	Irrigation3	6/11/2013	8:00		
SJR @ Hills Ferry	541STC512	TMDL	Irrigation3	6/11/2013	13:30		
San Joaquin River above Maze Boulevard	541STC510	TMDL	Irrigation3	6/11/2013	8:20		
San Joaquin River at Airport Way near Vernalis	541SJC501	TMDL	Irrigation3	6/11/2013	8:00		
SJR @ Hills Ferry	541STC512	TMDL	Irrigation3	6/11/2013	13:30		
Berenda Slough along Ave 18 1/2	545XBSAAE	MPM	Irrigation4; Management Plan Monitoring	7/9/2013	13:10		July Management Plan Monitoring for copper, chlorpyrifos, and *S. capricornutum* toxicity. Discharge recorded as zero due to non-contiguous waterbody.
Black Rascal Creek @ Yosemite Rd	535BRCAYR	MPM	Irrigation4; Management Plan Monitoring	7/9/2013	14:20		July Management Plan Monitoring for chlorpyrifos and *C. dubia* toxicity.
Cottonwood Creek @ Rd 20	545XCCART	MPM, NM	Irrigation4; Management Plan Monitoring	7/9/2013	9:40		July Management Plan Monitoring for copper.
Deadman Creek @ Gurr Rd	535XDCAGR	MPM	Irrigation4; Management Plan Monitoring	7/9/2013	14:40		July Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Dry Creek @ Rd 18	545XDCARE	MPM, NM	Irrigation4; Management Plan Monitoring	7/9/2013	12:00		July Management Plan Monitoring for copper and chlorpyrifos.
Dry Creek @ Wellsford Rd	535XDCAWR	MPM, NM	Irrigation4; Management Plan Monitoring	7/9/2013	9:30		July Management Plan Monitoring for chlorpyrifos.
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Irrigation4; Management Plan Monitoring	7/9/2013	15:00		July Management Plan Monitoring for copper and lead.
Hatch Drain @ Tuolumne Rd	535XHDATR	MPM	Irrigation4; Management Plan Monitoring	7/9/2013	10:30		July Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM	Irrigation4; Management Plan Monitoring	7/9/2013	12:00		July Management Plan Monitoring for copper and lead.
Highline Canal @ Lombardy Rd	535XHCALR	MPM	Irrigation4; Management Plan Monitoring	7/9/2013	11:20		July Management Plan Monitoring for chlorpyrifos.
Hilmar Drain @ Central Ave	535XHDACA	MPM	Irrigation4; Management Plan Monitoring	7/9/2013	14:10		July Management Plan Monitoring for copper and *S. capricornutum* toxicity. Discharge recorded as zero due to no measurable flow.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Howard Lateral @ Hwy 140	535XHLAHO	MPM	Irrigation4; Management Plan Monitoring	7/9/2013	13:20		July Management Plan Monitoring for copper.
Lateral 2 1/2 near Keyes Rd	535LTHNKR	MPM	Irrigation4; Management Plan Monitoring	7/9/2013	9:50		July Management Plan Monitoring for chlorpyrifos.
Levee Drain @ Carpenter Rd	535XLDACR	NM	High TSS 1-M ; Irrigation4	7/9/2013	11:00		
Livingston Drain @ Robin Ave	535XLDARA	MPM	Irrigation4; Management Plan Monitoring	7/9/2013	12:50		July Management Plan Monitoring for copper and chlorpyrifos.
Merced River @ Santa Fe	535XMRSFD	MPM, NM	Irrigation4; Management Plan Monitoring	7/9/2013	10:40		July Management Plan Monitoring for chlorpyrifos and *C. dubia* toxicity.
Miles Creek @ Reilly Rd	535XMCARR	MPM, NM	High TSS 1-M ; Irrigation4; Management Plan Monitoring	7/9/2013	16:00		July Management Plan Monitoring for copper, lead and chlorpyrifos.
Mootz Drain downstream of Langworth Pond	535XMDDLP	NM	High TSS 1-M ; Irrigation4	7/9/2013	8:30		
Mustang Creek @ East Ave	535XMCAEA	NM	Irrigation4	7/9/2013	10:10	Dry	Dry site, no samples collected.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM, NM	Irrigation4; Management Plan Monitoring	7/9/2013	12:20		July Management Plan Monitoring for dimethoate and *P. promelas* toxicity. Discharge recorded as zero due to no measurable flow.
Unnamed Drain @ Hwy 140	535XUDAHO	NM	High TSS 1-M ; Irrigation4	7/9/2013	14:10		
San Joaquin River above Maze Boulevard	541STC510	TMDL	Irrigation4	7/9/2013	8:50		
San Joaquin River at Airport Way near Vernalis	541SJC501	TMDL	Irrigation4	7/9/2013	8:10		
SJR @ Hills Ferry	541STC512	TMDL	Irrigation4	7/9/2013	13:10		
San Joaquin River above Maze Boulevard	541STC510	TMDL	Irrigation4	7/9/2013	8:50		
Bear Creek @ Kibby Rd	535XBCAKR	MPM	Irrigation5; Management Plan Monitoring	8/13/2013	15:40		August Management Plan Monitoring for copper only. Too deep to measure discharge.
Berenda Slough along Ave 18 1/2	545XBSAAE	MPM	Irrigation5; Management Plan Monitoring	8/13/2013	12:45	Dry	August Management Plan Monitoring for copper only. Dry site, no samples collected.
Black Rascal Creek @ Yosemite Rd	535BRCAYR	MPM	Irrigation5; Management Plan Monitoring	8/13/2013	16:10		August Management Plan Monitoring for chlorpyrifos and *C. dubia* toxicity. Discharge recorded as zero, due to no measurable flow.
Cottonwood Creek @ Rd 20	545XCCART	MPM, NM	Irrigation5; Management Plan Monitoring	8/13/2013	9:50	Dry	August Management Plan Monitoring for copper. Dry site, no samples collected.
Deadman Creek @ Gurr Rd	535XDCAGR	MPM	Irrigation5; Management Plan Monitoring	8/13/2013	13:40		August Management Plan Monitoring for chlorpyrifos. Too deep to measure discharge.
Deadman Creek @ Hwy 59	535DMCAHF	MPM	Irrigation5; Management Plan Monitoring	8/13/2013	14:30	Dry	August Management Plan Monitoring for chlorpyrifos. Dry site, no samples collected.
Dry Creek @ Rd 18	545XDCARE	MPM, NM	High TSS 1-P; High TSS 2-M; Irrigation5; Management Plan Monitoring	8/13/2013	11:30		August Management Plan Monitoring for copper and lead.
Dry Creek @ Wellsford Rd	535XDCAWR	MPM, NM	Irrigation5; Management Plan Monitoring	8/13/2013	10:30		August Management Plan Monitoring for chlorpyrifos.
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Irrigation5; Management Plan Monitoring	8/13/2013	13:50		August Management Plan Monitoring for copper and lead.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Hatch Drain @ Tuolumne Rd	535XHDATR	MPM	Irrigation5; Management Plan Monitoring	8/13/2013	10:30		August Management Plan Monitoring for *S. capricornutum* toxicity. Discharge not measured due to toxicity monitoring only.
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM	Irrigation5; Management Plan Monitoring	8/13/2013	13:30		August Management Plan Monitoring for copper and lead.
Highline Canal @ Lombardy Rd	535XHCALR	MPM	Irrigation5; Management Plan Monitoring	8/13/2013	12:00		August Management Plan Monitoring for copper, chlorpyrifos and *S. capricornutum* toxicity.
Levee Drain @ Carpenter Rd	535XLDACR	NM	High TSS 1-P; High TSS 2-M; Irrigation5	8/13/2013	11:20		
Livingston Drain @ Robin Ave	535XLDARA	MPM	Irrigation5; Management Plan Monitoring; Non-Contiguous	8/13/2013	14:40		August Management Plan Monitoring for chlorpyrifos. Non-contiguous waterbody. Discharge recorded as zero due to non-contiguous waterbody.
Merced River @ Santa Fe	535XMRSFD	MPM, NM	Irrigation5; Management Plan Monitoring	8/13/2013	12:40		August Management Plan Monitoring for *C. dubia* toxicity.
Miles Creek @ Reilly Rd	535XMCARR	MPM, NM	High TSS 1-P; High TSS 2-M; Irrigation5; Management Plan Monitoring	8/13/2013	15:00		August Management Plan Monitoring for lead, copper and chlorpyrifos.
Mootz Drain downstream of Langworth Pond	535XMDDLP	NM	High TSS 1-P; High TSS 2-M; Irrigation5	8/13/2013	9:30		
Mustang Creek @ East Ave	535XMCAEA	NM	High TSS 1-P; High TSS 2-M; Irrigation5	8/13/2013	11:39	Dry	Dry site, no samples collected.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM, NM	Irrigation5; Management Plan Monitoring	8/13/2013	12:30		August Management Plan Monitoring for dimethoate and *C. dubia* toxicity. Discharge recorded as zero due to no measureable flow.
Unnamed Drain @ Hwy 140	535XUDAHO	NM	High TSS 1-P; High TSS 2-M; Irrigation5	8/13/2013	14:20		
San Joaquin River above Maze Boulevard	541STC510	TMDL	Irrigation5	8/13/2013	8:30		
San Joaquin River at Airport Way near Vernalis	541SJC501	TMDL	Irrigation5	8/13/2013	9:20		
SJR @ Hills Ferry	541STC512	TMDL	Irrigation5	8/13/2013	13:20		
Berenda Slough along Ave 18 1/2	545XBSAAE	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	14:05	Dry	Dry site, no samples collected. September Management Plan Monitoring for copper and chlorpyrifos.
Black Rascal Creek @ Yosemite Rd	535BRCAYR	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	15:00		September Management Plan Monitoring for lead and chlorpyrifos. Channel was recently scraped/cleaned.
Cottonwood Creek @ Rd 20	545XCCART	MPM, NM	Irrigation6; Management Plan Monitoring; Non-Contiguous	9/10/2013	9:50		September Management Plan Monitoring for copper. Non-contiguous waterbody.
Deadman Creek @ Gurr Rd	535XDCAGR	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	15:00		September Management Plan Monitoring for chlorpyrifos.
Deadman Creek @ Hwy 59	535DMCAHF	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	14:35	Dry	Dry site, no samples collected. September Management Plan Monitoring for chlorpyrifos.

Station Name	Station Code	Monitoring Event	Season/Group	Sample Date	Sample Time	Failure Reason	Sample Comments
Dry Creek @ Rd 18	545XDCARE	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	12:00		September Management Plan Monitoring for copper, lead and *H. azteca* toxicity.
Dry Creek @ Wellsford Rd	535XDCAWR	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	10:00		September Management Plan Monitoring for chlorpyrifos and *H. azteca* toxicity.
Duck Slough @ Gurr Rd	535XDSAGR	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	15:20		September Management Plan Monitoring for copper and lead and *H. azteca* toxicity.
Hatch Drain @ Tuolumne Rd	535XHDATR	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	10:10		September Management Plan Monitoring for *H. azteca* toxicity.
Highline Canal @ Hwy 99	535XHCHNN	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	12:30		September Management Plan for *H. azteca* and *C. dubia* toxicity.
Highline Canal @ Lombardy Rd	535XHCALR	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	11:40		September Management Plan Monitoring for *H. azteca*, *S. capricornutum* and *C. dubia* toxicity.
Hilmar Drain @ Central Ave	535XHDACA	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	13:50		September Management Plan Monitoring for *S. capricornutum* and *H. azteca* toxicity.
Levee Drain @ Carpenter Rd	535XLDACR	NM, Sediment	Irrigation6	9/10/2013	11:00		Pesticides analyzed in toxic sediment only.
Livingston Drain @ Robin Ave	535XLDARA	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	13:29	Dry	Dry site, no samples collected. September Management Plan Monitoring for copper.
McCoy Lateral @ Hwy 140	535XMLAHO	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	13:50		September Management Plan Monitoring for copper.
Merced River @ Santa Fe	535XMRSFD	NM, Sediment	Irrigation6	9/10/2013	11:00		
Miles Creek @ Reilly Rd	535XMCARR	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	16:40		September Management Plan Monitoring for chlorpyrifos and *C. dubia* and *H. azteca* toxicity
Mootz Drain downstream of Langworth Pond	535XMDDLP	NM, Sediment	Irrigation6	9/10/2013	9:00		Pesticides analyzed in toxic sediment only.
Mustang Creek @ East Ave	535XMCAEA	NM, Sediment	Irrigation6	9/10/2013	9:10	Dry	Dry site, no samples collected.
Prairie Flower Drain @ Crows Landing Rd	535XPFDCL	MPM, NM	Irrigation6; Management Plan Monitoring	9/10/2013	12:20		September Management Plan for dimethoate and *H. azteca* and *C. dubia* toxicity.
Unnamed Drain @ Hwy 140	535XUDAHO	NM, Sediment	Irrigation6	9/10/2013	15:20		
San Joaquin River above Maze Boulevard	541STC510	TMDL	Irrigation6	9/10/2013	9:10		
San Joaquin River at Airport Way near Vernalis	541SJC501	TMDL	Irrigation6	9/10/2013	8:20		
SJR @ Hills Ferry	541STC512	TMDL	Irrigation6	9/10/2013	14:30		

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

SAMPLING AND ANALYTICAL METHODS

Sample collection procedures and descriptions of the field instruments are provided in Tables 13 and 14 respectively. Site-specific discharge methods are provided in Table 15. Analytical methods and reporting limits (RLs) are provided in Table 16.

All field sampling and analytical methods were performed as outlined in the Standard Operating Procedures (SOPs) provided in the Quality Assurance Project Plan (QAPP) amended on February 15, 2013 (Appendix I-XXXVII). Any deviations from these procedures are documented in the Precision, Accuracy, and Completeness section of this report.

Table 13. Sampling procedures.

Groups	Analytical Parameter	Sample Volume[1]	Sample Container	Initial Preservation/Holding Requirements	Holding Time[2]
Physical Parameters[3]	Total Dissolved Solids	500 mL	1x 2000 mL Polyethylene	Store at ≤6°C	7 Days
	Total Suspended Solids	500 mL			7 Days
	Turbidity	500 mL			48 Hours
Nutrients	Soluble Orthophosphate[3]	500 mL	1x 2000 mL Polyethylene	Store at ≤6°C	48 Hours
	TKN, Ammonia, Total Phosphorus, Nitrate-Nitrite as N	1000 mL	1x 1000 mL Polyethylene	Preserve to ≤pH 2 with H_2SO_4, store at ≤6°C	28 Days
Metals/ Trace Elements	Metals/Trace Elements, Hardness	500 mL	1x 500 mL Polyethylene	Filter as necessary; preserve to ≤pH 2 with HNO_3, store at ≤6°C	180 Days
Drinking Water	*E. coli* (pathogens)	150 mL	1x 150 mL Polyethylene	Preserved with $Na_2S_2O_3$, store at <8 °C	24 Hours[4]
	Total Organic Carbon	120 mL	3x 40 mL Amber glass VOA with PTFE-lined cap	Preserve with HCl, store at ≤6°C	28 Days
Pesticides	Carbamates	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
	Organochlorines	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
	Organophosphates	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
	Herbicides (general)	1 L	1x L Amber Glass	Store at ≤6°C; extract within 7 days	40 Days
	Herbicides (paraquat)	1 L	1x L Brown Polyethylene	Store at ≤6°C; extract within 7 days	21 days
	Herbicides (glyphosate)	80 mL	2x 40 mL Glass VOA	Store at ≤6°C; freeze (-20°C) within 2 weeks	6 Months
Water and Sediment Column Toxicity	Aquatic Toxicity	5 Gallons	5x 1 Gallon Amber Glass	Store at ≤6°C	36 Hours
	Sediment Toxicity	2 L	2x L Glass	Store at ≤6°C, do not freeze	14 Days
	Sediment Grain Size	125 mL	Clean Glass Jar	Store at ≤6°C, do not freeze	28 days
	Sediment Total Organic Carbon	125 mL	Clean Glass Jar	Store at ≤6°C (not frozen), analyze or freeze (-20C) within 28 days	28 days (not frozen) 12 Months (frozen)
	Sediment Chemistry	8 oz.	Amber Glass	Store at ≤6°C (not frozen), extract within 14 days or freeze (-20C) within 48 hours	14 days (not frozen) 12 Months (frozen)

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

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

Parameter	Instrument
Dissolved Oxygen	YSI Model Professional Plus 556
Temperature	YSI Model Professional Plus 556
pH	YSI Model Professional Plus 556
Specific Conductance	YSI Model Professional Plus 556
Discharge	Marsh McBirney Flo-Mate 2000

YSI- Yellow Springs Instruments

Table 15. Site specific discharge methods for January through September 2013.

Site	Discharge Method[1]	Meter/ Gauge
Bear Creek @ Kibby Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Berenda Slough along Ave 18 1/2	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Cottonwood Creek @ Rd 20	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Deadman Creek @ Gurr Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Deadman Creek @ Hwy 59	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Dry Creek @ Rd 18	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Dry Creek @ Wellsford Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Duck Slough @ Gurr Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Hatch Drain @ Tuolumne Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Highline Canal @ Hwy 99	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Highline Canal @ Lombardy Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Hilmar Drain @ Central Ave	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Howard Lateral @ Hwy 140	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Lateral 2 ½ near Keyes Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Levee Drain @ Carpenter Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Livingston Drain @ Robin Ave	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
McCoy Lateral @ Hwy 140	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Merced River @ Santa Fe Rd	DWR Gauge	California Data Exchange Center (CDEC) Merced River at Cressy (CRS)
Miles Creek @ Reilly Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Mootz Drain downstream of Langworth Rd	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 Rd	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000
Unnamed Drain @ Hwy 140	USGS R2Cross Streamflow Method	Marsh McBirney Flo-Mate 2000

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

Table 16. Field and laboratory analytical methods.

Group	Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Physical Parameters	Flow	Fresh Water	Field Measure	1 cfs	NA	USGS R2Cross Streamflow Method
	pH	Fresh Water	Field Measure	0.1 pH units	NA	EPA 150.1
	Specific Conductivity	Fresh Water	Field Measure	100 µmhos/cm	NA	EPA 120.1
	Dissolved Oxygen	Fresh Water	Field Measure	0.1 mg/L	NA	SM 4500-O
	Temperature	Fresh Water	Field Measure	0.1 °C	NA	SM 2550
	Turbidity	Fresh Water	Caltest	0.05 NTU	0.030 NTU	EPA 180.1
	Total Dissolved Solids	Fresh Water	Caltest	10 mg/L	4 mg/L	SM 2540 C
	Total Suspended Solids	Fresh Water	Caltest	3 mg/L	1 mg/L	SM 2540 D
Inorganics	Hardness	Fresh Water	Caltest	5 mg/L	1.7 mg/L	SM2340C
	Total Organic Carbon	Fresh Water	Caltest	0.5 mg/L	0.30 mg/L	SM 5310 B

Group	Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
Bacteria	*E. coli*	Fresh Water	Caltest	1 MPN/100 mL	1 MPN/100 mL	SM 9223
Toxicity	Water Column Toxicity	Fresh Water	AQUA-Science	NA	NA	EPA 821-R-02-012
		Fresh Water	AQUA-Science	NA	NA	EPA 821-R-02-013
	Sediment Toxicity	Sediment	AQUA-Science[1]	NA	NA	EPA 600/R-99-064
Carbamates	Aldicarb	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
	Carbaryl	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A
	Carbofuran	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A
	Methiocarb	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
	Methomyl	Fresh Water	APPL Inc	0.07 µg/L	0.050 µg/L	EPA 8321A
	Oxamyl	Fresh Water	APPL Inc	0.4 µg/L	0.20 µg/L	EPA 8321A
Organochlorines	DDD	Fresh Water	APPL Inc	0.01 µg/L	0.003 µg/L	EPA 8081A
	DDE	Fresh Water	APPL Inc	0.01 µg/L	0.004 µg/L	EPA 8081A
	DDT	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
	Dicofol	Fresh Water	APPL Inc	0.1 µg/L	0.01 µg/L	EPA 8081A
	Dieldrin	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
	Endrin	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
	Methoxychlor	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
Group A Pesticides	Aldrin	Fresh Water	APPL Inc	0.01 µg/L	0.009 µg/L	EPA 8081A
	Chlordane	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
	Heptachlor	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
	Heptachlor Epoxide	Fresh Water	APPL Inc	0.01 µg/L	0.007 µg/L	EPA 8081A
	Hexachlorocyclohexane (alpha-BHC)	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
	Hexachlorocyclohexane (beta-BHC)	Fresh Water	APPL Inc	0.01 µg/L	0.008 µg/L	EPA 8081A
	Hexachlorocyclohexane (gamma-BHC; Lindane)	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
	Hexachlorocyclohexane (delta-BHC)	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
	Endosulfan I	Fresh Water	APPL Inc	0.01 µg/L	0.005 µg/L	EPA 8081A
	Endosulfan II	Fresh Water	APPL Inc	0.01 µg/L	0.004 µg/L	EPA 8081A
	Toxaphene	Fresh Water	APPL Inc	0.5 µg/L	0.380 µg/L	EPA 8081A
Organophosphates	Azinphos-methyl	Fresh Water	APPL Inc	0.1 µg/L	0.02 µg/L	EPA 8141A
	Chlorpyrifos	Fresh Water	APPL Inc	0.015 µg/L	0.0026 µg/L	EPA 8141A
	Diazinon	Fresh Water	APPL Inc	0.02 µg/L	0.004 µg/L	EPA 8141A
	Dichlorvos	Fresh Water	APPL Inc	0.1 µg/L	0.02 µg/L	EPA 8141A
	Dimethoate	Fresh Water	APPL Inc	0.1 µg/L	0.08 µg/L	EPA 8141A
	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
	Methamidophos	Fresh Water	APPL Inc	0.2 µg/L	0.1 µg/L	EPA 8321A
	Methidathion	Fresh Water	APPL Inc	0.1 µg/L	0.04 µg/L	EPA 8141A
	Parathion, methyl	Fresh Water	APPL Inc	0.1 µg/L	0.075 µg/L	EPA 8141A
	Phorate	Fresh Water	APPL Inc	0.1 µg/L	0.07 µg/L	EPA 8141A
	Phosmet	Fresh Water	APPL Inc	0.2 µg/L	0.06 µg/L	EPA 8141A
Herbicides	Atrazine	Fresh Water	APPL Inc	0.5 µg/L	0.08 µg/L	EPA 8141A
	Cyanazine	Fresh Water	APPL Inc	0.5 µg/L	0.12 µg/L	EPA 8141A
	Diuron	Fresh Water	APPL Inc	0.4 µg/L	0.2 µg/L	EPA 8321A
	Glyphosate	Fresh Water	NCL Ltd	5 µg/L	1.7 µg/L	EPA 547
	Linuron	Fresh Water	APPL Inc	0.4 µg/L	0.2 µg/L	EPA 8321A

Group	Constituent	Matrix	Analyzing Lab	RL	MDL	Analytical Method
	Paraquat	Fresh Water	NCL Ltd	0.4 µg/L	0.19 µg/L	EPA 549.2M
	Simazine	Fresh Water	APPL Inc	0.5 µg/L	0.11 µg/L	EPA 8141A
	Trifluralin	Fresh Water	APPL Inc	0.05 µg/L	0.036 µg/L	EPA 8141
Metals	Arsenic	Fresh Water	Caltest	0.5 µg/L	0.02 µg/L	EPA 200.8 (ICPMS)
	Boron	Fresh Water	Caltest	10 µg/L	0.7 µg/L	EPA 200.8 (ICPMS)
	Cadmium	Fresh Water	Caltest	0.1 µg/L	0.04 µg/L	EPA 200.8 (ICPMS Collision Cell)
	Copper	Fresh Water	Caltest	0.5 µg/L	0.07 µg/L	EPA 200.8 (ICPMS Collision Cell)
	Lead	Fresh Water	Caltest	0.25 µg/L	0.03 µg/L	EPA 200.8 (ICPMS Collision Cell)
	Molybdenum	Fresh Water	Caltest	0.25 µg/L	0.04 µg/L	EPA 200.8 (ICPMS Collision Cell)
	Nickel	Fresh Water	Caltest	0.5 µg/L	0.04 µg/L	EPA 200.8 (ICPMS Collision Cell)
	Selenium	Fresh Water	Caltest	1 µg/L	0.06 µg/L	EPA 200.8 (ICPMS)
	Zinc	Fresh Water	Caltest	1 µg/L	0.7 µg/L	EPA 200.8 (ICPMS)
Nutrients	Total Kjeldahl Nitrogen	Fresh Water	Caltest	0.1mg/L	0.07 mg/L	SM 4500-NH3C
	Nitrate + Nitrite (as N)	Fresh Water	Caltest	0.05 mg/L	0.02 mg/L	EPA 353.2
	Total Ammonia	Fresh Water	Caltest	0.1 mg/L	0.040 mg/L	SM 4500-NH3C
	Total Phosphorus	Fresh Water	Caltest	0.01 mg/L	0.007 mg/L	SM 4500-P E
	Soluble Orthophosphate	Fresh Water	Caltest	0.01 mg/L	0.006 mg/L	SM 4500-P E
Sediment	Bifenthrin	Sediment	Caltest	0.33 ng/g dw	0.1 ng/g dw	GCIS/NCI/SIM
	Cyfluthrin	Sediment	Caltest	0.33 ng/g dw	0.11 ng/g dw	GCIS/NCI/SIM
	Cypermethrin	Sediment	Caltest	0.33 ng/g dw	0.1 ng/g dw	GCIS/NCI/SIM
	Deltamethrin: Tralomethrin	Sediment	Caltest	0.33 ng/g dw	0.12 ng/g dw	GCIS/NCI/SIM
	Esfenvalerate	Sediment	Caltest	0.33 ng/g dw	0.13 ng/g dw	GCIS/NCI/SIM
	Lambda-Cyhalothrin	Sediment	Caltest	0.33 ng/g dw	0.06 ng/g dw	GCIS/NCI/SIM
	Permethrin	Sediment	Caltest	0.33 ng/g dw	0.11 ng/g dw	GCIS/NCI/SIM
	Fenpropathrin	Sediment	Caltest	0.33 ng/g dw	0.07 ng/g dw	GCIS/NCI/SIM
	Chlorpyrifos	Sediment	Caltest	0.33 ng/g dw	0.12 ng/g dw	GCIS/NCI/SIM
	Total Organic Carbon	Sediment	Caltest[2]	200 mg/kg	100 mg/kg dw	Walkley Black
	Grain Size	Sediment	Caltest[2]	1% sand, silt, clay, gravel	0.4 µm	ASTM D422, ASTM D4464M-85

cfs- Cubic Feet per Second
MDL- Minimum Detection Limit
MPN- Most Probable Number
NA- Not applicable
RL- Reporting Limit
[1] Subcontracted to Nautilus Laboratories.
[2] Subcontracted to PTS Laboratories

PRECISION, ACCURACY AND COMPLETENESS

An assessment of precision, accuracy, and completeness is tabulated in Tables 17-33 for data analyzed from January through September 2013. All data are acceptable and useable. In a few instances, some data quality objectives were not met, but this does not affect the usability of data.

All results are tabulated in the Monitoring Results and Lab and Field Quality Control (QC) Results sections of this report (Appendix III and IV). Each result is flagged if it does not meet a data quality objective (acceptability criteria) using Surface Water Ambient Monitoring Program (SWAMP) codes. Results are found in the SWAMP comparable database managed by the Coalition. The Coalition works with the Central Valley Regional Data Center (CV RDC) to ensure that all data remain SWAMP comparable and that all data are suitable to be uploaded to the California Environmental Data Exchange Network (CEDEN). A copy of the database is submitted to the Regional Board with the hardcopy of this report. The database includes all data from January through September 2013 sampling.

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

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

COMPLETENESS

Completeness is assessed on three levels: field and transport completeness, analytical completeness and batch completeness (Tables 17-19). Field and transport completeness assesses how many of the scheduled samples were collected and sent for analysis. Completeness may be less than 100% for field and transport for reasons such as bottle breakage during transportation or inability to access a site. Dry sites are considered "collected" and do not count against completeness for field and transport. Analytical completeness assesses the number of samples that arrived at a laboratory and were analyzed. Analytical completeness may be less than 100% for various reasons including bottle breakage while the sample was stored at the laboratory or laboratory error resulting in an analysis not being performed. Batch completeness assesses whether chemistry and toxicity batches have all of the required laboratory quality control. For batch completeness, the number of batches with complete laboratory quality control is compared to the overall number of batches. Table 17 includes an evaluation of completeness for the various levels.

Field and Transport Completeness

Field and transport completeness is calculated by dividing the number of samples collected by the number of samples scheduled to be collected for each analyte. Dry sites are considered 'collected' and are included in the total number of samples collected used to calculate completeness. All sites and constituents were monitored as scheduled in 2013 (100% completeness, Table 17). The constituents sampled from January through September 2013 are listed by site in Tables 7 and 8.

Field parameter measurements, including discharge, DO, pH, SC, and temperature were taken at each site for all sampling events whenever there was enough water to collect a sample (33 sites were dry from January through September). Dissolved oxygen, pH, SC, and temperature were each measured 189 times compared to the scheduled 188 times due to an extra unscheduled sample collection resulting in 100.5% completeness (Table 18). The field and transport completeness is over 100% because field parameters were taken twice in March 2013 at Unnamed Drain @ Hwy 140. The original environmental samples collected on March 12th were lost due to laboratory error and therefore the Coalition collected new samples on March 15th. Field parameters from both events were reported and recorded in the Coalition's database.

Field parameters were measured at Burnett Lateral @ 28 Mile Rd on March 12, 2013 the day before the Coalition received the hard copy approval to remove the site from the ESJWQC monitoring schedule. The site was determined to be outside of the Coalition boundary; therefore, the Coalition did not have the remaining samples analyzed for Assessment Monitoring constituents. The March field results were not recorded in the database; however, the March field parameter collection is included in the total field parameter counts to assess completeness since the site was visited as scheduled (Table 18).

Discharge was measured or recorded as zero at 85.6% of sites and was not measured for one or more of the following reasons: 1) the water was too deep to safely measure discharge (7 events), or 3) the water was too shallow to measure discharge (1 event). Documentation of why discharge was not taken is included in the sample details table (Table 12).

Analytical Completeness

Analytical completeness assesses the number of samples that arrived at a laboratory and were analyzed. All samples collected (including field quality control samples) were preserved and analyzed, with the exception of the March samples collected at Burnett Lateral @ 28 Mile Rd (Table 17). The Coalition monitored Burnett Lateral @ 28 Mile Rd from January through March 2013; however, the letter from the Regional Board approving the removal of the site was received in the mail on March 13, 2013 (approval date March 8, 2013). Therefore the Coalition did not have the samples analyzed because the site was determined as not representative of water quality within the Coalition boundary.

For chemistry analysis, a field duplicate (FD) and a field blank (FB) must be analyzed with each sampling event with an overall percentage of at least 5% of the total samples analyzed. In addition, an equipment blank and travel blank are analyzed for dissolved metals and total metals, respectively. Overall, field blanks and field duplicates comprised more than 5% of samples analyzed for each analyte and an equipment and travel blank were analyzed with metals for each sampling event (Table 19).

For toxicity analysis, a field duplicate must be analyzed with each sampling event with an overall percentage of at least 5% of the total samples analyzed. Field duplicates were analyzed every sampling event and the overall percentage of field duplicates are as follows: *C. dubia* 12.7%, *P. promelas* 15.4%, *S. capricornutum* 12.4%, and *H. azteca* 8.3% (Table 19).

Batch Completeness

All chemistry batches were reviewed for Quality Assurance/Control (QA/QC) completeness. A complete batch must have a minimum of one laboratory blank (method blank), laboratory duplicate, laboratory control spike (LCS) and matrix spike (MS) with the exception of turbidity, *E. coli*, Total Dissolved Solids (TDS) and Total Suspended Solids (TSS) which do not require a MS. Batch completeness for January through September 2013 chemistry data is 99%; one methamidophos batch was run without a MS and matrix spike duplicate (MSD). One sample was re-extracted and analyzed outside of hold time due to the laboratory dropping and losing the extract vial prior to analysis; the sample was reanalyzed without an MS or MSD. A MS and MSD were run with the original batch and both recovered within QC limits. All other batches are considered acceptable based on an overall assessment of QA/QC samples meeting acceptability criteria in each batch.

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

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

Hold Time Compliance

Hold time compliance for all chemistry analysis is 99.8% (Table 30). One paraquat batch from the August sampling event was re-extracted and re-analyzed resulting in a total of 7 out of 14 samples ran outside of hold time (50%, Table 30). The QC samples from the original batch did not meet the acceptability criteria and therefore the laboratory re-extracted and re-analyzed the batch ten days outside of hold time. The original and re-analyzed environmental results were non detect and all re-analyzed QC samples met the acceptability criteria. Diazinon and disulfoton were detected in the laboratory blank run in the same batch as the samples collected on February 20th. Disulfoton was not detected in any of the environmental samples in the original analysis. However, diazinon was detected in a field duplicate sample. The laboratory re -extracted and re-analyzed the field duplicate for diazinon 16 days outside of hold time. Diazinon was detected in the re-extracted sample at concentrations ten times less than the original extraction and all QC samples ran with this batch met acceptability criteria except for the MS and MSD; the MS recovered above the QC limit and the MSD recovered below the QC limit, resulting in an RPD greater than 25% (RPD 35%). The Coalition has accepted the diazinon result of the field duplicate analyzed outside of hold time as acceptable due to the laboratory blank, LCS and LCSD meeting all objectives and the decrease in the diazinon concentration does not appear to be due to the hold time violation but rather the lack of diazinon contamination. Overall, diazinon met the hold time criteria for 98.7% of all samples analyzed from January through September 2013.

A single methamidophos batch was re-analyzed 20 days outside of hold time due to the laboratory dropping and losing the extract vial prior to analysis. Ninety-nine percent of all methamidophos samples being analyzed were within hold time and all environmental samples were non detect. A single orthophosphate sample was analyzed 30 minutes outside of the 48 hour hold time due to a laboratory tracking error; it is unlikely that the delay affected the concentration of orthophosphate detected in the sample. Overall, 99% of orthophosphate samples were analyzed within the hold time criteria (Table 30).

Hold time compliance for water column and sediment toxicity analysis is 100% (Table 30).

PRECISION AND ACCURACY

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

- Field and laboratory blank quality control sample evaluations (Tables 20, 23)
- Equipment and travel blank quality control sample evaluations (Table 21)
- Field precision met by analyzing field duplicates (Table 22)
- Laboratory accuracy met by analyzing LCS and MS percent recoveries (Tables 24,26)
- Laboratory precision met by analyzing laboratory duplicates (Tables 25,27,28)
- Surrogate recoveries to evaluate LABQA (Table 29)
- Summary of holding time evaluations (Table 30)
- Laboratory and field precision met when analyzing sediment grain size (Table 33)

All analytes are grouped by type and listed alphabetically; all pesticides and metal, and nutrients are grouped and discussed together. Batches are approved by evaluating all measures of precision and accuracy such that although a single quality control sample may be outside of acceptability criteria, the entire batch may be accepted due to the other quality control samples within that batch meeting acceptability criteria. Overall, precision and accuracy criteria were met for more than 90% of the samples for all criteria and all data are considered usable (Table 20-33).

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

Per batch:

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

Per new media lot:

- negative/negative non-coliform controls

Level III data packages document all laboratory controls performed be batch and new media lot and are submitted electronically with the quarterly data submittal and with the Annual Report. One hundred percent of laboratory blanks met acceptability criteria. Nine out of ten *E. coli* field blank results were less than the reporting limit of 1 (90%). Due to the nature of the analysis method and *E. coli* distribution within the water column, precision of *E. coli* analysis is conducted by evaluating R_{log} values of environmental and duplicate samples with the R_{log} criterion developed by the laboratory using similar samples. The mean R_{log} for the laboratory was calculated to be 0.40. This value multiplied by 3.27 resulted in a precision criterion of 1.30. One hundred percent of *E. coli* laboratory and field duplicates had R_{log} values below the criteria acceptance level. All *E. coli* data are accepted and usable.

Hardness as CaCO3 (Dissolved): One hundred percent of hardness field blanks had concentrations below the reporting limit. Eighty-three percent of hardness field duplicates met acceptability criteria (10 of 12). Two pairs of samples (one collected in August and the other in September) had RPDs above 25% (30% and 80%). Hardness samples are analyzed from the same sample bottles as dissolved metals. RPDs were above the 25% objective for lead and zinc analyzed from the same bottles that the hardness results were measured from in both August and September. The lead environmental and field duplicate samples collected in August and the zinc environmental and field duplicate samples collected in September were below the RL. However, this was not the case for all metals analyzed from the field duplicate and environmental samples collected in August and September. The copper duplicate RPD was less than 25%. All sampling SOPs were followed to ensure that field duplicates were collected at the same time and manner as the associated environmental sample.

All laboratory blanks and LCSs met laboratory QC criteria. Sixty-six percent of MS samples met the acceptability criteria (19 of 29). Four pairs of project MS/MSD samples recovered below the acceptable limit (PR 80-120) due to possible matrix interference. One pair of NONPJ MS/MSD samples recovered above the QC limit. Batches were accepted based on LCS and RPD QC data recovering within QC limits.; one hundred percent of MSDs met acceptability criteria for precision (RPD $\leq$ 25%). All hardness data are accepted and usable.

Inorganic analyses in sediment (grain size and Total Organic Carbon): Sediment grain size and TOC were analyzed for in sediment samples collected on March 19 and September 17, 2013.

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

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

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

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

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

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

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

Both sets of sediment samples analyzed for grain size met 100% acceptability criteria for field and laboratory duplicates (Table 33).

The criterion used in this report to assess precision for sediment TOC is RPD ≤ 20% and certified reference materials (CRM) samples were analyzed in each batch to assess accuracy. One hundred percent of the sediment TOC lab blank samples had results less than the RL. One hundred percent of the field duplicate and lab duplicate samples were within acceptability criteria (RPD $\leq$ 20%). One hundred percent of the TOC CRMs were within acceptability criteria (PR 75-125). Sediment inorganic samples (grain size and TOC analysis) are accepted and useable.

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

Overall, dissolved metal field duplicate samples met acceptability criteria for 91% of the samples analyzed (41 of 45). Two of the field duplicates (one dissolved lead and one dissolved zinc) with RPDs greater than 25 had concentrations below the reporting limit (estimated values), making the results more likely to have high variability. One hundred percent of LCS and MS samples were within acceptable recovery limits. All dissolved metal LCSDs and MSDs met acceptance criteria for precision. All dissolved metal results are accepted and useable.

Metals (total): One hundred percent of field and travel blanks for total metals met acceptability criteria. Laboratory blanks were run with each total metals batch and all met the acceptability criteria with the exception of total copper detected in one lab blank (92%, 13 of 14 samples). The copper detected in the laboratory blank was a low level contamination and the detection was less that the RL. Therefore, no corrective action was necessary.

Overall, total metals met acceptability criteria for field duplicates in 95% of the samples (69 of 73). One field duplicate RPD was greater than 25% for each of the following analytes: total lead, total nickel and total zinc. This resulted in 90% of lead and nickel samples (9 of 10) and 80% of zinc samples (8 of 10) meeting acceptability criteria. Three of the total metals (total lead, nickel, and zinc) with field duplicate RPDs above 25% were from the same sample collected in September. The waterbody where the sample was collected from was brown and murky with low flow (5.4 cfs), which may have resulted in a difference between the environmental sample and field duplicate collected side by side (lack of homogeneity in the water column). In addition, the lead and nickel results were below the reporting limit (estimated values), making the results more likely to have high variability. All sampling SOPs were followed to ensure that field duplicates were collected at the same time and manner as the associated environmental sample.

The total metals LCSs and MSs were within acceptable recovery limits for 100% of samples. One hundred percent of the MS/MSD pairs met the acceptability criteria for precision with the exception of one selenium MSD sample (90.9%, 10 of 11). All total metal results are accepted and useable.

Nutrients: One hundred percent of ammonia as N field blanks met acceptability criteria. Seventy percent of field duplicates (7 of 10) had an RPD below 25%. Ammonia samples collected on February 20th, March 12th, and April 2nd resulted in RPD calculations above 25% (36%, 28%, and 31%, respectively). Samples collected on February 20th also had a high RPD for TDS (RPD 80%), however all other environmental and field duplicate samples collected during the February event resulted in RPDs $\leq$ 25%.

The waterbody where the sample was collected from was brown, cloudy, and turbid with low flow (2.5 cfs), which may have resulted in a difference between the environmental sample and field duplicate collected side by side (lack of homogeneity in the water column). Ammonia samples were the only samples collected in March 12th and April 2nd to result in RPD calculations greater than 25%. All other QC samples met acceptability criteria for each batch. All sampling SOPs were followed to ensure that field duplicates were collected at the same time and manner as the associated environmental sample.

One hundred percent of laboratory blanks, LCS, and MS samples met acceptability criteria. Matrix spike, MSD, LCS, and LCSD samples were run with each batch and 100% met acceptability criteria for accuracy and precision.

Unionized ammonia values were determined by calculating the fraction of unionized ammonia in the total ammonia result based on field temperature and pH. Unionized ammonia values were calculated with the following formula:

Ammonia as N, unionized = Ammonia as N, total * f

Where:

f = unionized ammonia fraction of total ammonia

= 1/(10(pK_a-pH)+ 1

pK_a = the temperature related equilibrium constant

= 0.0901821 + (2729.92/T_k)

T_k = temperature in degrees Kelvin

= field temperature (°C) +273.2

pH = field pH

Ammonia and calculated unionized ammonia results are found in Table 6 in Appendix III and Table 9 in Appendix IV.

One hundred percent of nitrate + nitrite as N field and laboratory blanks results were below the RL. All field duplicates had RPDs equal to or below 25%. LCS and MS samples were run with each batch; 100% of the LCS/LCSD samples met acceptability criteria for accuracy (PR 90-110) and 70.6% of MS/MSD samples met acceptability criteria (24 of 34). Six MSD samples recovered below the percent recovery QC limit due to possible matrix interference. One pair of NONPJ MS/MSD samples and one pair of project MS/MSD samples were recovered above the QC limit. One hundred percent of MSD samples met the acceptability requirement for precision (RPD $\leq$ 25%).

One hundred percent of all Total Kjeldahl Nitrogen (TKN) field blank, laboratory blank, LCS, LCSD and MSD samples were analyzed and 100% met the QC criteria. Ninety percent of TKN field duplicate samples run met the QC limit (9 of 10). Ninety-five percent of TKN MS samples met the acceptability criteria for accuracy (PR 90-110).

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

Phosphorus as P field blanks met acceptability criteria in 100% of the samples collected. Eighty percent of field duplicates had RPDs less than 25% (8 of 10). One phosphorous field duplicate with an RPD greater than 25% had a concentration below the reporting limit (estimated values) while the second field duplicate had a concentration equal to the reporting limit. Results at or below the reporting limit have a high chance of having RPDs above 25% due to the variability of the results and the low level of detection. Laboratory blanks and LCS samples were within acceptability criteria for all batches. Ninety-three percent of MS and MSD samples were recovered within the QC limits for accuracy and 100% met acceptability criteria for precision.

All nutrient data are accepted and useable.

Pesticides: Pesticides were analyzed in seven different groups: organochlorines (EPA 8081A), organophosphates (EPA 8141A), carbamates (EPA 8321A), methamidophos (EPA 8321A), paraquat (EPA 549.2M), glyphosate (EPA 547M) and triazines (EPA 8141A). Organochlorines, glyphosate, and paraquat are only sampled during one storm and one irrigation event per year as per the approval to reduce monitoring received on May 6, 2011. Cis- and trans- permethrin (EPA 8081A) were analyzed in 2013 at Mustang Creek @ East Ave during every sampling event; the site was dry eight times and therefore only two cis- and trans- permethrin samples were analyzed. All cis- and trans- permethrin QC samples were within acceptability criteria.

Field blanks were run with each batch and overall, 100% of pesticide field blank acceptability criteria was met. One hundred percent of lab blank samples met acceptability criteria with the exception of diazinon (91%, 10 of 11) and disulfoton (90%, 9 of 10). The laboratory blank run with samples collected on February 20th had detections of diazinon and disulfoton. There was no detection of disulfoton in any of the samples ran with the batch and therefore it was not necessary to re-analyze the samples. There was diazinon detected in one sample in the batch, a field duplicate. The laboratory re-extracted and re-analyzed the laboratory blank sample and field duplicate sample and reported no contamination in this batch. All pesticide field duplicate samples met 100% acceptability criteria. The environmental sample associated with the field duplicate with a diazinon detection had no diazinon in it. An RPD cannot be calculated if one of the samples has a detection and the other does not; the RPD is recorded as NA in these situations.

Matrix spike and LCS samples were analyzed in each batch to assess accuracy as well as possible matrix interference. All MS samples were 100% within acceptability criteria with the exception of demeton-s and methamidophos (90%, 18 of 20), disulfoton (95%, 19 of 20), and malathion (70%, 14 of 20). All six malathion MS and MSD samples recovered above the QC limit; in each batch all environmental samples were non detect and all other QC samples recovered within the QC limits for two of the three batches.

Overall, 98% of all pesticide MS samples recovered within the QC limits. One hundred percent of pesticide LCS samples met the acceptability criteria with the exception of malathion (92%, 12 of 13). Overall, 99.7% of LCS pesticide samples recovered within QC limits.

The Coalition supplies the laboratory with sufficient sample water to perform MS and MSDs for every 20 environmental samples. Either an MSD and/or an LCSD were performed per batch to assess precision. All LCSD RPDs recovered within the QC limit and all MSD RPDs recovered within the QC limit with the exception of demeton-s and disulfoton (90%, 9 of 10). Overall, 99% of all pesticide MSD RPDs were within the acceptability criteria (RPD $\leq$ 25%).

Surrogates were run for each applicable pesticide analysis (surrogates are not performed for glyphosate and paraquat analysis). All surrogate recoveries were within specific acceptance criteria for more than 99.5% of all samples analyzed; 97% of diphenamid samples (EPA 8321A) met the acceptable criteria (Table 29). When a surrogate is recovered outside of the acceptability criteria, the associated environmental sample is flagged as well.

All pesticide data are accepted and useable.

Sediment Pesticides: Sediment pesticides were analyzed for in sediment samples with *H. azteca* toxicity if survival of the target organism was less than 80% compared to the control. One sediment sample in March and one sediment sample in September 2013 were analyzed for additional pesticides (chlorpyrifos and pyrethroids).

Two field duplicate samples were analyzed and both had RPDs less than 25% with the exception of one bifenthrin duplicate (RPD 48%), one esfenvalerate/fenvalerate duplicate (RPD 41%) and both chlorpyrifos duplicates (RPD 28% and 32%). One hundred percent of sediment chlorpyrifos and pyrethroid laboratory blanks were within acceptance criteria. An MS and LCS were performed to assess accuracy for each pesticide analyzed. One bifenthrin MSD and two lambda-cyhalothrin MS/MSDs recovered above QC limits; all other sediment pesticide MS samples and 100% of pesticide LCS samples analyzed for accuracy recovered within the acceptability criteria. Laboratory precision met acceptability criteria in 100% of LCSD and MSD samples. Surrogates were run for each sediment pesticide analysis. Surrogate recoveries were within the specific acceptability criteria for 100% of all samples analyzed. All sediment pesticide data are accepted and useable.

Total Dissolved Solids (TDS): Field blanks met acceptability criteria in 100% of the samples analyzed. Lab blanks were run with every batch and results were less than the RL for all samples.

Seventy percent of TDS field duplicates had RPDs less than 25% (7 of 10). The TDS samples collected in February, July, and August resulted in RPD calculations above 25% (80%, 28%, and 38%, respectively); all other QC samples were within acceptability criteria for each batch. One of the field duplicate samples collected on February 20th with an RPD greater than 25% also had a high RPD for ammonia. The samples were collected from water that was recorded as brown in color, cloudy, and turbid (25 NTU with a dilution of 10) with low flow at the time of sampling. One of the field duplicate samples in June with an RPD greater than 25% also had a high RPD for TKN and samples collected in July also had a high RPD for phosphorus. All other environmental and field duplicate samples collected during the June and July events resulted in RPDs below 25%. All sampling SOPs were followed to ensure that field duplicates were collected at the same time and manner as the associated environmental sample.

All laboratory duplicates met precision requirements. The LCS samples met acceptability criteria in 100% of the samples analyzed. Matrix spikes are not performed for TDS analysis. Overall, at least 90% of all TDS QC analyzed were within acceptable limits and all data are acceptable.

Total Organic Carbon (TOC): All TOC field blank and laboratory blank samples met acceptability criteria. One hundred percent of field duplicates had RPDs less than or equal to 25%. One hundred percent of LCS and MS samples analyzed for accuracy met the acceptance criteria (PR 80-120). One hundred percent of MSD samples analyzed met acceptability requirements. All TOC data are accepted and useable.

Total Suspended Solids (TSS): One hundred percent of field and laboratory blanks met acceptability criteria. Ninety percent of field duplicates had RPDs less than or equal to 25% (9 of 10). One hundred percent of LCS samples were within acceptability criteria. All laboratory duplicate samples met the acceptability criteria. Matrix spikes are not performed for analysis of TSS. All TSS data are accepted and useable.

Turbidity: One hundred percent of field blanks and field duplicates met acceptability criteria. Laboratory blanks were run with every batch and 100% were less than the RL. The LCS and laboratory duplicates were analyzed with each batch and all of the samples were within the QC limits. Matrix spikes are not performed for turbidity. All turbidity data are accepted and useable.

Toxicity

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

Water Column Toxicity: Field duplicates were collected during each monitoring event and were tested for toxicity to *C. dubia*, *S. capricornutum* and *P. promelas*. One hundred percent of field duplicates were within the acceptability criteria for *C. dubia* and *P. promelas*.

Seventy-three percent of *S. capricornutum* field duplicate samples were within the QC limit (8 of 11, Table 31). The toxicity field duplicate sample analyzed for *S. capricornutum* collected on February 12, 2013 resulted in 0% growth compared to the control and the associated environmental sample resulted in 50% growth compared to the control (RPD 200). The waterbody where the sample was collected from was brown, murky and turbid (22 NTU with a dilution of 5) and with no observed flow recorded which may have resulted in a difference between the environmental sample and field duplicate collected side by side. Two field duplicate samples collected in July and August had RPDs above 25% for *S. capricornutum* growth (34% and 29%, respectively). The July sampling event also resulted in high RPDs for TDS and phosphorus field duplicate samples. The August sampling event also resulted in high RPDs for hardness, lead, and zinc field duplicate samples. Dry Creek @ Rd 18 in both July and August had low flow recorded during the time of sampling (7 and 9 cfs). All sampling SOPs were followed to ensure that field duplicates were collected at the same time and manner as the associated environmental sample.

Negative controls (CNEGs) were performed with each toxicity batch for each species and 100% met acceptability criteria (Table 32). All water column toxicity tests are acceptable and useable.

Sediment Toxicity: Sediment toxicity samples were collected on March 19 and September 17, 2013. Two field duplicates were collected and both had RPDs less than 25%. One hundred percent of the sediment samples had laboratory control negatives within acceptability criteria. All sediment toxicity tests are acceptable and useable.

CORRECTIVE ACTIONS

Corrective actions were performed by Coalition laboratories as outlined in the ESJWQC QAPP for QA/QC results that did not meet acceptance criteria in 2013. If corrective actions occurred (e.g. reanalysis), details are included in the above sections.

Hold time violations occurred for a total of 16 samples as a result of corrective actions performed by the laboratory to address QC samples not meeting data quality objectives.

One diazinon field duplicate was re-extracted and reanalyzed 16 days outside of hold time as a corrective action to laboratory contamination in the original batch.

One sample was re-extracted and analyzed outside of hold time as a corrective action to the laboratory dropping and losing the extract vial prior to analysis; the sample was reanalyzed without an MS or MSD for methamidophos. An MS and MSD were run with the original batch and both recovered within QC limits.

QC samples from a paraquat batch did not meet the acceptability criteria and therefore the laboratory re-extracted and re-analyzed the batch ten days outside of hold time; the original and re-analyzed environmental results were non detect and all re-analyzed QC samples met the acceptability criteria.

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

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

Method	Analyte	Env. Samples Scheduled (#)	Dry Sites (#)	Env. Samples Collected (#)[1]	Field and Transport Completeness (%)	Env. Samples Analyzed (#)	Env. Samples Completeness (%)
EPA 8321A CARB	Aldicarb	60	11	49	100.0%	48	98.0%
EPA 8321A CARB	Carbaryl	60	11	49	100.0%	48	98.0%
EPA 8321A CARB	Carbofuran	60	11	49	100.0%	48	98.0%
EPA 8321A CARB	Methiocarb	60	11	49	100.0%	48	98.0%
EPA 8321A CARB	Methomyl	60	11	49	100.0%	48	98.0%
EPA 8321A CARB	Oxamyl	60	11	49	100.0%	48	98.0%
EPA 8321A CARB	Diuron	62	11	51	100.0%	50	98.0%
EPA 8321A CARB	Linuron	60	11	49	100.0%	48	98.0%
EPA 547M	Glyphosate	12	4	8	100.0%	8	100.0%
EPA 549.2M	Paraquat	12	4	8	100.0%	8	100.0%
EPA 8081A	DDD(p,p')	12	4	8	100.0%	8	100.0%
EPA 8081A	DDE(p,p')	12	4	8	100.0%	8	100.0%
EPA 8081A	DDT(p,p')	12	4	8	100.0%	8	100.0%
EPA 8081A	Dicofol	12	4	8	100.0%	8	100.0%
EPA 8081A	Dieldrin	12	4	8	100.0%	8	100.0%
EPA 8081A	Endrin	12	4	8	100.0%	8	100.0%
EPA 8081A	Methoxychlor	12	4	8	100.0%	8	100.0%
EPA 8081A	Aldrin	12	4	8	100.0%	8	100.0%
EPA 8081A	Chlordane	12	4	8	100.0%	8	100.0%
EPA 8081A	Heptachlor	12	4	8	100.0%	8	100.0%
EPA 8081A	Heptachlor epoxide	12	4	8	100.0%	8	100.0%
EPA 8081A	HCH, alpha	12	4	8	100.0%	8	100.0%
EPA 8081A	HCH, beta	12	4	8	100.0%	8	100.0%
EPA 8081A	HCH, delta	12	4	8	100.0%	8	100.0%
EPA 8081A	HCH, gamma	12	4	8	100.0%	8	100.0%
EPA 8081A	Endosulfan I	12	4	8	100.0%	8	100.0%
EPA 8081A	Endosulfan II	12	4	8	100.0%	8	100.0%
EPA 8081A	Toxaphene	12	4	8	100.0%	8	100.0%
EPA 8081A	Permethrin, cis-	10	8	2	100.0%	2	100.0%
EPA 8081A	Permethrin, trans-	10	8	2	100.0%	2	100.0%
EPA 8141A OP	Azinphos methyl	60	11	49	100.0%	48	98.0%
EPA 8141A OP	Chlorpyrifos	92	16	76	100.0%	75	98.7%
EPA 8141A OP	Diazinon	60	11	49	100.0%	48	98.0%
EPA 8141A OP	Dichlorvos	60	11	49	100.0%	48	98.0%
EPA 8141A OP	Dimethoate	63	11	52	100.0%	51	98.1%
EPA 8141A OP	Demeton-s	60	11	49	100.0%	48	98.0%
EPA 8141A OP	Disulfoton	60	11	49	100.0%	48	98.0%
EPA 8141A OP	Malathion	60	11	49	100.0%	48	98.0%
EPA 8141A OP	Methidathion	60	11	49	100.0%	48	98.0%
EPA 8141A OP	Parathion, Methyl	60	11	49	100.0%	48	98.0%
EPA 8141A OP	Phorate	60	11	49	100.0%	48	98.0%
EPA 8141A OP	Phosmet	60	11	49	100.0%	48	98.0%
EPA 8141A OP	Trifluralin	60	11	49	100.0%	48	98.0%
EPA 8141A	Atrazine	60	11	49	100.0%	48	98.0%
EPA 8141A	Cyanazine	60	11	49	100.0%	48	98.0%
EPA 8141A	Simazine	60	11	49	100.0%	48	98.0%
EPA 8321A	Methamidophos	60	11	49	100.0%	48	98.0%
SM 2340 C	Hardness as CaCO3 (Dissolved)	114	26	88	100.0%	87	98.9%
SM 2540 C	Total Dissolved Solids	109	9	100	100.0%	99	99.0%
SM 2540 D	Total Suspended Solids	109	9	100	100.0%	99	99.0%
EPA 180.1	Turbidity	109	9	100	100.0%	99	99.0%
SM 4500-NH3 C v20	Ammonia as N	109	9	100	100.0%	99	99.0%
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	109	9	100	100.0%	99	99.0%
EPA 353.2	Nitrate + Nitrite as N	109	9	100	100.0%	99	99.0%

Method	Analyte	Env. Samples Scheduled (#)	Dry Sites (#)	Env. Samples Collected (#)[1]	Field and Transport Completeness (%)	Env. Samples Analyzed (#)	Env. Samples Completeness (%)
SM 4500-P E	OrthoPhosphate as P	109	9	100	100.0%	99	99.0%
SM 4500-P E	Phosphorus as P	109	9	100	100.0%	99	99.0%
SM 5310 B	Total Organic Carbon	109	9	100	100.0%	99	99.0%
SM 9223B	E. coli	109	9	100	100.0%	99	99.0%
EPA 200.8	Arsenic	22	4	18	100.0%	18	100.0%
EPA 200.8	Boron	57	11	46	100.0%	45	97.8%
EPA 200.8	Cadmium	22	4	18	100.0%	18	100.0%
EPA 200.8	Copper	111	26	85	100.0%	84	98.8%
EPA 200.8	Lead	57	15	42	100.0%	41	97.6%
EPA 200.8	Molybdenum	22	4	18	100.0%	18	100.0%
EPA 200.8	Nickel	57	11	46	100.0%	45	97.8%
EPA 200.8	Selenium	57	11	46	100.0%	45	97.8%
EPA 200.8	Zinc	60	11	49	100.0%	48	98.0%
EPA 200.8	Cadmium (Dissolved)	29	11	18	100.0%	18	100.0%
EPA 200.8	Copper (Dissolved)	111	26	85	100.0%	84	98.8%
EPA 200.8	Lead (Dissolved)	57	15	42	100.0%	41	97.6%
EPA 200.8	Nickel (Dissolved)	57	11	46	100.0%	45	97.8%
EPA 200.8	Zinc (Dissolved)	60	11	49	100.0%	48	98.0%
Walkley-Black	Total Organic Carbon (sediment)	24	2	22	100.0%	22	100.0%
ASTM D4464M,ASTM D422	Sediment Grain Size	24	2	22	100.0%	22	100.0%
EPA 8270M_NCI	Bifenthrin	2	0	2	100.0%	2	100.0%
EPA 8270M_NCI	Chlorpyrifos	2	0	2	100.0%	2	100.0%
EPA 8270M_NCI	Cyfluthrin	2	0	2	100.0%	2	100.0%
EPA 8270M_NCI	Cyhalothrin, lambda	2	0	2	100.0%	2	100.0%
EPA 8270M_NCI	Cypermethrin	2	0	2	100.0%	2	100.0%
EPA 8270M_NCI	Deltamethrin:Tralomethrin	2	0	2	100.0%	2	100.0%
EPA 8270M_NCI	Esfenvalerate/Fenvalerate	2	0	2	100.0%	2	100.0%
EPA 8270M_NCI	Fenpropathrin	2	0	2	100.0%	2	100.0%
EPA 8270M_NCI	Permethrin	2	0	2	100.0%	2	100.0%
EPA 821/R-02-012	*Ceriodaphnia dubia*	82	12	70	100.0%	69	98.6%
EPA 821/R-02-012	*Pimephales promelas*	67	11	56	100.0%	55	98.2%
EPA 821/R-02-013	*Selenastrum capricornutum*	92	13	79	100.0%	78	98.7%
EPA 600/R-99-064	*Hyalella azteca*	25	2	23	100.0%	22	95.7%
	TOTAL	**4112**	**705**	**3407**	**100.0%**	**3357**	**98.5%**

[1] Environmental samples from Burnett Lateral @ 28 Mile Rd were collected in March 2013; however samples were not analyzed based on the Regional Boards approval on March 8, 2013 to remove the site from the ESJWQC monitoring schedule.

Table 18. ESJWQC field and transport completeness: field parameter counts and percentages.
Samples collected from January through September 2013; sorted by method and analyte.

Method	Analyte	Samples Scheduled[1]	Dry Sites	Samples Collected[2]	Completeness
USGS R2Cross streamflow	Discharge, cfs	188	31	130	85.6%
SM 4500-O	Dissolved Oxygen, mg/L	188	31	158	100.5%
EPA 150.1	pH	188	31	158	100.5%
EPA 120.1	Specific Conductivity, uS/cm	188	31	158	100.5%
SM 2550	Temperature, Deg C	188	31	158	100.5%
	TOTAL	**940**	**155**	**762**	**97.6%**

[1]Field parameters were taken twice in March 2013 at Unnamed Drain @ Hwy 140. The original environmental samples collected on March 12th were lost due to laboratory error and therefore the Coalition collected new samples on March 15th. Field parameters from both events were reported and recorded in the Coalition's database.
[2]Field parameters were measured at Burnett Lateral @ 28 Mile Rd in March 2013 and included in collected samples; however based on the Regional Board's approval on March 8, 2013 to remove the site from the ESJWQC monitoring schedule, the data were not recorded in the database.

Table 19. ESJWQC QC batch completeness: field quality, and field parameter counts and percentages.
Samples collected from January through September 2013, sorted by method and analyte.

Method	Analyte	Env. Samples Analyzed (#)	Env. and Field QC Samples (#)	Field Blank (#)	Field Blanks (%)	Field Dup. (#)	Field Dup. (%)	Equip. Blank (#)	Equip. Blank (%)	Travel Blank (#)	Travel Blank (%)
EPA 8321A CARB	Aldicarb	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8321A CARB	Carbaryl	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8321A CARB	Carbofuran	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8321A CARB	Methiocarb	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8321A CARB	Methomyl	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8321A CARB	Oxamyl	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8321A CARB	Diuron	50	72	11	15.3%	11	15.3%		NA		NA
EPA 8321A CARB	Linuron	48	68	10	14.7%	10	14.7%		NA		NA
EPA 547M	Glyphosate	8	12	2	16.7%	2	16.7%		NA		NA
EPA 549.2M	Paraquat	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	DDD(p,p')	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	DDE(p,p')	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	DDT(p,p')	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Dicofol	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Dieldrin	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Endrin	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Methoxychlor	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Aldrin	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Chlordane	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Heptachlor	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Heptachlor epoxide	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	HCH, alpha-	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	HCH, beta-	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	HCH, delta-	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	HCH, gamma-	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Endosulfan I	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Endosulfan II	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Toxaphene	8	12	2	16.7%	2	16.7%		NA		NA
EPA 8081A	Permethrin, cis-	2	6	2	33.3%	2	33.3%		NA		NA
EPA 8081A	Permethrin, trans-	2	6	2	33.3%	2	33.3%		NA		NA
EPA 8141A OP	Azinphos methyl	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A OP	Chlorpyrifos	75	97	11	11.3%	11	11.3%		NA		NA
EPA 8141A OP	Diazinon	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A OP	Dichlorvos	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A OP	Dimethoate	51	71	10	14.1%	10	14.1%		NA		NA
EPA 8141A OP	Demeton-s	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A OP	Disulfoton	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A OP	Malathion	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A OP	Methidathion	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A OP	Parathion, Methyl	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A OP	Phorate	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A OP	Phosmet	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A OP	Trifluralin	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A	Atrazine	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A	Cyanazine	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8141A	Simazine	48	68	10	14.7%	10	14.7%		NA		NA
EPA 8321A	Methamidophos	48	68	10	14.7%	10	14.7%		NA		NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	87	111	12	10.8%	12	10.8%		NA		NA
SM 2540 C	Total Dissolved Solids	99	119	10	8.4%	10	8.4%		NA		NA
SM 2540 D	Total Suspended Solids	99	119	10	8.4%	10	8.4%		NA		NA
EPA 180.1	Turbidity	99	119	10	8.4%	10	8.4%		NA		NA
SM 4500-NH3 C v20	Ammonia as N	99	119	10	8.4%	10	8.4%		NA		NA
SM 4500-NH3 C	Nitrogen, Total Kjeldahl	99	119	10	8.4%	10	8.4%		NA		NA

Method	Analyte	Env. Samples Analyzed (#)	Env. and Field QC Samples (#)	Field Blank (#)	Field Blanks (%)	Field Dup. (#)	Field Dup. (%)	Equip. Blank (#)	Equip. Blank (%)	Travel Blank (#)	Travel Blank (%)
v20											
EPA 353.2	Nitrate + Nitrite as N	99	119	10	8.4%	10	8.4%		NA		NA
SM 4500-P E	OrthoPhosphate as P	99	119	10	8.4%	10	8.4%		NA		NA
SM 4500-P E	Phosphorus as P	99	119	10	8.4%	10	8.4%		NA		NA
SM 5310 B	Total Organic Carbon	99	119	10	8.4%	10	8.4%		NA		NA
SM 9223B	E. coli	99	119	10	8.4%	10	8.4%		NA		NA
EPA 200.8	Arsenic	18	30	4	13.3%	4	13.3%		NA	4	13.3%
EPA 200.8	Boron	45	75	10	13.3%	10	13.3%		NA	10	13.3%
EPA 200.8	Cadmium	18	30	4	13.3%	4	13.3%		NA	4	13.3%
EPA 200.8	Copper	84	117	11	9.4%	11	9.4%		NA	11	9.4%
EPA 200.8	Lead	41	71	10	14.1%	10	14.1%		NA	10	14.1%
EPA 200.8	Molybdenum	18	30	4	13.3%	4	13.3%		NA	4	13.3%
EPA 200.8	Nickel	45	75	10	13.3%	10	13.3%		NA	10	13.3%
EPA 200.8	Selenium	45	75	10	13.3%	10	13.3%		NA	10	13.3%
EPA 200.8	Zinc	48	78	10	12.8%	10	12.8%		NA	10	12.8%
EPA 200.8	Cadmium (Dissolved)	18	30	4	13.3%	4	13.3%	4	13.3%		NA
EPA 200.8	Copper (Dissolved)	84	117	11	9.4%	11	9.4%	11	9.4%		NA
EPA 200.8	Lead (Dissolved)	41	71	10	14.1%	10	14.1%	10	14.1%		NA
EPA 200.8	Nickel (Dissolved)	45	75	10	13.3%	10	13.3%	10	13.3%		NA
EPA 200.8	Zinc (Dissolved)	48	78	10	12.8%	10	12.8%	10	12.8%		NA
Walkley-Black	Total Organic Carbon (sediment)	22	24	NA	NA	2	8.3%		NA		NA
ASTM D4464M, ASTM D422	Sediment Grain Size	22	24	NA	NA	2	8.3%		NA		NA
EPA 8270M_NCI	Bifenthrin	2	4	NA	NA	2	50.0%		NA		NA
EPA 8270M_NCI	Chlorpyrifos	2	4	NA	NA	2	50.0%		NA		NA
EPA 8270M_NCI	Cyfluthrin	2	4	NA	NA	2	50.0%		NA		NA
EPA 8270M_NCI	Cyhalothrin, lambda	2	4	NA	NA	2	50.0%		NA		NA
EPA 8270M_NCI	Cypermethrin	2	4	NA	NA	2	50.0%		NA		NA
EPA 8270M_NCI	Deltamethrin: Tralomethrin	2	4	NA	NA	2	50.0%		NA		NA
EPA 8270M_NCI	Esfenvalerate/ Fenvalerate	2	4	NA	NA	2	50.0%		NA		NA
EPA 8270M_NCI	Fenpropathrin	2	4	NA	NA	2	50.0%		NA		NA
EPA 8270M_NCI	Permethrin	2	4	NA	NA	2	50.0%		NA		NA
EPA 821/R-02-012	*Ceriodaphnia dubia*	69	79	NA	NA	10	12.7%		NA		NA
EPA 821/R-02-012	*Pimephales promelas*	55	65	NA	NA	10	15.4%		NA		NA
EPA 821/R-02-013	*Selenastrum capricornutum*	78	89	NA	NA	11	12.4%		NA		NA
EPA 600/R-99-064	*Hyalella azteca*	22	24	NA	NA	2	8.3%		NA		NA
	TOTAL	**3357**	**4582**	**526**	**11.5%**	**581**	**12.7%**	**45**	**11.4%**	**73**	**12.6%**

Table 20. ESJWQC summary of field blank QC sample evaluations.

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

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	<RL or < (env sample/5)	10	10	100.00
EPA 8321A CARB	Carbaryl	<RL or < (env sample/5)	10	10	100.00
EPA 8321A CARB	Carbofuran	<RL or < (env sample/5)	10	10	100.00
EPA 8321A CARB	Methiocarb	<RL or < (env sample/5)	10	10	100.00
EPA 8321A CARB	Methomyl	<RL or < (env sample/5)	10	10	100.00
EPA 8321A CARB	Oxamyl	<RL or < (env sample/5)	10	10	100.00
EPA 8321A CARB	Diuron	<RL or < (env sample/5)	11	11	100.00
EPA 8321A CARB	Linuron	<RL or < (env sample/5)	10	10	100.00
EPA 547M	Glyphosate	<RL or < (env sample/5)	2	2	100.00
EPA 549.2M	Paraquat	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	DDD(p,p')	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	DDE(p,p')	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	DDT(p,p')	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Dicofol	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Dieldrin	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Endrin	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Methoxychlor	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Aldrin	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Chlordane	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Heptachlor	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Heptachlor epoxide	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	HCH, alpha	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	HCH, beta	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	HCH, delta	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	HCH, gamma	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Endosulfan I	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Endosulfan II	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Toxaphene	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Permethrin, cis-	<RL or < (env sample/5)	2	2	100.00
EPA 8081A	Permethrin, trans-	<RL or < (env sample/5)	2	2	100.00
EPA 8141A OP	Azinphos methyl	<RL or < (env sample/5)	10	10	100.00
EPA 8141A OP	Chlorpyrifos	<RL or < (env sample/5)	11	11	100.00
EPA 8141A OP	Diazinon	<RL or < (env sample/5)	10	10	100.00
EPA 8141A OP	Dichlorvos	<RL or < (env sample/5)	10	10	100.00
EPA 8141A OP	Dimethoate	<RL or < (env sample/5)	10	10	100.00
EPA 8141A OP	Demeton-s	<RL or < (env sample/5)	10	10	100.00
EPA 8141A OP	Disulfoton	<RL or < (env sample/5)	10	10	100.00
EPA 8141A OP	Malathion	<RL or < (env sample/5)	10	10	100.00
EPA 8141A OP	Methidathion	<RL or < (env sample/5)	10	10	100.00
EPA 8141A OP	Parathion, Methyl	<RL or < (env sample/5)	10	10	100.00
EPA 8141A OP	Phorate	<RL or < (env sample/5)	10	10	100.00
EPA 8141A OP	Phosmet	<RL or < (env sample/5)	10	10	100.00
EPA 8141A OP	Trifluralin	<RL or < (env sample/5)	10	10	100.00
EPA 8141A	Atrazine	<RL or < (env sample/5)	10	10	100.00
EPA 8141A	Cyanazine	<RL or < (env sample/5)	10	10	100.00
EPA 8141A	Simazine	<RL or < (env sample/5)	10	10	100.00
EPA 8321A	Methamidophos	<RL or < (env sample/5)	10	10	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL or < (env sample/5)	12	12	100.00
EPA 160.1	Total Dissolved Solids	<RL or < (env sample/5)	10	10	100.00
EPA 160.2	Total Suspended Solids	<RL or < (env sample/5)	10	10	100.00
EPA 180.1	Turbidity	<RL or < (env sample/5)	10	10	100.00
EPA 350.2	Ammonia as N	<RL or < (env sample/5)	10	10	100.00
EPA 351.3	Nitrogen, Total Kjeldahl	<RL or < (env sample/5)	10	10	100.00
EPA 353.2	Nitrate + Nitrite as N	<RL or < (env sample/5)	10	10	100.00
EPA 365.2	OrthoPhosphate as P	<RL or < (env sample/5)	10	10	100.00
EPA 365.2	Phosphorus as P	<RL or < (env sample/5)	10	10	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 415.1	Total Organic Carbon	<RL or < (env sample/5)	10	10	100.00
SM 9223B	E. coli	<RL or < (env sample/5)	10	9	90.00
EPA 200.8	Arsenic	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Boron	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Cadmium	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Copper	<RL or < (env sample/5)	11	11	100.00
EPA 200.8	Lead	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Molybdenum	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Nickel	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Selenium	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Zinc	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Cadmium (Dissolved)	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Copper (Dissolved)	<RL or < (env sample/5)	11	11	100.00
EPA 200.8	Lead (Dissolved)	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Nickel (Dissolved)	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Zinc (Dissolved)	<RL or < (env sample/5)	10	10	100.00
Walkley-Black	Total Organic Carbon (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Chlorpyrifos (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Cyfluthrin (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Cypermethrin (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Fenpropathrin (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Permethrin (sediment)	NA	NA	NA	NA
		TOTAL	**526**	**525**	**99.81%**

NA-Not applicable

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

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

Method	Analyte	Data Quality Objective	Number of Samples	Blanks Within Control Limits	Percent Samples Acceptable
EPA 200.8	Arsenic	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Boron	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Cadmium	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Copper	<RL or < (env sample/5)	11	11	100.00
EPA 200.8	Lead	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Molybdenum	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Nickel	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Selenium	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Zinc	<RL or < (env sample/5)	10	10	100.00
		TRAVEL BLANK TOTAL	**73**	**73**	**100.00%**
EPA 200.8	Cadmium (Dissolved)	<RL or < (env sample/5)	4	4	100.00
EPA 200.8	Copper (Dissolved)	<RL or < (env sample/5)	11	11	100.00
EPA 200.8	Lead (Dissolved)	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Nickel (Dissolved)	<RL or < (env sample/5)	10	10	100.00
EPA 200.8	Zinc (Dissolved)	<RL or < (env sample/5)	10	10	100.00
		EQUIPMENT BLANK TOTAL	**45**	**45**	**100.00%**

Table 22. ESJWQC summary of field duplicate QC sample evaluations.

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

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25	10	10	100.00
EPA 8321A CARB	Carbaryl	RPD ≤ 25	10	10	100.00
EPA 8321A CARB	Carbofuran	RPD ≤ 25	10	10	100.00
EPA 8321A CARB	Methiocarb	RPD ≤ 25	10	10	100.00
EPA 8321A CARB	Methomyl	RPD ≤ 25	10	10	100.00
EPA 8321A CARB	Oxamyl	RPD ≤ 25	10	10	100.00
EPA 8321A CARB	Diuron	RPD ≤ 25	11	11	100.00
EPA 8321A CARB	Linuron	RPD ≤ 25	10	10	100.00
EPA 547M	Glyphosate	RPD ≤ 25	2	2	100.00
EPA 549.2M	Paraquat	RPD ≤ 25	2	2	100.00
EPA 8081A	DDD(p,p')	RPD ≤ 25	2	2	100.00
EPA 8081A	DDE(p,p')	RPD ≤ 25	2	2	100.00
EPA 8081A	DDT(p,p')	RPD ≤ 25	2	2	100.00
EPA 8081A	Dicofol	RPD ≤ 25	2	2	100.00
EPA 8081A	Dieldrin	RPD ≤ 25	2	2	100.00
EPA 8081A	Endrin	RPD ≤ 25	2	2	100.00
EPA 8081A	Methoxychlor	RPD ≤ 25	2	2	100.00
EPA 8081A	Aldrin	RPD ≤ 25	2	2	100.00
EPA 8081A	Chlordane	RPD ≤ 25	2	2	100.00
EPA 8081A	Heptachlor	RPD ≤ 25	2	2	100.00
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	2	2	100.00
EPA 8081A	HCH, alpha	RPD ≤ 25	2	2	100.00
EPA 8081A	HCH, beta	RPD ≤ 25	2	2	100.00
EPA 8081A	HCH, delta	RPD ≤ 25	2	2	100.00
EPA 8081A	HCH, gamma	RPD ≤ 25	2	2	100.00
EPA 8081A	Endosulfan I	RPD ≤ 25	2	2	100.00
EPA 8081A	Endosulfan II	RPD ≤ 25	2	2	100.00
EPA 8081A	Toxaphene	RPD ≤ 25	2	2	100.00
EPA 8081A	Permethrin, cis-	RPD ≤ 25	2	2	100.00
EPA 8081A	Permethrin, trans-	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	11	11	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	10	10	100.00
EPA 8141A	Atrazine	RPD ≤ 25	10	10	100.00
EPA 8141A	Cyanazine	RPD ≤ 25	10	10	100.00
EPA 8141A	Simazine	RPD ≤ 25	10	10	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	10	10	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	12	10	83.33
SM 2540 C	Total Dissolved Solids	RPD ≤ 25	10	7	70.00
SM 2540 D	Total Suspended Solids	RPD ≤ 25	10	9	90.00
EPA 180.1	Turbidity	RPD ≤ 25	10	10	100.00
SM 4500-NH3 C v20	Ammonia as N	RPD ≤ 25	10	7	70.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	RPD ≤ 25	10	9	90.00
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	10	10	100.00
SM 4500-P E	OrthoPhosphate as P	RPD ≤ 25	10	10	100.00
SM 4500-P E	Phosphorus as P	RPD ≤ 25	10	8	80.00
SM 5310 B	Total Organic Carbon	RPD ≤ 25	10	10	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 9223 B	E. coli	Rlog ≤ 1.30	10	10	100.00
EPA 200.8	Arsenic	RPD ≤ 25	4	4	100.00
EPA 200.8	Boron	RPD ≤ 25	10	10	100.00
EPA 200.8	Cadmium	RPD ≤ 25	4	4	100.00
EPA 200.8	Copper	RPD ≤ 25	11	11	100.00
EPA 200.8	Lead	RPD ≤ 25	10	9	90.00
EPA 200.8	Molybdenum	RPD ≤ 25	4	4	100.00
EPA 200.8	Nickel	RPD ≤ 25	10	9	90.00
EPA 200.8	Selenium	RPD ≤ 25	10	10	100.00
EPA 200.8	Zinc	RPD ≤ 25	10	8	80.00
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25	4	4	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 25	11	11	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 25	10	8	80.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	10	10	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	10	8	80.00
Walkley-Black	Total Organic Carbon (sediment)	RPD ≤ 20	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	RPD < 25	2	1	50.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD < 25	2	0	0.00
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD < 25	2	1	50.00
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Permethrin (sediment)	RPD < 25	2	2	100.00
		TOTAL	**546**	**522**	**95.60%**

Table 23. ESJWQC summary of method blank QC sample evaluations.

Samples analyzed in batches with samples collected from January through September 2013, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	<RL	10	10	100.00
EPA 8321A CARB	Carbaryl	<RL	10	10	100.00
EPA 8321A CARB	Carbofuran	<RL	10	10	100.00
EPA 8321A CARB	Methiocarb	<RL	10	10	100.00
EPA 8321A CARB	Methomyl	<RL	10	10	100.00
EPA 8321A CARB	Oxamyl	<RL	10	10	100.00
EPA 8321A CARB	Diuron	<RL	11	11	100.00
EPA 8321A CARB	Linuron	<RL	10	10	100.00
EPA 547M	Glyphosate	<RL	2	2	100.00
EPA 549.2M	Paraquat	<RL	2	2	100.00
EPA 8081A	DDD(p,p')	<RL	2	2	100.00
EPA 8081A	DDE(p,p')	<RL	2	2	100.00
EPA 8081A	DDT(p,p')	<RL	2	2	100.00
EPA 8081A	Dicofol	<RL	2	2	100.00
EPA 8081A	Dieldrin	<RL	2	2	100.00
EPA 8081A	Endrin	<RL	2	2	100.00
EPA 8081A	Methoxychlor	<RL	2	2	100.00
EPA 8081A	Aldrin	<RL	2	2	100.00
EPA 8081A	Chlordane	<RL	2	2	100.00
EPA 8081A	Heptachlor	<RL	2	2	100.00
EPA 8081A	Heptachlor epoxide	<RL	2	2	100.00
EPA 8081A	HCH, alpha	<RL	2	2	100.00
EPA 8081A	HCH, beta	<RL	2	2	100.00
EPA 8081A	HCH, delta	<RL	2	2	100.00
EPA 8081A	HCH, gamma	<RL	2	2	100.00
EPA 8081A	Endosulfan I	<RL	2	2	100.00
EPA 8081A	Endosulfan II	<RL	2	2	100.00
EPA 8081A	Toxaphene	<RL	2	2	100.00
EPA 8081A	Permethrin, cis-	<RL	2	2	100.00
EPA 8081A	Permethrin, trans-	<RL	2	2	100.00
EPA 8141A OP	Azinphos methyl	<RL	10	10	100.00
EPA 8141A OP	Chlorpyrifos	<RL	11	11	100.00
EPA 8141A OP	Diazinon	<RL	11	10	90.91
EPA 8141A OP	Dichlorvos	<RL	10	10	100.00
EPA 8141A OP	Dimethoate	<RL	10	10	100.00
EPA 8141A OP	Demeton-s	<RL	10	10	100.00
EPA 8141A OP	Disulfoton	<RL	10	9	90.00
EPA 8141A OP	Malathion	<RL	10	10	100.00
EPA 8141A OP	Methidathion	<RL	10	10	100.00
EPA 8141A OP	Parathion, Methyl	<RL	10	10	100.00
EPA 8141A OP	Phorate	<RL	10	10	100.00
EPA 8141A OP	Phosmet	<RL	10	10	100.00
EPA 8141A OP	Trifluralin	<RL	10	10	100.00
EPA 8141A	Atrazine	<RL	10	10	100.00
EPA 8141A	Cyanazine	<RL	10	10	100.00
EPA 8141A	Simazine	<RL	10	10	100.00
EPA 8321A	Methamidophos	<RL	11	11	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	<RL	14	14	100.00
SM 2540 C	Total Dissolved Solids	<RL	17	17	100.00
SM 2540 D	Total Suspended Solids	<RL	16	16	100.00
EPA 180.1	Turbidity	<RL	11	11	100.00
SM 4500-NH3 C v20	Ammonia as N	<RL	12	12	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	<RL	11	11	100.00
EPA 353.2	Nitrate + Nitrite as N	<RL	14	14	100.00
SM 4500-P E	OrthoPhosphate as P	<RL	10	10	100.00
SM 4500-P E	Phosphorus as P	<RL	14	14	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 5310 B	Total Organic Carbon	<RL	19	19	100.00
SM 9223 B	E. coli	<RL	10	10	100.00
EPA 200.8	Arsenic	<RL	4	4	100.00
EPA 200.8	Boron	<RL	10	10	100.00
EPA 200.8	Cadmium	<RL	4	4	100.00
EPA 200.8	Copper	<RL	14	13	92.86
EPA 200.8	Lead	<RL	11	11	100.00
EPA 200.8	Molybdenum	<RL	4	4	100.00
EPA 200.8	Nickel	<RL	10	10	100.00
EPA 200.8	Selenium	<RL	11	11	100.00
EPA 200.8	Zinc	<RL	11	11	100.00
EPA 200.8	Cadmium (Dissolved)	<RL	4	4	100.00
EPA 200.8	Copper (Dissolved)	<RL	13	13	100.00
EPA 200.8	Lead (Dissolved)	<RL	10	10	100.00
EPA 200.8	Nickel (Dissolved)	<RL	11	11	100.00
EPA 200.8	Zinc (Dissolved)	<RL	11	11	100.00
Walkley-Black	Total Organic Carbon (sediment)	<RL	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	<RL	2	2	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	<RL	2	2	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	<RL	2	2	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	<RL	2	2	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	<RL	2	2	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	<RL	2	2	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	<RL	2	2	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	<RL	2	2	100.00
EPA 8270M_NCI	Permethrin (sediment)	<RL	2	2	100.00
		TOTAL	**594**	**591**	**99.49%**

Table 24. ESJWQC summary of LCS QC sample evaluations.

Laboratory control spikes and laboratory control spike duplicates analyzed in batches with samples collected from January through September 2013, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	PR 31-133	11	11	100.00
EPA 8321A CARB	Carbaryl	PR 44-133	11	11	100.00
EPA 8321A CARB	Carbofuran	PR 36-165	11	11	100.00
EPA 8321A CARB	Methiocarb	PR 35-142	11	11	100.00
EPA 8321A CARB	Methomyl	PR 23-152	11	11	100.00
EPA 8321A CARB	Oxamyl	PR 10-117	11	11	100.00
EPA 8321A CARB	Diuron	PR 52-136	12	12	100.00
EPA 8321A CARB	Linuron	PR 49-144	11	11	100.00
EPA 547M	Glyphosate	PR 84-113	4	4	100.00
EPA 549.2M	Paraquat	PR 70-130	4	4	100.00
EPA 8081A	DDD(p,p')	PR 38-135	2	2	100.00
EPA 8081A	DDE(p,p')	PR 21-134	2	2	100.00
EPA 8081A	DDT(p,p')	PR 18-145	2	2	100.00
EPA 8081A	Dicofol	PR 40-135	2	2	100.00
EPA 8081A	Dieldrin	PR 48-121	2	2	100.00
EPA 8081A	Endrin	PR 24-143	2	2	100.00
EPA 8081A	Methoxychlor	PR 30-163	2	2	100.00
EPA 8081A	Aldrin	PR 11-138	2	2	100.00
EPA 8081A	Chlordane	PR 44-152	2	2	100.00
EPA 8081A	Heptachlor	PR 24-124	2	2	100.00
EPA 8081A	Heptachlor epoxide	PR 58-109	2	2	100.00
EPA 8081A	HCH, alpha	PR 33-111	2	2	100.00
EPA 8081A	HCH, beta	PR 49-119	2	2	100.00
EPA 8081A	HCH, delta	PR 12-97	2	2	100.00
EPA 8081A	HCH, gamma	PR 40-114	2	2	100.00
EPA 8081A	Endosulfan I	PR 50-131	2	2	100.00
EPA 8081A	Endosulfan II	PR 55-128	2	2	100.00
EPA 8081A	Toxaphene	PR 23-140	2	2	100.00
EPA 8081A	Permethrin, cis-	PR 24-166	2	2	100.00
EPA 8081A	Permethrin, trans-	PR 24-166	2	2	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	13	13	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	14	14	100.00
EPA 8141A OP	Diazinon	PR 57-130	15	15	100.00
EPA 8141A OP	Dichlorvos	PR 10-175	13	13	100.00
EPA 8141A OP	Dimethoate	PR 68-202	13	13	100.00
EPA 8141A OP	Demeton-s	PR 40-125	13	13	100.00
EPA 8141A OP	Disulfoton	PR 47-117	13	13	100.00
EPA 8141A OP	Malathion	PR 47-125	13	12	92.31
EPA 8141A OP	Methidathion	PR 50-150	13	13	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	13	13	100.00
EPA 8141A OP	Phorate	PR 44-117	13	13	100.00
EPA 8141A OP	Phosmet	PR 50-150	13	13	100.00
EPA 8141A OP	Trifluralin	PR 40-148	13	13	100.00
EPA 8141A	Atrazine	PR 39-156	13	13	100.00
EPA 8141A	Cyanazine	PR 22-172	13	13	100.00
EPA 8141A	Simazine	PR 21-179	13	13	100.00
EPA 8321A	Methamidophos	PR 25-136	11	11	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	15	15	100.00
SM 2540 C	Total Dissolved Solids	PR 80-120	17	17	100.00
SM 2540 D	Total Suspended Solids	PR 80-120	16	16	100.00
EPA 180.1	Turbidity	PR 90-110	11	11	100.00
SM 4500-NH3 C v20	Ammonia as N	PR 90-110	24	24	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	PR 90-110	17	17	100.00
EPA 353.2	Nitrate + Nitrite as N	PR 90-110	14	14	100.00
SM 4500-P E	OrthoPhosphate as P	PR 90-110	10	10	100.00
SM 4500-P E	Phosphorus as P	PR 90-110	14	14	100.00

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 5310 B	Total Organic Carbon	PR 80-120	19	19	100.00
SM 9223 B	E. coli	NA	NA	NA	NA
EPA 200.8	Arsenic	PR 85-115	4	4	100.00
EPA 200.8	Boron	PR 85-115	10	10	100.00
EPA 200.8	Cadmium	PR 85-115	4	4	100.00
EPA 200.8	Copper	PR 85-115	14	14	100.00
EPA 200.8	Lead	PR 85-115	11	11	100.00
EPA 200.8	Molybdenum	PR 85-115	4	4	100.00
EPA 200.8	Nickel	PR 85-115	10	10	100.00
EPA 200.8	Selenium	PR 85-115	11	11	100.00
EPA 200.8	Zinc	PR 85-115	11	11	100.00
EPA 200.8	Cadmium (Dissolved)	PR 85-115	4	4	100.00
EPA 200.8	Copper (Dissolved)	PR 85-115	13	13	100.00
EPA 200.8	Lead (Dissolved)	PR 85-115	10	10	100.00
EPA 200.8	Nickel (Dissolved)	PR 85-115	11	11	100.00
EPA 200.8	Zinc (Dissolved)	PR 85-115	11	11	100.00
Walkley-Black	Total Organic Carbon (sediment)	PR 75-125	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	PR 50-150	4	4	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	PR 50-150	4	4	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	PR 50-150	4	4	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	PR 50-150	4	4	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	PR 50-150	4	4	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	PR 50-150	4	4	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	PR 50-150	4	4	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	PR 50-200	4	4	100.00
EPA 8270M_NCI	Permethrin (sediment)	PR 50-150	4	4	100.00
		TOTAL	**682**	**681**	**99.72%**

NA-Not applicable

Table 25. ESJWQC summary of LCSD QC sample evaluations.

Laboratory control spike duplicates analyzed in batches with samples collected from January through September 2013, sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Carbaryl	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Carbofuran	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Methiocarb	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Methomyl	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Oxamyl	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Diuron	RPD ≤ 25	1	1	100.00
EPA 8321A CARB	Linuron	RPD ≤ 25	1	1	100.00
EPA 547M	Glyphosate	RPD ≤ 25	2	2	100.00
EPA 549.2M	Paraquat	RPD ≤ 25	2	2	100.00
EPA 8081A	DDD(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDE(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDT(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	Dicofol	RPD ≤ 25	NA	NA	NA
EPA 8081A	Dieldrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Endrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Methoxychlor	RPD ≤ 25	NA	NA	NA
EPA 8081A	Aldrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Chlordane	RPD ≤ 25	NA	NA	NA
EPA 8081A	Heptachlor	RPD ≤ 25	NA	NA	NA
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, alpha	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, beta	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, delta	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, gamma	RPD ≤ 25	NA	NA	NA
EPA 8081A	Endosulfan I	RPD ≤ 25	NA	NA	NA
EPA 8081A	Endosulfan II	RPD ≤ 25	NA	NA	NA
EPA 8081A	Toxaphene	RPD ≤ 25	NA	NA	NA
	Permethrin, cis-	RPD ≤ 25	NA	NA	NA
EPA 8081A	Permethrin, trans-	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	3	3	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	3	3	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	4	4	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	3	3	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	3	3	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	3	3	100.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	3	3	100.00
EPA 8141A OP	Malathion	RPD ≤ 25	3	3	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	3	3	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	3	3	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	3	3	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	3	3	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	3	3	100.00
EPA 8141A	Atrazine	RPD ≤ 25	3	3	100.00
EPA 8141A	Cyanazine	RPD ≤ 25	3	3	100.00
EPA 8141A	Simazine	RPD ≤ 25	3	3	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	NA	NA	NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 20	1	1	100.00
SM 2540 C	Total Dissolved Solids	RPD ≤ 25	NA	NA	NA
SM 2540 D	Total Suspended Solids	RPD ≤ 20	NA	NA	NA
EPA 180.1	Turbidity	RPD ≤ 20	NA	NA	NA
SM 4500-NH3 C v20	Ammonia as N	RPD ≤ 20	12	12	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	RPD ≤ 20	6	6	100.00
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 20	NA	NA	NA
SM 4500-P E	OrthoPhosphate as P	RPD ≤ 25	NA	NA	NA
SM 4500-P E	Phosphorus as P	RPD ≤ 20	NA	NA	NA

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
SM 5310 B	Total Organic Carbon	RPD ≤ 20	NA	NA	NA
SM 9223 B	E. coli	NA	NA	NA	NA
EPA 200.8	Arsenic	RPD ≤ 20	NA	NA	NA
EPA 200.8	Boron	RPD ≤ 20	NA	NA	NA
EPA 200.8	Cadmium	RPD ≤ 20	NA	NA	NA
EPA 200.8	Copper	RPD ≤ 20	NA	NA	NA
EPA 200.8	Lead	RPD ≤ 20	NA	NA	NA
EPA 200.8	Molybdenum	RPD ≤ 20	NA	NA	NA
EPA 200.8	Nickel	RPD ≤ 20	NA	NA	NA
EPA 200.8	Selenium	RPD ≤ 20	NA	NA	NA
EPA 200.8	Zinc	RPD ≤ 20	NA	NA	NA
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 200.8	Copper (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 200.8	Lead (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 200.8	Nickel (Dissolved)	RPD ≤ 20	NA	NA	NA
EPA 200.8	Zinc (Dissolved)	RPD ≤ 20	NA	NA	NA
Walkley-Black	Total Organic Carbon (sediment)	RPD ≤ 20	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD ≤ 25	2	2	100.00
EPA 8270M_NCI	Permethrin (sediment)	RPD ≤ 25	2	2	100.00
		TOTAL	**98**	**98**	**100.00%**

NA-Not applicable

Table 26. ESJWQC summary of matrix spike QC sample evaluations.

Matrix spikes and matrix spike duplicates collected from January through September 2013. Non project matrix spikes are included for batch Quality Assurance completeness purposes. Evaluations are sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	PR 31-133	20	20	100.00
EPA 8321A CARB	Carbaryl	PR 44-133	20	20	100.00
EPA 8321A CARB	Carbofuran	PR 36-165	20	20	100.00
EPA 8321A CARB	Methiocarb	PR 35-142	20	20	100.00
EPA 8321A CARB	Methomyl	PR 23-152	20	20	100.00
EPA 8321A CARB	Oxamyl	PR 10-117	20	20	100.00
EPA 8321A CARB	Diuron	PR 52-136	22	22	100.00
EPA 8321A CARB	Linuron	PR 49-144	20	20	100.00
EPA 547M	Glyphosate	PR 84-113	4	4	100.00
EPA 549.2M	Paraquat	PR 70-130	4	4	100.00
EPA 8081A	DDD(p,p')	PR 38-135	4	4	100.00
EPA 8081A	DDE(p,p')	PR 21-134	4	4	100.00
EPA 8081A	DDT(p,p')	PR 18-145	4	4	100.00
EPA 8081A	Dicofol	PR 40-135	4	4	100.00
EPA 8081A	Dieldrin	PR 48-121	4	4	100.00
EPA 8081A	Endrin	PR 24-143	4	4	100.00
EPA 8081A	Methoxychlor	PR 30-163	4	4	100.00
EPA 8081A	Aldrin	PR 11-138	4	4	100.00
EPA 8081A	Chlordane	PR 44-152	4	4	100.00
EPA 8081A	Heptachlor	PR 24-124	4	4	100.00
EPA 8081A	Heptachlor epoxide	PR 58-109	4	4	100.00
EPA 8081A	HCH, alpha	PR 33-111	4	4	100.00
EPA 8081A	HCH, beta	PR 49-119	4	4	100.00
EPA 8081A	HCH, delta	PR 12-97	4	4	100.00
EPA 8081A	HCH, gamma	PR 40-114	4	4	100.00
EPA 8081A	Endosulfan I	PR 50-131	4	4	100.00
EPA 8081A	Endosulfan II	PR 55-128	4	4	100.00
EPA 8081A	Toxaphene	PR 23-140	4	4	100.00
EPA 8081A	Permethrin, cis-	PR 24-166	4	4	100.00
EPA 8081A	Permethrin, trans-	PR 24-166	4	4	100.00
EPA 8141A OP	Azinphos methyl	PR 36-189	20	20	100.00
EPA 8141A OP	Chlorpyrifos	PR 61-125	22	22	100.00
EPA 8141A OP	Diazinon	PR 57-130	20	20	100.00
EPA 8141A OP	Dichlorvos	PR 10-175	20	20	100.00
EPA 8141A OP	Dimethoate	PR 68-202	20	20	100.00
EPA 8141A OP	Demeton-s	PR 40-125	20	18	90.00
EPA 8141A OP	Disulfoton	PR 47-117	20	19	95.00
EPA 8141A OP	Malathion	PR 47-125	20	14	70.00
EPA 8141A OP	Methidathion	PR 50-150	20	20	100.00
EPA 8141A OP	Parathion, Methyl	PR 55-164	20	20	100.00
EPA 8141A OP	Phorate	PR 44-117	20	20	100.00
EPA 8141A OP	Phosmet	PR 50-150	20	20	100.00
EPA 8141A OP	Trifluralin	PR 40-148	20	20	100.00
EPA 8141A	Atrazine	PR 39-156	20	20	100.00
EPA 8141A	Cyanazine	PR 22-172	20	20	100.00
EPA 8141A	Simazine	PR 21-179	20	20	100.00
EPA 8321A	Methamidophos	PR 25-136	20	18	90.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	PR 80-120	29	19	65.52
SM 2540 C	Total Dissolved Solids	PR 80-120	NA	NA	NA
SM 2540 D	Total Suspended Solids	PR 80-120	NA	NA	NA
EPA 180.1	Turbidity	PR 90-110	NA	NA	NA
SM 4500-NH3 C v20	Ammonia as N	PR 90-110	24	24	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	PR 90-110	22	21	95.45
EPA 353.2	Nitrate + Nitrite as N	PR 90-110	34	24	70.59
SM 4500-P E	OrthoPhosphate as P	PR 90-110	20	20	100.00
SM 4500-P E	Phosphorus as P	PR 90-110	28	26	92.86

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 5310 B	Total Organic Carbon	PR 80-120	38	38	100.00
SM 9223 B	E. coli	NA	NA	NA	NA
EPA 200.8	Arsenic	PR 75-125	8	8	100.00
EPA 200.8	Boron	PR 75-125	20	20	100.00
EPA 200.8	Cadmium	PR 75-125	8	8	100.00
EPA 200.8	Copper	PR 75-125	28	28	100.00
EPA 200.8	Lead	PR 75-125	22	22	100.00
EPA 200.8	Molybdenum	PR 75-125	8	8	100.00
EPA 200.8	Nickel	PR 75-125	20	20	100.00
EPA 200.8	Selenium	PR 75-125	22	22	100.00
EPA 200.8	Zinc	PR 75-125	22	22	100.00
EPA 200.8	Cadmium (Dissolved)	PR 75-125	8	8	100.00
EPA 200.8	Copper (Dissolved)	PR 75-125	26	26	100.00
EPA 200.8	Lead (Dissolved)	PR 75-125	20	20	100.00
EPA 200.8	Nickel (Dissolved)	PR 75-125	22	22	100.00
EPA 200.8	Zinc (Dissolved)	PR 75-125	22	22	100.00
Walkley-Black	Total Organic Carbon (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	PR 30-200	6	5	83.33
EPA 8270M_NCI	Chlorpyrifos (sediment)	PR 30-180	4	4	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	PR 30-180	4	4	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	PR 30-180	4	2	50.00
EPA 8270M_NCI	Cypermethrin (sediment)	PR 30-180	4	4	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	PR 30-180	4	4	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	PR 30-180	4	4	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	PR 30-200	4	4	100.00
EPA 8270M_NCI	Permethrin (sediment)	PR 30-200	4	4	100.00
		TOTAL	**1081**	**1044**	**96.58%**

NA-Not applicable

Table 27. ESJWQC summary of matrix spike duplicate QC sample evaluations.

Matrix spike duplicates collected from January through September 2013. Non project matrix spike duplicates are included for batch Quality Assurance completeness purposes. Evaluations are sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25	10	10	100.00
EPA 8321A CARB	Carbaryl	RPD ≤ 25	10	10	100.00
EPA 8321A CARB	Carbofuran	RPD ≤ 25	10	10	100.00
EPA 8321A CARB	Methiocarb	RPD ≤ 25	10	10	100.00
EPA 8321A CARB	Methomyl	RPD ≤ 25	10	10	100.00
EPA 8321A CARB	Oxamyl	RPD ≤ 25	10	9	90.00
EPA 8321A CARB	Diuron	RPD ≤ 25	11	11	100.00
EPA 8321A CARB	Linuron	RPD ≤ 25	10	10	100.00
EPA 547M	Glyphosate	RPD ≤ 25	2	2	100.00
EPA 549.2M	Paraquat	RPD ≤ 25	2	2	100.00
EPA 8081A	DDD(p,p')	RPD ≤ 25	2	2	100.00
EPA 8081A	DDE(p,p')	RPD ≤ 25	2	2	100.00
EPA 8081A	DDT(p,p')	RPD ≤ 25	2	2	100.00
EPA 8081A	Dicofol	RPD ≤ 25	2	2	100.00
EPA 8081A	Dieldrin	RPD ≤ 25	2	2	100.00
EPA 8081A	Endrin	RPD ≤ 25	2	2	100.00
EPA 8081A	Methoxychlor	RPD ≤ 25	2	2	100.00
EPA 8081A	Aldrin	RPD ≤ 25	2	2	100.00
EPA 8081A	Chlordane	RPD ≤ 25	2	2	100.00
EPA 8081A	Heptachlor	RPD ≤ 25	2	2	100.00
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	2	2	100.00
EPA 8081A	HCH, alpha	RPD ≤ 25	2	2	100.00
EPA 8081A	HCH, beta	RPD ≤ 25	2	2	100.00
EPA 8081A	HCH, delta	RPD ≤ 25	2	2	100.00
EPA 8081A	HCH, gamma	RPD ≤ 25	2	2	100.00
EPA 8081A	Endosulfan I	RPD ≤ 25	2	2	100.00
EPA 8081A	Endosulfan II	RPD ≤ 25	2	2	100.00
EPA 8081A	Toxaphene	RPD ≤ 25	2	2	100.00
EPA 8081A	Permethrin, cis-	RPD ≤ 25	2	2	100.00
EPA 8081A	Permethrin, trans-	RPD ≤ 25	2	2	100.00
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	11	11	100.00
EPA 8141A OP	Diazinon	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Dichlorvos	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Dimethoate	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Demeton-s	RPD ≤ 25	10	9	90.00
EPA 8141A OP	Disulfoton	RPD ≤ 25	10	9	90.00
EPA 8141A OP	Malathion	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Methidathion	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Phorate	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Phosmet	RPD ≤ 25	10	10	100.00
EPA 8141A OP	Trifluralin	RPD ≤ 25	10	10	100.00
EPA 8141A	Atrazine	RPD ≤ 25	10	10	100.00
EPA 8141A	Cyanazine	RPD ≤ 25	10	10	100.00
EPA 8141A	Simazine	RPD ≤ 25	10	10	100.00
EPA 8321A	Methamidophos	RPD ≤ 25	10	10	100.00
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 20	14	14	100.00
SM 2540 C	Total Dissolved Solids	RPD ≤ 25	NA	NA	NA
SM 2540 D	Total Suspended Solids	RPD ≤ 20	NA	NA	NA
EPA 180.1	Turbidity	RPD ≤ 20	NA	NA	NA
SM 4500-NH3 C v20	Ammonia as N	RPD ≤ 20	12	12	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	RPD ≤ 20	11	11	100.00
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 20	17	17	100.00
SM 4500-P E	OrthoPhosphate as P	RPD ≤ 20	10	10	100.00
SM 4500-P E	Phosphorus as P	RPD ≤ 20	14	14	100.00

Method	Analyte	Data Quality Objective	Number of Pairs	Pairs Within Control Limits	Percent Samples Acceptable
SM 5310 B	Total Organic Carbon	RPD ≤ 20	19	19	100.00
SM 9223 B	E. coli	NA	NA	NA	NA
EPA 200.8	Arsenic	RPD ≤ 20	4	4	100.00
EPA 200.8	Boron	RPD ≤ 20	10	10	100.00
EPA 200.8	Cadmium	RPD ≤ 20	4	4	100.00
EPA 200.8	Copper	RPD ≤ 20	14	14	100.00
EPA 200.8	Lead	RPD ≤ 20	11	11	100.00
EPA 200.8	Molybdenum	RPD ≤ 20	4	4	100.00
EPA 200.8	Nickel	RPD ≤ 20	10	10	100.00
EPA 200.8	Selenium	RPD ≤ 20	11	10	90.91
EPA 200.8	Zinc	RPD ≤ 20	11	11	100.00
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 20	4	4	100.00
EPA 200.8	Copper (Dissolved)	RPD ≤ 20	13	13	100.00
EPA 200.8	Lead (Dissolved)	RPD ≤ 20	10	10	100.00
EPA 200.8	Nickel (Dissolved)	RPD ≤ 20	11	11	100.00
EPA 200.8	Zinc (Dissolved)	RPD ≤ 20	11	11	100.00
Walkley-Black	Total Organic Carbon (sediment)	NA	NA	NA	NA
EPA 8270M_NCI	Bifenthrin (sediment)	RPD < 25	3	3	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD < 25	2	2	100.00
EPA 8270M_NCI	Permethrin (sediment)	RPD < 25	2	2	100.00
		TOTAL	**540**	**536**	**99.26%**

NA-Not applicable

Table 28. ESJWQC summary of laboratory duplicate QC sample evaluations.

Laboratory duplicates were analyzed in batches with samples collected January through September 2013. Non project samples are included for batch Quality Assurance completeness purposes. Evaluations sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Carbaryl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Carbofuran	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Methiocarb	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Methomyl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Oxamyl	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Diuron	RPD ≤ 25	NA	NA	NA
EPA 8321A CARB	Linuron	RPD ≤ 25	NA	NA	NA
EPA 547M	Glyphosate	RPD ≤ 25	NA	NA	NA
EPA 549.2M	Paraquat	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDD(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDE(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	DDT(p,p')	RPD ≤ 25	NA	NA	NA
EPA 8081A	Dicofol	RPD ≤ 25	NA	NA	NA
EPA 8081A	Dieldrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Endrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Methoxychlor	RPD ≤ 25	NA	NA	NA
EPA 8081A	Aldrin	RPD ≤ 25	NA	NA	NA
EPA 8081A	Chlordane	RPD ≤ 25	NA	NA	NA
EPA 8081A	Heptachlor	RPD ≤ 25	NA	NA	NA
EPA 8081A	Heptachlor epoxide	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, alpha	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, beta	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, delta	RPD ≤ 25	NA	NA	NA
EPA 8081A	HCH, gamma	RPD ≤ 25	NA	NA	NA
EPA 8081A	Endosulfan I	RPD ≤ 25	NA	NA	NA
EPA 8081A	Endosulfan II	RPD ≤ 25	NA	NA	NA
EPA 8081A	Toxaphene	RPD ≤ 25	NA	NA	NA
EPA 8081A	Permethrin, cis-	RPD ≤ 25	NA	NA	NA
EPA 8081A	Permethrin, trans-	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Azinphos methyl	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Chlorpyrifos	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Diazinon	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Dichlorvos	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Dimethoate	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Demeton-s	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Disulfoton	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Malathion	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Methidathion	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Parathion, Methyl	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Phorate	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Phosmet	RPD ≤ 25	NA	NA	NA
EPA 8141A OP	Trifluralin	RPD ≤ 25	NA	NA	NA
EPA 8141A	Atrazine	RPD ≤ 25	NA	NA	NA
EPA 8141A	Cyanazine	RPD ≤ 25	NA	NA	NA
EPA 8141A	Simazine	RPD ≤ 25	NA	NA	NA
EPA 8321A	Methamidophos	RPD ≤ 25	NA	NA	NA
SM 2340 C	Hardness as CaCO3 (Dissolved)	RPD ≤ 25	NA	NA	NA
SM 2540 C	Total Dissolved Solids	RPD ≤ 25	19	19	100.00
SM 2540 D	Total Suspended Solids	RPD ≤ 25	17	17	100.00
EPA 180.1	Turbidity	RPD ≤ 25	11	11	100.00
SM 4500-NH3 C v20	Ammonia as N	RPD ≤ 25	NA	NA	NA
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	RPD ≤ 25	NA	NA	NA
EPA 353.2	Nitrate + Nitrite as N	RPD ≤ 25	NA	NA	NA
SM 4500-P E	OrthoPhosphate as P	RPD ≤ 25	NA	NA	NA
SM 4500-P E	Phosphorus as P	RPD ≤ 25	NA	NA	NA

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 5310 B	Total Organic Carbon	RPD ≤ 25	NA	NA	NA
SM 9223 B	E. coli	Rlog ≤ 1.3	11	11	100.00
EPA 200.8	Arsenic	RPD ≤ 25	NA	NA	NA
EPA 200.8	Boron	RPD ≤ 25	NA	NA	NA
EPA 200.8	Cadmium	RPD ≤ 25	NA	NA	NA
EPA 200.8	Copper	RPD ≤ 25	NA	NA	NA
EPA 200.8	Lead	RPD ≤ 25	NA	NA	NA
EPA 200.8	Molybdenum	RPD ≤ 25	NA	NA	NA
EPA 200.8	Nickel	RPD ≤ 25	NA	NA	NA
EPA 200.8	Selenium	RPD ≤ 25	NA	NA	NA
EPA 200.8	Zinc	RPD ≤ 25	NA	NA	NA
EPA 200.8	Cadmium (Dissolved)	RPD ≤ 25	NA	NA	NA
EPA 200.8	Copper (Dissolved)	RPD ≤ 25	NA	NA	NA
EPA 200.8	Lead (Dissolved)	RPD ≤ 25	NA	NA	NA
EPA 200.8	Nickel (Dissolved)	RPD ≤ 25	NA	NA	NA
EPA 200.8	Zinc (Dissolved)	RPD ≤ 25	NA	NA	NA
Walkley-Black	Total Organic Carbon (sediment)	RPD ≤ 20	2	2	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Chlorpyrifos (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Cyfluthrin (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Cypermethrin (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Fenpropathrin (sediment)	RPD ≤ 25	NA	NA	NA
EPA 8270M_NCI	Permethrin (sediment)	RPD ≤ 25	NA	NA	NA
		TOTAL	**60**	**60**	**100.00%**

NA-Not applicable

Table 29. ESJWQC summary of surrogate recovery QC sample evaluations.

Surrogates were run with water sediment chemistry samples collected and Laboratory Quality Assurance (LABQA) analyzed from January through September 2013 for all organics except paraquat and glyphosate. Evaluation sorted by method and analyte.

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Tributylphosphate	RPD ≤ 25; PR 36-140	117	117	100.00
EPA 8321A	Diphenamid	RPD ≤ 25; PR 52-122	110	107	97.27
EPA 8081A	PCB 209	RPD ≤ 25; PR 27-110	34	34	100.00
EPA 8081A	Tetrachloro-m-xylene	RPD ≤ 25; PR 24-114	34	34	100.00
EPA 8141A	Tributylphosphate	RPD ≤ 25; PR 60-150	153	153	100.00
EPA 8141A	Triphenyl phosphate	RPD ≤ 25; PR 56-129	153	153	100.00
EPA 8270M_NCI	Esfenvalerate-d6-1	RPD ≤ 25; PR 70-130	14	14	100.00
EPA 8270M_NCI	Esfenvalerate-d6-2	RPD ≤ 25; PR 70-130	14	14	100.00
		TOTAL	**629**	**626**	**99.52%**

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

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

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
EPA 8321A CARB	Aldicarb	7 days	78	78	100.00
EPA 8321A CARB	Carbaryl	7 days	78	78	100.00
EPA 8321A CARB	Carbofuran	7 days	78	78	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	83	83	100.00
EPA 8321A CARB	Linuron	7 days	78	78	100.00
EPA 547M	Glyphosate	14 days	14	14	100.00
EPA 549.2M	Paraquat	7 days	14	7	50.00
EPA 8081A	DDD(p,p')	7 days	14	14	100.00
EPA 8081A	DDE(p,p')	7 days	14	14	100.00
EPA 8081A	DDT(p,p')	7 days	14	14	100.00
EPA 8081A	Dicofol	7 days	14	14	100.00
EPA 8081A	Dieldrin	7 days	14	14	100.00
EPA 8081A	Endrin	7 days	14	14	100.00
EPA 8081A	Methoxychlor	7 days	14	14	100.00
EPA 8081A	Aldrin	7 days	14	14	100.00
EPA 8081A	Chlordane	7 days	14	14	100.00
EPA 8081A	Heptachlor	7 days	14	14	100.00
EPA 8081A	Heptachlor epoxide	7 days	14	14	100.00
EPA 8081A	HCH, alpha	7 days	14	14	100.00
EPA 8081A	HCH, beta	7 days	14	14	100.00
EPA 8081A	HCH, delta	7 days	14	14	100.00
EPA 8081A	HCH, gamma	7 days	14	14	100.00
EPA 8081A	Endosulfan I	7 days	14	14	100.00
EPA 8081A	Endosulfan II	7 days	14	14	100.00
EPA 8081A	Toxaphene	7 days	14	14	100.00
EPA 8081A	Permethrin, cis-	7 days	8	8	100.00
EPA 8081A	Permethrin, trans-	7 days	8	8	100.00
EPA 8141A OP	Azinphos methyl	7 days	78	78	100.00
EPA 8141A OP	Chlorpyrifos	7 days	108	108	100.00
EPA 8141A OP	Diazinon	7 days	79	78	98.73
EPA 8141A OP	Dichlorvos	7 days	78	78	100.00
EPA 8141A OP	Dimethoate	7 days	81	81	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	Atrazine	7 days	78	78	100.00
EPA 8141A	Cyanazine	7 days	78	78	100.00
EPA 8141A	Simazine	7 days	78	78	100.00
EPA 8321A	Methamidophos	7 days	78	77	98.72
SM 2340 C	Hardness as CaCO3 (Dissolved)	6 months	124	124	100.00
SM 2540 C	Total Dissolved Solids	7 days	119	119	100.00
SM 2540 D	Total Suspended Solids	7 days	119	119	100.00
EPA 180.1	Turbidity	48 hours	119	119	100.00
SM 4500-NH3 C v20	Ammonia as N	Field acidify, 28 days	129	129	100.00
SM 4500-NH3 C v20	Nitrogen, Total Kjeldahl	Field acidify, 28 days	129	129	100.00
EPA 353.2	Nitrate + Nitrite as N	Field acidify, 28 days	133	133	100.00
SM 4500-P E	OrthoPhosphate as P	48 hours	129	128	99.22

Method	Analyte	Data Quality Objective	Number of Samples	Samples Within Control Limits	Percent Samples Acceptable
SM 4500-P E	Phosphorus as P	Field acidify, 28 days	129	129	100.00
SM 5310 B	Total Organic Carbon	28 days	133	133	100.00
SM 9223 B	E. coli	24 hours	119	119	100.00
EPA 200.8	Arsenic	Field acidify, 6 months	34	34	100.00
EPA 200.8	Boron	Field acidify, 6 months	84	84	100.00
EPA 200.8	Cadmium	Field acidify, 6 months	34	34	100.00
EPA 200.8	Copper	Field acidify, 6 months	128	128	100.00
EPA 200.8	Lead	Field acidify, 6 months	81	81	100.00
EPA 200.8	Molybdenum	Field acidify, 6 months	34	34	100.00
EPA 200.8	Nickel	Field acidify, 6 months	85	85	100.00
EPA 200.8	Selenium	Field acidify, 6 months	85	85	100.00
EPA 200.8	Zinc	Field acidify, 6 months	88	88	100.00
EPA 200.8	Cadmium (Dissolved)	Field acidify, 6 months	34	34	100.00
EPA 200.8	Copper (Dissolved)	Field acidify, 6 months	129	129	100.00
EPA 200.8	Lead (Dissolved)	Field acidify, 6 months	81	81	100.00
EPA 200.8	Nickel (Dissolved)	Field acidify, 6 months	86	86	100.00
EPA 200.8	Zinc (Dissolved)	Field acidify, 6 months	88	88	100.00
Walkley-Black	Total Organic Carbon (sediment)	Freeze within 48 hours; unfrozen 28 days	22	22	100.00
ASTM D4464M,ASTM D422	Grain Size (sediment)	Analyze within 28 days	22	22	100.00
EPA 8270M_NCI	Bifenthrin (sediment)	Freeze within 48 hours; 12 months	6	6	100.00
EPA 8270M_NCI	Chlorpyrifos (sediment)	Freeze within 48 hours; 12 months	6	6	100.00
EPA 8270M_NCI	Cyfluthrin (sediment)	Freeze within 48 hours; 12 months	6	6	100.00
EPA 8270M_NCI	Cyhalothrin, lambda (sediment)	Freeze within 48 hours; 12 months	6	6	100.00
EPA 8270M_NCI	Cypermethrin (sediment)	Freeze within 48 hours; 12 months	6	6	100.00
EPA 8270M_NCI	Deltamethrin:Tralomethrin (sediment)	Freeze within 48 hours; 12 months	6	6	100.00
EPA 8270M_NCI	Esfenvalerate/Fenvalerate (sediment)	Freeze within 48 hours; 12 months	6	6	100.00
EPA 8270M_NCI	Fenpropathrin (sediment)	Freeze within 48 hours; 12 months	6	6	100.00
EPA 8270M_NCI	Permethrin (sediment)	Freeze within 48 hours; 12 months	6	6	100.00
EPA 600/R-99-064	*Hyalella azteca*	Store at ≤6°C do not freeze, 14 days	24	24	100.00
EPA 821/R-02-012	*Ceriodaphnia dubia*	Store at ≤6°C, 36 Hours	79	79	100.00
EPA 821/R-02-012	*Pimephales promelas*	Store at ≤6°C, 36 Hours	65	65	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	Store at ≤6°C, 36 Hours	89	89	100.00
		TOTAL	**5073**	**5063**	**99.80%**

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

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

METHOD	TOXICITY SPECIES	TOTAL FIELD DUPLICATE SAMPLES	DATA QUALITY OBJECTIVE (DQO)	TOTAL FIELD DUPLICATE SAMPLES WITHIN DQO	PERCENT SAMPLES WITHIN ACCEPTABLE CRITERIA
EPA 821/R-02-012	*Ceriodaphnia dubia*	10	RPD ≤ 25	10	100.00
EPA 821/R-02-012	*Pimephales promelas*	10	RPD ≤ 25	10	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	11	RPD ≤ 25	8	72.73
EPA 600/R-99-064	*Hyalella azteca*	2	RPD ≤ 25	2	100.00

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

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

METHOD	TOXICITY SPECIES	TOTAL LAB CONTROL SAMPLES	DATA QUALITY OBJECTIVE (DQO)	TOTAL LAB CONTROLS WITHIN DQO	PERCENT SAMPLES WITHIN ACCEPTABLE CRITERIA
EPA 821/R-02-012	*Ceriodaphnia dubia*	10	Survival in control samples ≥90%	10	100.00
EPA 821/R-02-012	*Pimephales promelas*	1	Survival in control samples ≥80%	11	100.00
EPA 821/R-02-013	*Selenastrum capricornutum*	12	> 200,000 cells/mL, variability of controls <20%	12	100.00
EPA 600/R-99-064	*Hyalella azteca*	3	Survival in control samples ≥80%	3	100.00

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

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

SAMPLE TYPE	ANALYSIS MONTH	Φ5	Φ16	Φ84	Φ95	SD	RPD_{SD}
Environmental Sample	March 2013	0.69	1.75	6.15	7.95	2.2	-
Lab Duplicate	March 2013	0.55	1.71	6.44	8.56	2.39	3.40
Field Duplicate	March 2013	0.77	1.8	6.38	8.5	2.32	5.15
Environmental Sample	September 2013	-2.02	-0.35	3.18	4.52	1.87	-
Lab Duplicate	September 2013	-1.8	-0.21	3.11	4.37	1.76	5.97
Field Duplicate	September 2013	-2.14	-0.21	3.11	4.37	1.82	3.09

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

DISCUSSION OF RESULTS

Sites monitored during the reporting period are listed in Table 12. Tables 6, 8, 9 outline the constituents monitored from January through September 2013.

The Coalition monitored Assessment Monitoring locations on February 20, April 2, July 9, and August 13, 2013 to capture storm / high TSS events (including additional samples for organochlorines, glyphosate, paraquat, arsenic, cadmium, lead, and molybdenum analysis) in accordance to the May 6, 2011 reduced monitoring approval.

Current Pesticide Use Report (PUR) data were reviewed in an effort to determine sources of WQTL exceedances of applied pesticides. All PUR data are considered preliminary and may contain some level of inaccuracy until they are finalized and made available through California Pesticide Information Portal (CalPIP). The most recent data available from the CalPIP website are through December 2011. The Coalition received all PUR data associated with January through September 2013 exceedances and therefore a PUR addendum to this report is not necessary (Table 34).

Preliminary data may include zeroes or blank cells in the pounds Active Ingredient (AI) per acre column of the PUR appendix (Appendix V). Preliminary data do not include the pounds AI per acre and therefore it must be calculated based on the amount applied and area reported. In order for the calculations to be made correctly, the proper units be reported for the amount applied and for the area treated; if there are errors in the data these calculations cannot be performed and will result in a blank cell for AI per acre. Zero values in the pounds AI per acre column are due to values less than 0.0001 being rounded to zero during the calculation process; this occurs when the amount applied relative to an acre is very minimal. The original data are not rounded; only the pounds AI per acre derived from calculations are rounded.

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

County	2013 PUR Data Obtained	2013 PUR Data Outstanding for 2014 Report
Madera	January through December	None
Merced	January through September	None
Stanislaus	January through September	None

From January through September 2013, the Coalition monitored all constituents as required in the MRP and outlined in the MRPP (Table 11, pp 61-63). At least 90% of samples collected from January through September 2013 met data quality objectives for completeness, precision and accuracy. A discussion of all Quality Assurance/ Quality Control can be found in the Precision and Accuracy section of this report. Exceedances of WQTLs were reported to Regional Board staff within five business days upon receipt of laboratory results (Appendix VI). Four Exceedance Reports required amendments. An amendment to the February 21, 2013 Exceedance Report was made on June 18, 2013 to include a previously overlooked *E. coli* exceedance. The July 26, 2013 toxicity Exceedance Report was amended on December 16, 2013 to correct a typo in the value reported as the percent control. An amendment to the September 16, 2013 Field Exceedance Report was sent on September 17, 2013 to omit a previously reported pH exceedance. An amendment to the October 18, 2013 exceedance report was sent on October 24, 2013 to account for a previously overlooked SC exceedance. A list of all WQTLs used to evaluate results is included in Table 35.

Coalition monitoring from January through September 2013 resulted in exceedances of WQTLs for DO, pH, SC, TDS, ammonia, nitrates, *E. coli*, copper, chlorpyrifos, diazinon, diuron, and malathion (Tables 36-38). Water column toxicity to *C. dubia, S. capricornutum, P. promelas,* and sediment toxicity to *H. azteca* also occurred (Tables 39-41). The next section summarizes all data on exceedances.

A TIE was performed on water samples when survival or growth of the respective target organism was 50% or less compared to the control. Additional sediment chemistry analysis for chlorpyrifos and pyrethroids was performed if survival of the target organism was less than 80% compared to the control. All TIE results were submitted quarterly with all laboratory results.

Table 35. Water Quality Trigger Limits (WQTLs).

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
pH	6.5 - 8.5 units	Numeric		Sacramento/San Joaquin Rivers Basin Plan (Page III.6.00)	1
Electrical Conductivity (maximum)	700 µmhos/cm	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcot)	3
Dissolved Oxygen (minimum)	7 mg/L	Numeric	Cold Freshwater Habitat, Spawning	Sacramento/San Joaquin Rivers Basin Plan. Water Quality Control Plan for the Tulare Lake Basin.	1
	5 mg/L		Warm Freshwater Habitat	Basin Plan Objective, Page III-5.00: for waters designated WARM (aquatic life). Tulare Lake Basin Plan	
Turbidity	variable	Numeric	Municipal and Domestic Supply	Basin Plan Objective - increase varies based on natural turbidity	1
Total Dissolved Solids	450 mg/L	Narrative	Agricultural Supply	Water Quality for Agriculture (Ayers & Westcott)	3
Total Suspended Solids	NA				
Temperature	variable	Numeric		Basin Plan Objective (see objectives for COLD, WARM, and Enclosed Bays and Estuaries)	1
E coli	235 MPN/100 ml	Narrative	Water Contact Recreation	EPA ambient water quality criteria, single-sample maximum	3
Fecal coliform	200 MPN/100 ml **400 MPN/100 ml**	Numeric	Water Contact Recreation	Sacramento/San Joaquin Rivers Basin Plan (Page III.3.00) Geometric mean of not less than five samples for any 30- day period, **nor shall more than 10% of the total number of samples taken during a 30 -day period.**	1
TOC	NA				
Pesticides – Carbamates					
Aldicarb	3 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: United States Environmental Protection Agency (USEPA) Primary Maximum Contaminant Level (MCL) (MUN, human health)	1
Carbaryl	2.53 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average	3
Carbofuran	ND	Numeric		Sacramento/San Joaquin Basin Plan - Basin Plan Prohibition	2
Methiocarb	0.5 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates	3
Methomyl	0.52 µg/L	Narrative	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Toxicity Objective: Freshwater Aquatic Life Protection - Continuous Concentration, 4-Day Average (California Department of Fish and Game) (aquatic life)	3
Oxamyl	50 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: Drinking Water Standards - Maximum Contaminant Levels (MCLs). California Dept of Health Services. Primary MCL	3
Pesticides – Organochlorines					
DDD(p,p')	0.00083 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR, Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
DDE(p,p')	0.00059 µg/L				
DDT(p,p')	0.00059 µg/L				
Dicofol	NA				
Dieldrin	0.00014 µg/L	Numeric	Municipal and Domestic Supply	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA), Human Health Protection, 30-Day Average - Sources of Drinking Water (water & fish consumption)	1
	0.056 µg/L	Numeric	Freshwater Habitat	Sacramento/San Joaquin Basin Plan Chemical Constituents Objective: CTR (USEPA) / Continuous Concentration 4-day average (total)	1

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

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

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

Constituent	Water Quality Trigger Limit (WQTL)	Standard Type	Beneficial Use (BU) with most protective limit	Reference for the Trigger Limit	Category (see footnotes)
	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 Water Quality Objective (WQO) listed by reference such as MCLs (Page III-3.0)* , CTRs (Page III-10.1)*,
Category 2: Pesticides with discharge prohibitions. Prohibitions apply to any discharges not subject to board-approved management practices (Page IV-25.0)*.
Category 3: Constituent does not have numeric WQO, and does not have a primary MCL. WQTL exceedance is based on implementation of narrative objective. All detections should be tracked. None are default exceedances.
MUN-Municipal and Domestic Supply
NA-Not Available. Until completion of evaluation studies and MRP Plan submittals with site specific information on beneficial uses.
ND-Not Detected
(*)-Water Quality Control Plan for the Sacramento and San Joaquin River Basins. Revised on October 2007.
Narrative WQTLs are based on Water Quality Goals Database. Updated by Jon Marshack on July 16, 2008.

SUMMARY OF EXCEEDANCE REPORTS

All Exceedance Reports and communications are included in Appendix VI. If any errors occurred in the original communication of the exceedance, an updated report was emailed to the Regional Board. Tallies of exceedances occurring in January through September 2013 are listed by constituent in Tables 36-41. Additional sediment chemistry results associated with sediment toxicity can be found in Table 41. Where applicable, exceedances are tallied by the number of NM exceedances, the number of exceedances that occurred in non-contiguous waterbodies (not connected to downstream waterbody), the number of MPM exceedances (red bolded values) and total count for all WQTL exceedances. If an exceedance occurred in both the environmental and the associated field duplicate sample, the result was counted only once.

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

The WQTLs are listed below each constituent. Field parameters under a management plan are all classified as Priority E constituents and are monitored only as a part of NM (see Management Plan approved November 25, 2008, Prioritization of Exceedances section) or when a site is monitored for a high priority constituent in a management plan.

Station Name	Sample Date	Season	DO	pH	SC
			<7 mg/L	<6.5 or >8.5	>700 µS/cm
Hatch Drain @ Tuolumne Rd	1/8/2013	Winter1			1688
Levee Drain @ Carpenter Rd	1/8/2013	Winter1			1445
Livingston Drain @ Robin Ave	1/8/2013	Winter1		8.85	
McCoy Lateral @ Hwy 140	1/8/2013	Winter1		8.89	
Prairie Flower Drain @ Crows Landing Rd	1/8/2013	Winter1	0.2		2145
Unnamed Drain @ Hwy 140	1/8/2013	Winter1		8.94	
Deadman Creek @ Gurr Rd	2/12/2013	Winter2		8.56	
Dry Creek @ Rd 18	2/12/2013	Winter2, Non-contiguous		9.09	
Hatch Drain @ Tuolumne Rd	2/12/2013	Winter2	5.93		1152
Hilmar Drain @ Central Ave	2/12/2013	Winter2			1532
Levee Drain @ Carpenter Rd	2/12/2013	Winter2	3.48		1988
Prairie Flower Drain @ Crows Landing Rd	2/12/2013	Winter2			2469
Levee Drain @ Carpenter Rd	2/20/2013	Storm1			1704
Miles Creek @ Reilly Rd	2/20/2013	Storm1		8.63	
Prairie Flower Drain @ Crows Landing Rd	2/20/2013	Storm1			1965
Deadman Creek @ Gurr Rd	3/12/2013	Winter3		8.55	
Hatch Drain @ Tuolumne Rd	3/12/2013	Winter3, SED	5.86		1194
Highline Canal @ Hwy 99	3/12/2013	Winter3, SED		8.95	
Levee Drain @ Carpenter Rd	3/12/2013	Winter3, SED			1746
Prairie Flower Drain @ Crows Landing Rd	3/12/2013	Winter3, SED			1616
Unnamed Drain @ Hwy 140	3/12/2013	Winter3, SED		9.06	
Dry Creek @ Rd 18	4/2/2013	Storm2		8.57	
Dry Creek @ Wellsford Rd	4/2/2013	Storm2	6.96		
Duck Slough @ Gurr Rd	4/2/2013	Storm2			1823
Highline Canal @ Hwy 99	4/2/2013	Storm2		9.01	
Mootz Drain downstream of Langworth Pond	4/2/2013	Storm2	4.32		
Prairie Flower Drain @ Crows Landing Rd	4/2/2013	Storm2			2196
Black Rascal Creek @ Yosemite Rd	4/9/2013	Irrigation1	6.4		
Hatch Drain @ Tuolumne Rd	4/9/2013	Irrigation1	2.56		1296
Hilmar Drain @ Central Ave	4/9/2013	Irrigation1			901
Lateral 2 1/2 near Keyes Rd	4/9/2013	Irrigation1		8.79	
Livingston Drain @ Robin Ave	4/9/2013	Irrigation1, Non-contiguous		8.89	
Black Rascal Creek @ Yosemite Rd	5/14/2013	Irrigation2	1.68		
Dry Creek @ Wellsford Rd	5/14/2013	Irrigation2	5.99		
Duck Slough @ Gurr Rd	5/14/2013	Irrigation2		8.73	

Station Name	Sample Date	Season	DO	pH	SC
			<7 mg/L	<6.5 or >8.5	>700 µS/cm
Hatch Drain @ Tuolumne Rd	5/14/2013	Irrigation2	0.96		1283
Highline Canal @ Hwy 99	5/14/2013	Irrigation2		8.85	
Levee Drain @ Carpenter Rd	5/14/2013	Irrigation2	4.99		1324
Merced River @ Santa Fe	5/14/2013	Irrigation2	6.41		
Mootz Drain downstream of Langworth Pond	5/14/2013	Irrigation2	4.17		
Prairie Flower Drain @ Crows Landing Rd	5/14/2013	Irrigation2	1.58		1202
Unnamed Drain @ Hwy 140	5/14/2013	Irrigation2	5.79		
Livingston Drain @ Robin Ave	5/21/2013	Irrigation2		8.54	
Dry Creek @ Wellsford Rd	6/11/2013	Irrigation3	6.10		
Hilmar Drain @ Central Ave	6/11/2013	Irrigation3			1080
Levee Drain @ Carpenter Rd	6/11/2013	Irrigation3	4.77		1305
Livingston Drain @ Robin Ave	6/11/2013	Irrigation3		8.85	
McCoy Lateral @ Hwy 140	6/11/2013	Irrigation3		9.29	
Mootz Drain downstream of Langworth Pond	6/11/2013	Irrigation3	4.28		
Prairie Flower Drain @ Crows Landing Rd	6/11/2013	Irrigation3			1841
Berenda Slough along Ave 18 1/2	7/9/2013	Irrigation4, Non-contiguous	3.66		
Black Rascal Creek @ Yosemite Rd	7/9/2013	Irrigation4	2.40	6.26	
Cottonwood Creek @ Rd 20	7/9/2013	Irrigation4	5.28		
Dry Creek @ Wellsford Rd	7/9/2013	Irrigation4	5.61		
Duck Slough @ Gurr Rd	7/9/2013	Irrigation4	6.62		871
Hatch Drain @ Tuolumne Rd	7/9/2013	Irrigation4	0.37		1156
Hilmar Drain @ Central Ave	7/9/2013	Irrigation4			1651
Lateral 2 ½ near Keyes Rd	7/9/2013	Irrigation4		8.54	
Levee Drain @ Carpenter Rd	7/9/2013	Irrigation4	1.07		1015
Livingston Drain @ Robin Ave	7/9/2013	Irrigation4		9.44	
Merced River @ Santa Fe	7/9/2013	Irrigation4	6.05		
Mootz Drain downstream of Langworth Pond	7/9/2013	Irrigation4	4.35	6.42	
Prairie Flower Drain @ Crows Landing Rd	7/9/2013	Irrigation4			2177
Unnamed Drain @ Hwy 140	7/9/2013	Irrigation4	5.70		
Black Rascal Creek @ Yosemite Rd	8/13/2013	Irrigation5	1.92		
Deadman Creek @ Gurr Rd	8/13/2013	Irrigation5	6.46		
Dry Creek @ Rd 18	8/13/2013	Irrigation5	6.54		
Duck Slough @ Gurr Rd	8/13/2013	Irrigation5	6.56		
Hatch Drain @ Tuolumne Rd	8/13/2013	Irrigation5	0.49		
Highline Canal @ Hwy 99	8/13/2013	Irrigation5		8.53	
Levee Drain @ Carpenter Rd	8/13/2013	Irrigation5	3.82		1203
Livingston Drain @ Robin Ave	8/13/2013	Irrigation5, Non-contiguous		8.81	
Merced River @ Santa Fe	8/13/2013	Irrigation5	6.20		
Mootz Drain downstream of Langworth Pond	8/13/2013	Irrigation5	5.65		
Prairie Flower Drain @ Crows Landing Rd	8/13/2013	Irrigation5	1.65		945
Cottonwood Creek @ Rd 20	9/10/2013	Irrigation6, Non-contiguous	5.34		
Dry Creek @ Rd 18	9/10/2013	Irrigation6, SED	5.17		
Dry Creek @ Wellsford Rd	9/10/2013	Irrigation6	6.93		
Duck Slough @ Gurr Rd	9/10/2013	Irrigation6, SED	4.29		
Hatch Drain @ Tuolumne Rd	9/10/2013	Irrigation6, SED	2.05		1028
Hilmar Drain @ Central Ave	9/10/2013	Irrigation6, SED			1175
Levee Drain @ Carpenter Rd	9/10/2013	Irrigation6, SED	3.76		1583
McCoy Lateral @ Hwy 140	9/10/2013	Irrigation6		9.25	
Merced River @ Santa Fe	9/10/2013	Irrigation6	6.82		
Miles Creek @ Reilly Rd	9/10/2013	Irrigation6, SED	4.97		
Mootz Drain downstream of Langworth Pond	9/10/2013	Irrigation6, SED	3.07		
Prairie Flower Drain @ Crows Landing Rd	9/10/2013	Irrigation6, SED	4.10		1544
Non-contiguous Waterbody Exceedances			**2**	**3**	**0**
Total Exceedances			**48**	**25**	**33**

SED-Sediment monitoring

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

The table only includes field duplicate exceedances if no exceedances occurred in the environmental sample. If an exceedance in the field duplicate sample and not the environmental sample occurred, the field duplicate result was included and noted by (FD) by the station name. Constituents under a management plan that are not applied by agriculture are classified as Priority E constituents and are monitored only as a part of NM and not counted toward MPM Exceedances (see Management Plan approved November 25, 2008, Prioritization of Exceedances section). Red bolded values represent MPM exceedances.

Station Name	Sample Date	Season	TDS 450 mg/L	Ammonia 1.5 mg/L	Nitrate + Nitrite 10 mg/L	*E. coli* 235 MPN/100 mL	Copper Dissolved[1] (hardness based trigger limit) µg/L
Cottonwood Creek @ Rd 20	1/8/2013	Winter1				690	**13 (6.84)**
Dry Creek @ Rd 18	1/8/2013	Winter1				1700	**11 (5.79)**
Dry creek @ Wellsford Rd	1/8/2013	Winter1				>2400	
Duck Slough @ Gurr Rd	1/8/2013	Winter1				>2400	
Highline Canal @ Hwy 99	1/8/2013	Winter1				1400	**11 (8.42)**
Highline Canal @ Lombardy Rd	1/8/2013	Winter1					**11 (9.72)**
Levee Drain @ Carpenter Rd	1/8/2013	Winter1	1100		25	250	
McCoy Lateral @ Hwy 140	1/8/2013	Winter1					**3.2 (1.87)**
Merced River @ Santa Fe	1/8/2013	Winter1				1700	
Miles Creek @ Reilly Rd	1/8/2013	Winter1				>2400	
Mustang Creek @ East Ave	1/8/2013	Winter1					11 (8.96)
Prairie Flower Drain @ Crows Landing Rd	1/8/2013	Winter1	1600	24		>2400	
Unnamed Drain @ Hwy 140	1/8/2013	Winter1				250	4.7 (4.27)
Levee Drain @ Carpenter Rd	2/12/2013	Winter2	1500	17	20	>2400	
Prairie Flower Drain @ Crows Landing Rd	2/12/2013	Winter2	1800		29	390	
Dry Creek @ Wellsford Rd	2/20/2013	Storm1				440	
Levee Drain @ Carpenter Rd	2/20/2013	Storm1	1300		34	>2400	
Miles Creek @ Reilly Rd	2/20/2013	Storm1				440	
Prairie Flower Drain @ Crows Landing Rd	2/20/2013	Storm1	1500	6	31	>2400	
Dry Creek @ Wellsford Rd	3/12/2013	Winter3				920	
Duck Slough @ Gurr Rd	3/12/2013	Winter3	460	1.7			
Levee Drain @ Carpenter Rd	3/12/2013	Winter3	1200		23	>2400	
Merced River @ Santa Fe	3/12/2013	Winter3	1100				
Miles Creek @ Reilly Rd	3/12/2013	Winter3				>2400	
Prairie Flower Drain @ Crows Landing Rd	3/12/2013	Winter3	1100		16		
Levee Drain @ Carpenter Rd	4/2/2013	Storm2				720	
Mootz Drain downstream of Langworth Pond	4/2/2013	Storm2				2000	
Prairie Flower Drain @ Crows Landing Rd	4/2/2013	Storm2	1400		28	240	
Unnamed Drain @ Hwy 140	4/2/2013	Storm2				440	
Howard Lateral @ Hwy 140	4/9/2013	Irrigation1					**7.2 (4.95)**
Dry Creek @ Wellsford Rd	5/14/2013	Irrigation2				307.6	
Levee Drain @ Carpenter Rd	5/14/2013	Irrigation2	780		11	517.2	
Miles Creek @ Reilly Rd	5/14/2013	Irrigation2				387.3	
Mootz Drain downstream of Langworth Pond	5/14/2013	Irrigation2				>2419.6	
Prairie Flower Drain @ Crows Landing Rd	5/14/2013	Irrigation2	730		17		
Dry Creek @ Rd 18	6/11/2013	Irrigation3				307.6	**6.8 (1.77)**

Station Name	Sample Date	Season	TDS 450 mg/L	Ammonia 1.5 mg/L	Nitrate + Nitrite 10 mg/L	*E. coli* 235 MPN/100 mL	Copper Dissolved[1] (hardness based trigger limit) µg/L
Dry Creek @ Wellsford Rd	6/11/2013	Irrigation3				344.8	
Levee Drain @ Carpenter Rd	6/11/2013	Irrigation3	800		11	>2419.6	
Mootz Drain downstream of Langworth Pond	6/11/2013	Irrigation3				>2419.6	
Prairie Flower Drain @ Crows Landing Rd	6/11/2013	Irrigation3	1200		22		
Unnamed Drain @ Hwy 140	6/11/2013	Irrigation3				261.3	
Cottonwood Creek @ Rd 20	7/9/2013	Irrigation4				1203.3	
Dry Creek @ Rd 18	7/9/2013	Irrigation4					**3.7 (1.6)**
Dry Creek @ Wellsford Rd	7/9/2013	Irrigation4				261.3	
Duck Slough @ Gurr Rd	7/9/2013	Irrigation4	530			325.5	
Levee Drain @ Carpenter Rd	7/9/2013	Irrigation4	640	5.4		>2419.6	
Miles Creek @ Reilly Rd	7/9/2013	Irrigation4	1700			325.5	
Mootz Drain downstream of Langworth Pond	7/9/2013	Irrigation4				920.8	
Prairie Flower Drain @ Crows Landing Rd	7/9/2013	Irrigation4	1400				
Dry Creek @ Rd 18	8/13/2013	Irrigation5					**3.0 (1.67)**
Dry Creek @ Wellsford Rd	8/13/2013	Irrigation5				461.1	
Duck Slough @ Gurr Rd	8/13/2013	Irrigaiton5				>2419.6	
Levee Drain @ Carpenter Rd	8/13/2013	Irrigation5	720		12	517.2	
Mootz Drain downstream of Langworth Pond	8/13/2013	Irrigation5				>2419.6	
Prairie Flower Drain @ Crows Landing Rd	8/13/2013	Irrigation5	600			410.6	
Cottonwood Creek @ Rd 20	9/10/2013	Irrigation6, Non-contiguous				1986.3	
Dry Creek @ Rd 18	9/10/2013	Irrigation6					**2.3 (1.67)**
Duck Slough @ Gurr Rd	9/10/2013	Irrigation6				410.6	
Levee Drain @ Carpenter Rd	9/10/2013	Irrigation6	1000			461.1	
McCoy Lateral @ Hwy 140	9/10/2013	Irrigation6					**2.1 (1.87)**
Mootz Drain downstream of Langworth Pond	9/10/2013	Irrigation6				>2419.6	
Prairie Flower Drain @ Crows Landing Rd	9/10/2013	Irrigation6	920				
		Normal Monitoring Exceedances	**23**	**5**	**13**	**46**	**2**
		Non-contiguous Waterbody Exceedances	**0**	**0**	**0**	**1**	**0**
		Management Plan Monitoring Exceedances[2]	**0**	**0**	**0**	**0**	**11**
		Total Exceedances	**23**	**5**	**13**	**47**	**13**

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

Table 38. Exceedances of pesticide WQTLs.

The table only includes field duplicate exceedances if no exceedances occurred in the environmental sample. If an exceedance in the field duplicate sample and not environmental sample occurred, the field duplicate result was included and noted (FD) by the station name. Red bolded values represent MPM exceedances.

Station Name	Sample Date	Season	Monitoring Type[1]	Chlorpyrifos 0.015 µg/L	Diazinon 0.1 µg/L	Diuron 2.0 µg/L	Malathion 0 µg/L
Dry Creek @ Rd 18	1/8/2013	Winter1	MPM			**5.2**	
Miles Creek @ Reilly Rd (FD)	2/20/2013	Storm1	NM		0.18		
Miles Creek @ Reilly Rd	4/2/2013	Storm2	MPM, NM				0.78
Dry Creek @ Wellsford Rd	9/10/2013	Irrigation6	MPM	**0.14**			
Normal Monitoring Exceedances				**0**	**1**	**0**	**1**
Non-contiguous Waterbody Exceedances[2]				**0**	**0**	**0**	**0**
Management Plan Monitoring Exceedances[3]				**1**	**0**	**1**	**0**
TOTAL Exceedances				**1**	**1**	**1**	**1**

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

Table 39. Water column and sediment toxicity exceedance summary.

The table only includes field duplicate exceedances if no exceedances occurred in the environmental sample. If an exceedance in the field duplicate sample and not environmental sample occurred, the field duplicate result was included and noted (FD) by the station name. Red bolded values represent MPM exceedances.

Station Name	Sample Date	Season & Monitoring Type[1]	Species	Toxicity End Point	Mean	Percent Control	Toxicity Significance	Summary Comments
Prairie Flower Drain @ Crows Landing Rd	1/8/2013	Winter1, MPM	*S. capricornutum*	Total Cell Count (cells/mL)	136,538	**16**	SL	The TIE was not conducted due to high DO, TSS, and ammonia concentrations.
Dry Creek @ Rd 18	2/12/2013	Winter2, MPM, Non-contiguous	*S. capricornutum*	Total Cell Count (cells/mL)	12,791	**4**	SL	Samples lost all toxicity prior to initiation of the TIE.
Highline Canal @ Hwy 99	2/12/2013	Winter2, MPM, Non-contiguous	*S. capricornutum*	Total Cell Count (cells/mL)	45,356	**12**	SL	Samples lost all toxicity prior to initiation of the TIE.
Levee Drain @ Carpenter Rd	2/12/2013	Winter2, NM	*C. dubia*	Survival (%)	50	50	SL	The TIE indicated ammonia caused the toxicity.
Levee Drain @ Carpenter Rd	2/12/2013	Winter2, NM	*P. promelas*	Survival (%)	0	0	SL	The TIE indicated ammonia caused the toxicity.
Levee Drain @ Carpenter Rd	2/12/2013	Winter2, NM	*S. capricornutum*	Total Cell Count (cells/mL)	0	0	SL	Samples lost all toxicity prior to initiation of the TIE.
Miles Creek @ Reilly Rd	2/12/2013	Winter2, NM	*S. capricornutum*	Total Cell Count (cells/mL)	182,129	50	SL	Samples lost all toxicity prior to initiation of the TIE.
Duck Slough @ Gurr Rd	3/12/2013	Winter3, MPM	*C. dubia*	Survival (%)	0	**0**	SL	The TIE indicated OP insecticides caused the toxicity.
Hatch Drain @ Tuolumne Rd	3/12/2013	Winter3, MPM, SED	*H. azteca*	Survival (%)	71	**72**	SL	Pyrethroids and chlorpyrifos detected.
Levee Drain @ Carpenter Rd	7/9/2013	Irrigation4, NM	*C. dubia*	Survival (%)	35	35	SL	The TIE indicated ammonia caused the toxicity.
Prairie Flower Drain @ Crows Landing Rd	8/13/2013	Irrigation5, MPM	*C. dubia*	Survival (%)	0	**0**	SL	The TIE indicated organophosphates caused the toxicity.
Dry Creek @ Rd 18	9/10/2013	Irrigation6, MPM	*H. azteca*	Survival (%)	88	**92**	SG	No TIE conducted.
Duck Slough @ Gurr Rd	9/10/2013	Irrigation6, MPM	*H. azteca*	Survival (%)	0	**0**	SL	Pyrethroids and chlorpyrifos detected.
Hatch Drain @ Tuolumne Rd	9/10/2013	Irrigation6, MPM, SED	*H. azteca*	Survival (%)	82	**85**	SG	No TIE conducted.

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

SED-Sediment monitoring
SL-Statistically significantly different from control; less than 80% threshold
SG-Statistically significantly different from control; Greater than 80% threshold

Table 40. Water column and sediment toxicity tally.

The table only includes field duplicate exceedances if no exceedances occurred in the environmental sample. If an exceedance in the field duplicate sample and not the environmental sample occurred, the field duplicate result was included and noted by (FD) by the station name. Red bolded values represent MPM exceedances.

Monitoring Type	*C. dubia*	*P. promelas*	*S. capricornutum*	*H. azteca*
Normal Monitoring Exceedances	2	1	2	0
Non-contiguous Waterbody Exceedances[1]	0	0	**2**	0
Management Plan Monitoring Exceedances[2]	**2**	**0**	**3**	**4**
Total	4	1	5	4

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

Table 41. Sediment toxicity chemistry results for samples with 80% or less survival when compared to the control.

Station Name	Sample Date	Monitoring Type	*H. azteca* (% Control)	Sediment Pesticides µg/kg dw: Bifenthrin, µg/kg	Chlorpyrifos , µg/kg	Cyfluthrin, µg/kg	Cyhalothrin, Lambda µg/kg	Cypermethrin, µg/kg	Deltamethrin:Tralomethrin, µg/kg	Esfenvalerate/Fenvalerate, µg/kg	Fenpropathrin, µg/kg	Permethrin, µg/kg	TOC (mg/Kg dw)	Percent TOC	Mean GS Description	Median GS (mm)
Hatch Drain @ Tuolumne Rd	3/12/2013	MPM	72	25	7.2	ND	J0.95	ND	ND	ND	ND	ND	39,000	3.9	Fine Sand[1]	0.068
Duck Slough @ Gurr Rd	9/10/2013	MPM	0	1.9	3.3	J0.14	46	ND	ND	3.5	0.36	0.40	11,000	1.1	Silt[2]	0.010

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

DISCUSSION OF EXCEEDANCES

Pesticide Use Report Data

Available PUR data are provided to the Coalition from each of the County Agricultural Commissioner's offices. Registered products recorded in the database are evaluated for applications relevant to exceedances of WQTLs. To assess possible sources of toxicity, applications of pesticides known to be toxic to the test species are identified based on a variety of factors including the organic carbon partitioning coefficient (K_{oc}), chemical type, mode of action and solubility. If sediment toxicity occurs, pesticides with a relatively high K_{oc} (1600 or greater) are considered potential causes. If water column toxicity occurs, pesticides with a relatively low K_{oc} (below 1900) are evaluated. The PUR database is queried for pesticides applied within 30 days prior to water sampling. When determining if pyrethroid pesticides could be responsible for toxicity, the PUR database is queried for applications within 180 days prior to the date of toxicity, due to the long half-life of pyrethroids. The database is queried for applications of metals 90 days prior to exceedances (Table 42). If there were no applications within the specified time period, the PUR database was queried an additional 30 days to determine which pesticides were applied within 60 days of the sample date. Appendix V includes tables and maps of all pesticide applications that are relevant to WQTL exceedances or toxicity. When PUR data for any county are unattainable, the Coalition makes a note in Appendix V; any outstanding PUR data are submitted in an Addendum to the Annual Report. Information regarding available and outstanding PURs is included in Table 42. If exceedances of WQTLs for aldrin, dieldrin, endrin, hexachlorocyclohexane (HCH), DDD, DDE, DDT or molybdenum occur, these constituents cannot be queried for associated applications since there are no longer any registered products containing these chemicals. From January through September 2013, there were no exceedances of WQTLs for any pesticide that is no longer registered.

Table 42. Pesticide Use Data collected for reported exceedances.

Exceedance Type	Pesticide Use Data Collected
Pesticides	30 days
Metals	90 days
Sediment Toxicity	90 days with 180 days for pyrethroids
Water Column Toxicity	30 days with 180 days for pyrethroids and 90 days for metals

Burnett Lateral is comprised of 1,160 irrigated acres and originates from Oakdale North Main Canal and eventually flows into San Joaquin Main Canal. The primary agriculture consists of almonds and pastureland. This site subwatershed is located north of the ESJWQC boundary and has been removed from the Coalition monitoring plan. Results from samples collected at Burnett Lateral @ 28 Mile Rd from January and February 2013 are included below; exceedances of DO, pH, and *E. coli* and *S. capricornutum* toxicity occurred. Sample details and complete monitoring results for samples collected in January and February 2013 from Burnett Lateral @ 28 Mile Rd are included in Table 12 and Appendices III and IV, respectively. All detections above the WQTL for constituents monitored at Burnett Lateral @ 28 Mile Rd are included in Table 43; exceedance counts from Burnett Lateral @ 28 Mile Rd are not included in the overall exceedance tallies for the Coalition region since the site is not representative of water quality in the Coalition boundary.

Table 43. Burnett Lateral @ 28 Mile Rd exceedances of WQTLs (January through February 2013).
The WQTLs are listed below each constituent.

Station Name	Sample Date	Season	DO	pH	*E. coli*	*S. capricornutum* toxicity	Comments
			<7 mg/L	<6.5 or >8.5	235 MPN/100 mL	% Growth Compared to Control	
Burnett Lateral @ 28 Mile Rd	1/8/2013	Winter1		8.86	>2400		
Burnett Lateral @ 28 Mile Rd	2/12/2013	Winter2, Non-contiguous	6.33		>2400	8	Toxicity lost in samples prior to TIE

All other exceedances that occurred from January through September 2013 are tabulated by zone in Tables 44-51. The tables are accompanied by a discussion of exceedances and an assessment of agricultural pesticide applications that are potential sources of the exceedances. All PUR data relevant to pesticide exceedances and toxicity are discussed based on pounds (lbs) of AI applied upstream of the sampling site. Measures taken to address these exceedances are described in the Actions Taken to Address Water Quality Exceedances section of this report.

Zone 1 (Dry Creek @ Wellsford Rd and Mootz Drain downstream of Langworth Pond)

Dry Creek @ Wellsford Rd was monitored for Core Monitoring constituents and management plan constituents from January through September. Mootz Drain downstream of Langworth Pond was monitored as the Assessment Monitoring location in Zone 1 from April through September 2013. Burnett Lateral @ 28 Mile Rd was monitored as the Assessment Monitoring location in Zone 1 in January and February 2013. The Coalition received the approval letter to remove Burnett Lateral @ 28 Mile Rd from the Coalition's monitoring program the day after March 12, 2013 samples were collected (approval March 8, 2013). Since Burnett Lateral @ 28 Mile Rd is not in the current ESJWQC WDR boundary, the Coalition did not have the March samples analyzed and Assessment Monitoring resumed at Mootz Drain downstream of Langworth Pond in April 2013. All detections above the WQTL for constituents monitored at Burnett Lateral @ 28 Mile Rd are included in Table 43. The discussion of results for Zone 1 includes Dry Creek @ Wellsford Rd (January through September) and Mootz Drain downstream of Langworth Pond results (April through September) only.

Field Parameters and E. coli

In Zone 1, exceedances of the WQTLs for DO (11), pH (1), and *E. coli* (13) occurred from January through September 2013 (Table 44). Exceedances of water quality objectives for field parameters such as DO, SC, and pH are difficult to track and source. Both DO and pH are non-conserved meaning that they can increase or decrease as water moves downstream. The concentrations of these parameters are the result of processes occurring in the water column and in the sediment. These processes can vary diurnally and seasonally. Photosynthesis and decomposition cause daily and season variation in pH. Furthermore, the bioavailability of some constituents (e.g. copper) is affected by changes in pH. Eleven exceedances of the WQTL of less than 7 mg/L for DO occurred ranging from 4.17 to 6.96 mg/L; five were from Dry Creek @ Wellsford Rd and six from Mootz Drain downstream of Langworth Pond. In Zone 1, one exceedance of pH occurred which was slightly less than the WQTL of 6.5 at Mootz Drain downstream of Langworth Pond (6.42; Table 44).

Thirteen exceedances above the WQTL of 235 MPN/100 mL for *E. coli* occurred in Zone 1 and ranged from 261.3 to >2419.6 MPN/100 mL; seven were from Dry Creek @ Wellsford Rd and six from at Mootz Drain downstream of Langworth Pond (Table 44). There are numerous dairies located in both subwatersheds. Elevated levels of *E. coli* in the waterways could be due to 1) storm runoff carrying bacteria from dairy facilities in the subwatershed (past instances of direct dairy discharges have been noted in the Coalition region), 2) manure from dairies is sold to adjacent farms and if improperly composted and stored can contribute to elevated levels of bacteria in the waterway, and 4) naturally occurring *E. coli* bacteria in the waterways could be measured during sampling events. It is possible that the exceedances of the WQTL for *E. coli* during the spring and early irrigation season were associated with fall/spring applications of manure. It is also possible that natural populations of *E. coli* in stream sediments become active with increasing air and water temperatures during the spring.

Chlorpyrifos

Chlorpyrifos is an organophosphate pesticide applied for pest control on a wide variety of crops in California. In a waterbody, chlorpyrifos can both bind to sediment and remain in the water column (K_{oc} of 6070). The concentration at which 50% mortality (LC_{50}) to *C. dubia* occurs is 0.055 µg/L. The WQTL to protect aquatic life is 0.015 µg/L. In Zone 1, a single exceedance of the WQTL for chlorpyrifos occurred in 2013 in samples collected from Dry Creek @ Wellsford Rd in samples collected in September (Table 44).

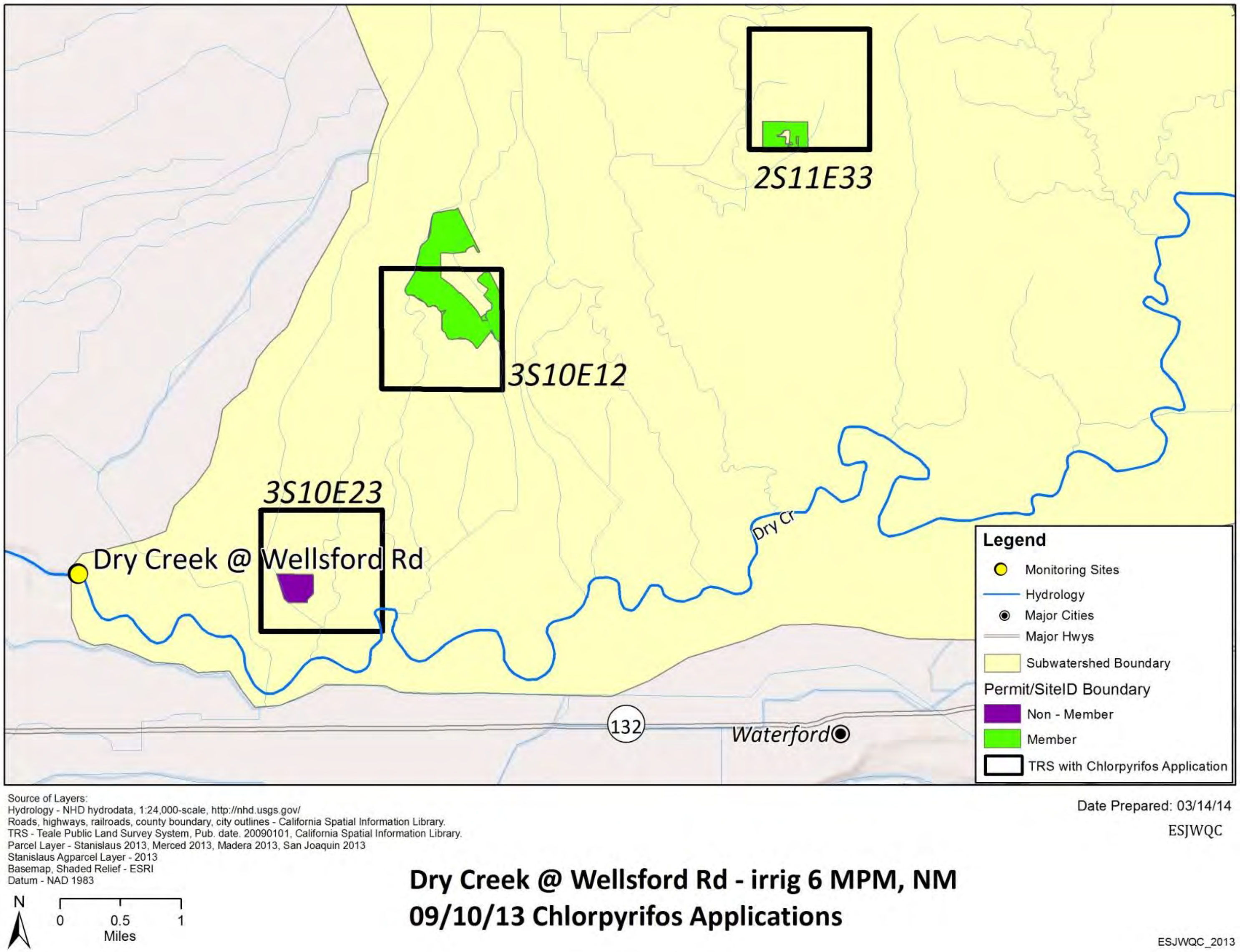
Samples collected for MPM on September 10, 2013 resulted in an exceedance level detection of chlorpyrifos at Dry Creek @ Wellsford Rd (0.14 µg/L; Table 44). The PUR data associated with the September exceedance indicate that from August 24, 2013 through September 10, 2013 a total of 11 applications (products include Drexel, Lorsban and Warhawk) ranging between 0.31 and 80.80 lbs AI were applied. A total of 280 lbs AI across 214 acres of corn and walnut crops were associated with this exceedance. In addition, applications were made by ground and aerial spray methods where it is possible for chlorpyrifos to enter the waterway via drift. According to the PUR data, there were applications of chlorpyrifos associated with the exceedance on the day samples were collected (September 10, 2013; Appendix V). Two of the three parcels (corn and walnut crops) are farmed by Coalition members; however, these parcels are located near the outer boundary of the subwatershed are most likely too far (more than 2 miles) away to have contributed to the exceedance (Figure 10). Parcels next to the waterbody have a higher likelihood of having direct drainage and a higher potential for spray drift to end up in the water column. Chlorpyrifos applications to corn were made to a non-member parcel located within a mile of the creek and along a canal/lateral that drains directly to Dry Creek (Figure 10). During the 2014 WY, Core site monitoring will occur for chlorpyrifos monthly; MPM for chlorpyrifos is scheduled during July through September 2014 (Appendix IX).

Table 44. Zone 1 (Dry Creek @ Wellsford Rd and Mootz Drain downstream of Langworth Pond) exceedances.
The WQTLs are listed below each constituent.

ZONE 1 STATION NAME	MONITORING TYPE	SAMPLE DATE	DO, MG/L	PH, NONE	*E. COLI*, MPN/100 ML	CHLORPYRIFOS, µG/L
Dry Creek @ Wellsford Rd	NM	1/8/2013			>2400	
Dry Creek @ Wellsford Rd	NM	2/20/2013			440	
Dry Creek @ Wellsford Rd	MPM, NM, SED	3/12/2013			920	
Dry Creek @ Wellsford Rd	NM	4/22/2013	6.96			
Dry Creek @ Wellsford Rd	NM	5/14/2013	5.99		307.6	
Dry Creek @ Wellsford Rd	NM	6/11/2013	6.10		344.8	
Dry Creek @ Wellsford Rd	MPM, NM	7/9/2013	5.61		261.3	
Dry Creek @ Wellsford Rd	MPM, NM	8/13/2013			461.1	
Dry Creek @ Wellsford Rd	MPM, NM, SED	9/10/2013	6.93			0.14
Mootz Drain downstream of Langworth Pond	High TSS, NM	4/2/2013	4.32		2000	
Mootz Drain downstream of Langworth Pond	NM	5/14/2013	4.17		>2419.6	
Mootz Drain downstream of Langworth Pond	NM	6/11/2013	4.28		>2419.6	
Mootz Drain downstream of Langworth Pond	High TSS, NM	7/9/2013	4.35	6.42	920.8	
Mootz Drain downstream of Langworth Pond	High TSS, NM	8/13/2013	5.65		>2419.6	
Mootz Drain downstream of Langworth Pond	NM, SED	9/10/2013	3.07		>2419.6	

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

Figure 13. Dry Creek @ Wellsford Rd chlorpyrifos applications associated with September 10, 2013 exceedance.



Zone 2 (Hatch Drain @ Tuolumne Rd, Hilmar Drain @ Central Ave, Lateral 2 ½ near Keyes Rd, Levee Drain @ Carpenter Rd, and Prairie Flower Drain @ Crows Landing Rd)

From January through September, Hatch Drain @ Tuolumne Rd, Hilmar Drain @ Central Ave, and Lateral 2 ½ near Keyes Rd were monitored for management plan constituents. Levee Drain @ Carpenter Rd was monitored for Assessment Monitoring constituents and Prairie Flower Drain @ Crows Landing Rd was monitored for Core Monitoring and management plan constituents (Table 45).

Field Parameters, Total Dissolved Solids, and E. coli

In Zone 2, exceedances of the WQTLs for DO (17), pH (2), SC (31), TDS (20), and *E. coli* (17) occurred (Table 45). Seventeen exceedances of the WQTL for DO occurred in Zone 2 and concentrations ranged from 0.20 to 5.93 mg/L. Seven were from Hatch Drain @ Tuolumne Rd, six from Levee Drain @ Carpenter Rd, and four from Prairie Flower Drain @ Crows Landing Rd. Processes affecting DO in waterways include stream flow, fluctuations in temperature, loss of vegetation around streams, as well as excessive nutrients, and algal growth. The majority of exceedances of the WQTL for DO in Zone 2 occurred during the irrigation season when temperatures were elevated (between 20-25^{o}C/68-77^{o}F) which could have contributed to the lower DO resulting in the exceedances. Both exceedances of the WQTL for pH were above the upper limit of 8.5 and occurred at Lateral 2 ½ near Keyes Rd (April and July).

Elevated levels of TDS and SC are common in Zone 2 subwatersheds because the monitoring sites are located in the western portion of the Coalition region with shallow, salty groundwater. This section of the Valley has inadequate subsurface drainage conditions that result in a negative impact on crop productivity. Management of subsurface drainage is necessary to cope with shallow groundwater conditions which result in the accumulation of salts in the root zone (http://www.water.ca.gov/drainage/index.cfm). Tile drains have been installed to intercept rising groundwater and move the water to the larger drains that are sampled by the Coalition. All TDS detections above the WQTL were associated with exceedance level detections of SC. Exceedance level detections of SC above the 700 µS/cm WQTL occurred at all sites in Zone 2 except Lateral 2 ½ near Keyes Rd and ranged from 901 to 2469 µS/cm (Table 45). Exceedances of the WQTLs for TDS and *E. coli* occurred at both Levee Drain @ Carpenter Rd and Prairie Flower Drain @ Crows Landing Rd.

There are many dairies located in the Levee Drain @ Carpenter Rd and Prairie Flower Drain @ Crows Landing Rd site subwatersheds. These dairies generate solid and liquid manure that is applied to the dairy irrigated cropland, and sometimes adjacent cropland. The presence of *E. coli* and nutrients (ammonia and nitrate) above the WQTLs at both sites may be associated with dairy manure applications and/or possible discharges from dairy lagoons. Seven of ten sampling events in which there were exceedances of the WQTL for *E. coli* at Levee Drain @ Carpenter Rd also coincided with elevated levels of nitrates, three of five events at Prairie Flower Drain @ Crows Landing Rd resulted in exceedances of the WQTL for *E. coli* and also coincided with elevated nitrates. In discussions of exceedances of the WQTL for *E. coli* in the Prairie Flower Drain watershed, Regional Board staff indicated that they have identified illegal discharges from dairies in the area, and have monitored in that watershed in the past in an attempt to detect the dairy discharges immediately after they occur.

Ammonia

Ammonium can enter a waterbody from three sources: 1) direct discharge of agricultural fertilizers (anhydrous ammonia), 2) direct discharge of animal waste, and 3) discharge from wastewater treatment plants. In soils, ammonium from fertilizers is typically converted to nitrite and then to nitrate over a short period of time. Therefore, ammonium from fertilizers would require a direct discharge to surface waters to detect ammonia in the receiving waterbody. The method of anhydrous ammonium application to fields is injection into soil which argues against direct discharge to a receiving waterbody. Ammonium can also be formed in the waterbody through the mineralization of organic nitrogen. Previous exceedances of the WQTL for ammonia and associated water column toxicities in Zone 2 were attributed to discharge from dairies. In Zone 2, there were four exceedances of the WQTL for ammonia ranging from 5.4 to 24 mg/L in samples collected in January, February and July; two were from samples collected at Levee Drain @ Carpenter Rd and the other two were from Prairie Flower Drain @ Crows Landing Rd (Table 45).

In the past, dairy wastewater discharge has been responsible for high ammonia results in the Prairie Flower Drain @ Crows Landing Rd site subwatershed. In addition, dairy discharge and/or applications of manure as fertilizer have contributed to other exceedances of the WQTLs by other constituents within the subwatershed including nitrate and *E. coli*.

Nitrates

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

In Zone 2, 14 exceedances of the WQTL for nitrate occurred from January through September 2013. These exceedances were from samples collected from both Levee Drain @ Carpenter Rd and Prairie

Flower Drain @ Crows Landing Rd. Concentrations of nitrate ranged from 11 to 34 mg/L (Table 45). Two exceedances of the WQTL for nitrate were associated with elevated levels of ammonia; eleven were associated with exceedances of the WQTL for *E. coli* (Table 45).

Toxicity

In Zone 2, water column toxicity occurred three times to *C. dubia*, once to *P. promelas,* and twice to *S. capricornutum*. Two sediment samples were toxic to *H. azteca* during March and September MPM at Hatch Drain @ Tuolumne Rd (Table 45).

Sediment samples collected during MPM on March 12, 2013 and September 10, 2013 from Hatch Drain @ Tuolumne Rd were toxic to *H. azteca* (72% and 85% survival compared to the control, respectively). Since the March survival was less than 80% compared to the control, additional sediment chemistry analysis for pyrethroids and chlorpyrifos was required. Table 41 includes additional chemistry results for the March sample where bifenthrin (25 µg/kg dw), chlorpyrifos (7.2 µg/kg dw), and cyhalothrin lambda (J0.095 µg/kg dw) were detected. Total organic carbon concentration was 39,000 mg/kg for this sample with a median grain size of 0.068 mm (fine sand). The amount of pyrethroids contributing to sediment toxicity can be evaluated using the toxic units (TUs) calculation based on the LC50s for pyrethroids determined to cause acute toxicity and growth impairment to *H. azteca* (Amweg et al., 2005 and Weston et al., 2013). Based on the chemistry results, there were sufficient TUs of pyrethroids (1.29 TUs) in the March sediment sample to account for the Hatch Drain @ Tuolumne Rd sediment toxicity (Table 46). The PUR data associated with the March sediment toxicity indicate that from December 21, 2012 through March 12, 2013 a total of 11 applications (pyraclostrobin, bifenthrin, copper hydroxide, and paraquat) ranging from 0.50 to 258 lbs AI were applied. In the three months prior to the exceedance, 329 lbs AI across 362 acres were associated with this toxicity. Nine of the 11 applications were to almonds and two were to alfalfa (Appendix V). Additional chemistry analysis for pyrethroids and chlorpyrifos was not required for the September sediment toxicity at Hatch Drain @ Tuolumne Rd. The PUR data associated with the September sediment toxicity indicate that from March 26, 2013 through August 14, 2013 a total of 79 applications (pyrethroids and chlorpyrifos) ranging between 0.10 and 120 lbs AI were applied. A total of 876 lbs AI across 3,050 acres of alfalfa, almonds, and corn were associated with this toxicity (Appendix V). Data from 2013 are preliminary and additional PUR data may be received. During the 2014 WY, MPM for sediment toxicity will continue during March and September at Hatch Drain @ Tuolumne Rd (Appendix IX).

Samples collected during Assessment Monitoring on February 12, 2013 from Levee Drain @ Carpenter Rd were toxic to *C. dubia* (50% survival compared to the control), *P. promelas* (0% survival compared to the control), and *S. capricornutum* (0% growth compared to the control; Table 45). ATIE was initiated for all three species. The TIE indicated that ammonia was the cause of the *C. dubia* and *P. promelas* toxicity; the TIE for the *S. capricornutum* was inconclusive because the sample lost all toxicity to the algae before the TIE could be initiated. A detection of ammonia in exceedance of the WQTL (17 mg/L) also occurred during February; the elevated levels of ammonia in the water column are likely the cause of the initial *S. capricornutum* toxicity (Table 45).

It is likely that the high concentration of ammonia was the cause of toxicity to all three species in the February 12 sample collected from Levee Drain @ Carpenter Rd, the Coalition still reviewed associated PUR data and those results are in Appendix V. Rainfall from late January through February 8, 2013 occurred and increased flows in the Coalition region. Rainfall could have increased stormwater runoff transporting applied products to the waterways contributing to the February toxicities.

Samples collected on July 9, 2013 from Levee Drain @ Carpenter Rd were again toxic to *C. dubia* (35% survival compared to the control) resulting in the constituent being added to the site's management plan. Since survival was 50% or less compared to the control, a TIE was required. Results from the TIE indicate ammonia was the cause of the toxicity; an exceedance of the WQTL for ammonia (5.4 mg/L) was detected in the July samples. The PUR data associated with the July *C. dubia* toxicity indicate there were 87 applications of potentially toxic products ranging from 0.10 to 514 lbs AI. A total of 1102 lbs AI were applied from March 16, 2013 through July 9, 2013 across 3589 acres of alfalfa, almond, bean and corn crops (Appendix V). Toxicity to *C. dubia* has been added to the management plan at Levee Drain @ Carpenter Rd following exceedances in 2013; MPM for *C. dubia* toxicity will occur at Levee Drain @ Carpenter Rd when the site becomes high priority in 2016.

Samples collected on January 8, 2013 during MPM from Prairie Flower Drain @ Crows Landing Rd were toxic to *S. capricornutum* (16% growth compared to the control; Table 45). Samples were not collected to test for toxicity to *P. promelas* or *C. dubia*. Normally, when algal growth 50% or less compared to the control, a TIE is initiated to help determine the cause of the toxicity. The TIE for this sample was not conducted since the cause of the toxicity was considered to be due to ammonia (24 mg/L; Table 45). The sample contained high levels of total suspended solids, smelled like manure and was extremely turbid. The toxicity laboratory determined that conducting a TIE for this sample would most likely not be successful in identifying a source other than ammonia because 1) sample dissolved oxygen levels were below the required levels to conduct a TIE and could not be elevated despite vigorous aeration, 2) samples contained very high levels of ammonia as N which would be difficult to fully remove as part of the TIE process, and 3) samples contained high suspended solids and additional extractions would have been required and could have contaminated the TIE process (lab report submitted with Quarterly Data Submittal on September 1, 2013).

It is possible that pesticides were contributing to the algae toxicity in addition to the ammonia. The PUR data associated with the January *S. capricornutum* toxicity indicate there were 38 applications of potentially toxic products ranging from 0.11 to 83 lbs AI (598 lbs AI total) applied from December 13, 2012 through January 4, 2013 across 1629 acres of alfalfa, oats and wheat (Appendix V). The applications were made by aerial and ground methods indicating a potential for spray drift from parcels being treated adjacent to Prairie Flower Drain. Heavy rainfall from January 5 through January 6, 2013 occurred and precipitation was reported at 1.13 inches in the Coalition region (rain gauge located in Modesto). This substantial amount of rainfall could result in stormwater runoff that could have transported sediment and applied chemicals to the waterways contributing to the January toxicity.

Samples collected during MPM on August 13, 2013 from Prairie Flower Drain @ Crows Landing Rd were tested for toxicity to *C. dubia* and detections of dimethoate. The samples were toxic to *C. dubia* and the TIE indicated that metabolically activated non-polar organics, most likely organophosphates, were the cause of the toxicity (0% survival compared to the control, Table 45). There was no dimethoate detected in the samples and therefore extra water collected for the toxicity laboratory was sent for chlorpyrifos analysis. This analysis was done informally to determine if chlorpyrifos was the likely cause of the toxicity. Additional lab analysis confirmed that the August sample from Prairie Flower Drain @ Crows Landing Rd contained 0.25 µg/L of chlorpyrifos. The PUR data associated with the *C. dubia* toxicity in August indicate there were 23 applications of pesticides ranging from 0.14 to 60 lbs AI. A total of 286 lbs AI were applied from May 11, 2013 through August 12, 2013 across 1107 acres of almonds and corn (Appendix V). Three of the 23 applications were chlorpyrifos on July 16 and August 9 totaling 90 lbs AI across 93 acres of corn. During the 2014 WY, MPM for toxicity will continue at Prairie Flower Drain @ Crows Landing Rd and the site will be monitored monthly for all constituents as part of Core site monitoring (Appendix IX).

Table 45. Zone 2 (Hatch Drain @ Tuolumne Rd, Hilmar Drain @ Central Ave, Lateral 2 ½ near Keyes Rd, Levee Drain @ Carpenter Rd, and Prairie Flower Drain @ Crows Landing Rd) exceedances.
The WQTLs are listed below each constituent.

Zone 2 Station Name	Monitoring Type	Sample Date	DO, mg/L	pH, none	SC, µS/cm	TDS, mg/L	*E. coli*, MPN/100 mL	Ammonia, mg/L	Nitrates, mg/L	*C. dubia*, % Control	*H. azteca*, % Control	*P. promelas*, % Control	*S. capricornutum*, % Control
Hatch Drain @ Tuolumne Rd	MPM	1/8/2013			1688								
Hatch Drain @ Tuolumne Rd	MPM	2/12/2013	5.93		1152								
Hatch Drain @ Tuolumne Rd	MPM, SED	3/12/2013	5.86		1194						72		
Hatch Drain @ Tuolumne Rd	MPM	4/9/2013	2.56		1296								
Hatch Drain @ Tuolumne Rd	MPM	5/14/2013	0.96		1283								
Hatch Drain @ Tuolumne Rd	MPM	7/9/2013	0.37		1156								
Hatch Drain @ Tuolumne Rd	MPM	8/13/2013	0.49										
Hatch Drain @ Tuolumne Rd	MPM, SED	9/10/2013	2.05		1028						85		
Hilmar Drain @ Central Ave	MPM	2/12/2013			1532								
Hilmar Drain @ Central Ave	MPM	4/9/2013			901								
Hilmar Drain @ Central Ave	MPM	6/11/2013			1080								
Hilmar Drain @ Central Ave	MPM	7/9/2013			1651								
Hilmar Drain @ Central Ave	MPM, SED	9/10/2013			1175								
Lateral 2 ½ near Keyes Rd	MPM	4/9/2013		8.79									
Lateral 2 ½ near Keyes Rd	MPM	7/9/2013		8.54									
Levee Drain @ Carpenter Rd	NM	1/8/2013			1445	1100	250		25				
Levee Drain @ Carpenter Rd	NM	2/12/2013	3.48		1988	1500	>2400	17	20	50		0	0
Levee Drain @ Carpenter Rd	High TSS, NM	2/20/2013			1704	1300	>2400		34				
Levee Drain @ Carpenter Rd	NM, SED	3/12/2013			1746	1200	>2400		23				
Levee Drain @ Carpenter Rd (FD)	NM, SED	3/12/2013				1200	>2400		21				
Levee Drain @ Carpenter Rd	High TSS, NM	4/2/2013					720						
Levee Drain @ Carpenter Rd (FD)	High TSS, NM	4/2/2013					310						
Levee Drain @ Carpenter Rd	NM	5/14/2013	4.99		1324	780	517.2		11				
Levee Drain @ Carpenter Rd	NM	6/11/2013	4.77		1305	800	>2419.6		11				
Levee Drain @ Carpenter Rd	High TSS, NM	7/9/2013	1.07		1015	640	>2419.6	5.4		35			
Levee Drain @ Carpenter Rd	High TSS, NM	8/13/2013	3.82		1203	720	517.2		12				
Levee Drain @ Carpenter Rd	NM, SED	9/10/2013	3.76		1583	1000	461.1						
Prairie Flower Drain @ Crows Landing Rd	MPM, NM	1/8/2013	0.20		2145	1600	>2400	24					16
Prairie Flower Drain @ Crows Landing Rd	MPM, NM	2/12/2013			2469	1800	390		29				
Prairie Flower Drain @ Crows Landing Rd	NM	2/20/2013			1965	1500	>2400	6	31				
Prairie Flower Drain @ Crows Landing Rd	MPM, NM, SED	3/12/2013			1616	1100			16				
Prairie Flower Drain @ Crows Landing Rd	MPM, NM	4/2/2013			2196	1400	240		28				

Zone 2 Station Name	Monitoring Type	Sample Date	DO, mg/L	pH, none	SC, µS/cm	TDS, mg/L	*E. coli*, MPN/100 mL	Ammonia, mg/L	Nitrates, mg/L	*C. dubia*, % Control	*H. azteca*, % Control	*P. promelas*, % Control	*S. capricornutum*, % Control
Prairie Flower Drain @ Crows Landing Rd	MPM, NM	5/14/2013	1.58		1202	730			17				
Prairie Flower Drain @ Crows Landing Rd	NM	6/11/2013			1841	1200			22				
Prairie Flower Drain @ Crows Landing Rd	MPM, NM	7/9/2013			2177	1400							
Prairie Flower Drain @ Crows Landing Rd	MPM, NM	8/13/2013	1.65		945	600	410.6			0			
Prairie Flower Drain @ Crows Landing Rd	MPM, NM, SED	9/10/2013	4.10		1544	920							

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

Table 46. Hatch Drain @ Tuolumne Rd total TUs of sediment pyrethroids.

Calculated TUs rounded to the nearest 100th and LC50 µg/g converted to µg/kg for calculating the TUs. The Percent TOC is converted to a numerical value for calculation. TU formula: Pesticide Concentration/%TOC/LC50 OC.

Station Name	*H. azteca*, % Control	Sediment Pesticide	Concentration (µg/kg DW)	LC50[1] (µg/kg OC)	Sample TOC (mg/kg DW)	TOC %	Calculated TU
Hatch Drain @ Tuolumne Rd	72	Bifenthrin	25	520	39,000	3.9% (0.039)	1.23
		Cyhalothrin	J0.95	450			0.05
						Total TUs of Pyrethroids	**1.29**

[1]- Normalized to TOC measurements in sediments collected for research (Amweg, et al., 2005 and Weston, et al., 2013).
DW-Dry Weight
OC-Organic Carbon
TOC-Total Organic Carbon

Zone 3 (Highline Canal @ Hwy 99, Highline Canal @ Lombardy Rd, Mustang Creek @ East Ave)

Highline Canal @ Hwy 99 was monitored for Core constituents and management plan constituents; Highline Canal @ Lombardy Rd was monitored for management plan constituents, and Assessment Monitoring occurred at Mustang Creek @ East Ave from January through September 2013. Non-contiguous samples were collected from Highline Canal @ Hwy 99 (February) and Highline Canal @ Lombardy Rd (February). Mustang Creek @ East Ave was dry during every monitoring event except January and February.

Field Parameters and E. coli

In Zone 3, exceedances of the WQTLs for pH (4) and *E. coli* (1) occurred from January through August 2013. Four exceedances of the upper level WQTL for pH (8.5) occurred during sampling at Highline Canal @ Hwy 99. The pH levels ranged from 8.53 to 9.01 and occurred during the March, April, May, and August monitoring events (Table 47).

The January 8, 2013 monitoring event resulted in an exceedance of the WQTL for *E. coli* at Highline Canal @ Hwy 99 (Table 47). This was the only exceedance of the WQTL for *E. coli* in Zone 3 during the 2013 WY. Heavy rainfall from January 5 through January 6, 2013 increased flows in Highline Canal from December 2012 (dry site) to 3.44 cfs in January. The subwatershed has numerous dairies and/or lands managed by dairies located directly upstream of the sample location. These lands receive applications of manure. Any storm runoff carrying bacteria from dairies in the subwatershed could have contributed to the exceedance of the WQTL for *E. coli* during the January monitoring event.

Copper

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

Dissolved copper concentrations are adjusted for the hardness of the water to determine if the bioavailable amount of copper could be toxic to aquatic life. Therefore, the WQTL for dissolved copper potentially is different for each sample. In Zone 3, there were three exceedances of the hardness based WQTL for dissolved copper from January through September 2013; all of the exceedances were from the January 8, 2013 winter monitoring event (Table 47).

Samples collected for MPM during the first winter event on January 8, 2013 at Highline Canal @ Hwy 99 contained 11 µg/L dissolved copper (hardness based WQTL 8.42 µg/L). Upstream samples were collected on the same day at Highline Canal @ Lombardy Rd and also contained the same concentration of dissolved copper of 11 µg/L (hardness based WQTL 9.72 µg/L; Table 47). Water column toxicity was not scheduled to be monitored during January MPM at Highline Canal @ Hwy 99; however, samples were collected for *C. dubia* MPM at Highline Canal @ Lombardy Rd and did not result in toxicity. The PUR data associated with the January exceedance at Highline Canal @ Hwy 99 indicate there were 49 applications of copper ranging from 16 to 2730 lbs AI (18,679 total lbs AI) across 3413 acres of almonds, apricots, and peaches from November 27, 2012 through January 8, 2013 (Appendix V). The PUR data associated with the January exceedance at Highline Canal @ Lombardy Rd indicate there were 33 applications of copper ranging from 34 to 2730 lbs AI (16,744 total lbs AI) across 3255 acres of almonds, apricots, and peaches from November 27, 2012 through January 8, 2013 (Appendix V). Applications at both site subwatersheds were made by aerial and ground methods indicating a potential for spray drift from parcels being treated adjacent to Highline Canal. Highline Canal is a TID supply canal and therefore does not generally accept drainage from nearby parcels; however, some growers may return irrigation tailwater or storm water to the canal. Heavy rainfall from January 5 through January 6, 2013 occurred and precipitation was reported at 1.13 inches (Modesto) in the Coalition region. This substantial amount of rainfall could result in storm runoff that might have transported copper to the waterways contributing to the exceedances that occurred during January 2013. During the 2014 WY, MPM for copper will continue at Highline Canal @ Hwy 99 (January through April) and at Highline Canal @ Lombardy Rd (January through March, May, and August; Appendix IX).

Samples collected during Assessment Monitoring on January 8, 2013 from Mustang Creek @ East Ave contained 11 µg/L dissolved copper (hardness based WQTL 8.96 µg/L, Table 47). Samples collected for water column toxicity were not toxic. The PUR data associated with the January exceedance indicate there were four applications of copper ranging from 327 to 619 lbs AI (1739 total lbs AI) across 363 acres of almonds from November 5, 2012 through December 30, 2012 (Appendix V). Heavy rainfall from January 5 through January 6, 2013 occurred and precipitation was reported at 1.13 inches (Modesto) in the Coalition region. This substantial amount of rainfall could result in storm runoff that might have transported copper to the waterways contributing to the exceedances that occurred during January 2013. Rainfall increased flows in Mustang Creek enough for samples to be collected in January and February; Mustang Creek was dry for all other monitoring events (March through September). During the 2014 WY, MPM for copper will continue Mustang Creek @ East Ave in October through December 2013 and January through April 2014 (Appendix IX).

Toxicity

Non-contiguous samples collected during the second winter monitoring event on February 12, 2013 during MPM at Highline Canal @ Hwy 99 were toxic to *S. capricornutum* (12% growth compared to the control, Table 47). Algae growth was less than 50% compared to the control and therefore a TIE was initiated. However, the TIE baseline test did not detect toxicity, indicating the sample lost all detectable toxicity prior to initiation of the TIE. There were no exceedances of WQTLs of any metals that coincided with this toxicity. The PUR data associated with the February toxicity indicate there were 600 applications of pesticides ranging between 0.0096 and 17,552 lbs AI (188,806 total lbs AI) across 40,504 acres of alfalfa, almonds, grape, kiwi, peaches, pistachios, walnuts, and wheat from November 27, 2012 through February 12, 2013 (Appendix V). Applications were made by aerial and ground methods indicating a potential for spray drift of potentially toxic chemicals from parcels being treated adjacent to Highline Canal. Rainfall events from late January through February 8, 2013 could have increased flows in the Coalition region and storm runoff transporting applied products to the waterways may have contributing to the February toxicity. The water sampled was non-contiguous and therefore not connected to any upstream or downstream water. There was flow at this location in January and the water in the canal may have dried up after the late January storms. During the 2014 WY, MPM for *S. capricornutum* toxicity will continue at Highline Canal @ Hwy 99 (February through May) and Highline Canal @ Lombardy Rd (February through May, August through September; Appendix IX).

Table 47. Zone 3 (Highline Canal @ Hwy 99, Highline Canal @ Lombardy Rd and Mustang Creek @ East Ave) exceedances.

The WQTLs are listed below each constituent.

Zone 3 Station Name	Monitoring Type	Sample Date	pH, none	*E. coli*, MPN/ 100 mL	Copper Dissolved, µg/L (hardness based trigger limit)	*S. capricornutum*, % Control
Highline Canal @ Hwy 99	MPM, NM	1/8/2013		1400	11 (8.42)	
Highline Canal @ Hwy 99	MPM, NM, Non-contiguous	2/12/2013				12
Highline Canal @ Hwy 99	MPM, NM, SED	3/12/2013	8.95			
Highline Canal @ Hwy 99	MPM, NM	4/2/2013	9.01			
Highline Canal @ Hwy 99	MPM, NM	5/14/2013	8.85			
Highline Canal @ Hwy 99	MPM, NM	8/13/2013	8.53			
Highline Canal @ Lombardy Rd	MPM	1/8/2013			11 (9.72)	
Mustang Creek @ East Ave	NM	1/8/2013			11 (8.96)	

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

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

Assessment Monitoring occurred at Unnamed Drain @ Hwy 140 and Core Monitoring occurred at Merced River @ Santa Fe within Zone 4 and MPM occurred at six sites within this zone (Bear Creek @ Kibby Rd, Black Rascal Creek @ Yosemite Rd, Howard Lateral @ Hwy 140, Livingston Drain @ Robin Ave, McCoy Lateral @ Hwy 140, and Merced River @ Santa Fe). Two sites in Zone 4 were dry during monitoring: Livingston Drain @ Robin Ave (February and September) and Unnamed Drain @ Hwy 140 (February). Samples were collected from Livingston Drain @ Robin Ave when it was non-contiguous during April and August.

Field Parameters, Total Dissolved Solids, and E. coli

In Zone 4, exceedances of the WQTLs for DO (10), pH (12), TDS (1), and *E. coli* (4) occurred from January through September 2013 (Table 48). Ten exceedances of the WQTL for DO occurred ranging from 1.68 to 6.82 mg/L; four were from Black Rascal Creek @ Yosemite Rd, four from Merced River @ Santa Fe, and two from Unnamed Drain @ Hwy 140. Eleven detections of pH were slightly greater than the WQTL of 8.5 ranging from 8.54 to 9.44 (two from non-contiguous samples collected from Livingston Drain @ Robin Ave). One detection of pH was slightly less than the lower WQTL of 6.5 at Black Rascal Creek @ Yosemite Rd (pH 6.26, Table 48).

One instance of elevated TDS occurred in Zone 4 at Merced River @ Santa Fe during the March 12, 2013 sampling event (Table 48). The high TDS detection did not coincide with high SC.

Four exceedances of the WQTL for *E. coli* occurred in Zone 4 from January through June, three from Unnamed Drain @ Hwy 140, and one from Merced River @ Santa Fe, ranging from 250 to 1700 MPN/100 mL (Table 48). Three of the four exceedances of the WQTL for *E. coli* occurred during months when substantial rainfall was received, two exceedances occurred in January (Merced River @ Santa Fe and Unnamed Drain @ Hwy 140) and one in April (Unnamed Drain @ Hwy 140). Heavy rainfall from January 5 through January 6, 2013 occurred and precipitation was reported at 1.13 inches (Modesto) in the Coalition region. This substantial amount of rainfall increased flows in Merced River @ Santa Fe (from 187 to 334 cfs). This was the first time Unnamed Drain @ Hwy 140 (1.38 cfs) was monitored. Both Merced River @ Santa Fe and Unnamed Drain @ Hwy 140 site subwatersheds have dairies and/or lands managed by dairies located directly upstream and adjacent to the sample locations that receive manure. Any storm runoff carrying bacteria from dairies in the subwatersheds could have contributed to the exceedance of the WQTL for *E. coli* that occurred during the January and April monitoring events.

Copper

In Zone 4, five exceedances of the hardness based WQTL for dissolved copper occurred from January through September 2013; two were from McCoy Lateral @ Hwy 140, one from Unnamed Drain @ Hwy 140, and two from Howard Lateral @ Hwy 140 (environmental and field duplicate samples, Table 48). Toxicity was not associated with any of the elevated concentrations of dissolved copper.

Samples collected for MPM during the first winter event on January 8, 2013 from McCoy Lateral @ Hwy 140 contained 3.2 µg/L (dissolved copper hardness based WQTL 1.87 µg/L, Table 48). Samples were not collected for toxicity during this MPM event. The PUR data associated with the January exceedance indicate there were 10 applications of copper ranging from 14 to 207 lbs AI (1100 lbs AI) across 184 acres of almonds and peaches from December 6, 2012 through January 8, 2013 (Appendix V). The applications were made by ground methods indicating a potential for spray drift from parcels being treated adjacent to the site. Heavy rainfall from January 5 through January 6, 2013 occurred and precipitation was reported at 1.13 inches (Modesto) in the Coalition region. This substantial amount of rainfall could result in storm runoff that might have transported copper to the waterways contributing to the exceedances that occurred during January 2013. Samples collected for MPM during September 10, 2013 for copper contained 2.1 µg/L dissolved copper (hardness based WQTL 1.87 µg/L, Table 48). Samples were not collected for toxicity during this MPM event. The PUR data associated with the September exceedance indicate there were six applications of copper ranging from 57 to 246 lbs AI. A total of 839 lbs AI across 315 acres of grapes were applied from August 1, 2013 through August 3, 2013 (Appendix V). The applications were made by ground methods indicating a potential for spray drift from parcels being treated adjacent to the waterbody. Management Plan Monitoring will occur at McCoy Lateral @ Hwy 140 when the site becomes high priority in 2016.

Samples collected during the first irrigation event on April 9, 2013 from Howard Lateral @ Hwy 140 contained 7.2 µg/L (dissolved copper hardness based WQTL 4.95 µg/L, environmental sample) and 7.2 µg/L (dissolved copper hardness based WQTL 5.62 µg/L, field duplicate). Monitoring for MPM for toxicity was not scheduled during this event. The PUR data associated with the April exceedance indicate there were 58 applications of copper ranging from 19 to 906 lbs AI. A total of 8,410 lbs AI across 1,691 acres of almonds, grapes, peaches, and walnuts were applied from January 16, 2013 through April 9, 2013 (Appendix V). The applications were made by ground methods indicating a potential for spray drift from parcels being treated adjacent to the site. Heavy rainfall from March 6 through April 8, 2013 was recorded and increased flows in the Coalition region. Storm runoff could have transported copper to the waterway contributing to the exceedances of WQTLs of copper that occurred during the April event. Management Plan Monitoring will occur again at Howard Lateral @ Hwy 140 when the site becomes high priority in 2015.

Table 48. Zone 4 (Bear Creek @ Kibby Rd, Black Rascal Creek @ Yosemite Rd, Howard Lateral @ Hwy 140, Livingston Drain @ Robin Ave, McCoy Lateral @ Hwy 140, Merced River @ Santa Fe, and Unnamed Drain @ Hwy 140) exceedances.

The WQTLs are listed below each constituent.

Zone 4 Station Name	Monitoring Type	Sample Date	DO, mg/L	pH, none	TDS, mg/L	*E. coli*, MPN/100 mL	Copper Dissolved, µg/L (hardness based trigger limit)
Black Rascal Creek @ Yosemite Rd	MPM	4/9/2013	6.40				
Black Rascal Creek @ Yosemite Rd	MPM	5/14/2013	1.68				
Black Rascal Creek @ Yosemite Rd	MPM	7/9/2013	2.40	6.26			
Black Rascal Creek @ Yosemite Rd	MPM	8/13/2013	1.92				
Howard Lateral @ Hwy 140	MPM	4/9/2013					7.2 (4.95)
Howard Lateral @ Hwy 140 (FD)	MPM	4/9/2013					7.2 (5.62)
Livingston Drain @ Robin Ave	MPM	1/8/2013		8.85			
Livingston Drain @ Robin Ave	MPM, Non-contiguous	4/9/2013		8.89			
Livingston Drain @ Robin Ave	MPM	5/21/2013		8.54			
Livingston Drain @ Robin Ave	MPM	6/11/2013		8.85			
Livingston Drain @ Robin Ave	MPM	7/9/2013		9.44			
Livingston Drain @ Robin Ave	MPM, Non-contiguous	8/13/2013		8.81			
McCoy Lateral @ Hwy 140	MPM	1/8/2013		8.89			3.2 (1.87)
McCoy Lateral @ Hwy 140	MPM	6/11/2013		9.29			
McCoy Lateral @ Hwy 140	MPM	9/10/2013		9.25			2.1 (1.87)
Merced River @ Santa Fe	MPM, NM	1/8/2013				1700	
Merced River @ Santa Fe	MPM, NM	3/12/2013			1100		
Merced River @ Santa Fe	NM	5/14/2013	6.41				
Merced River @ Santa Fe	MPM, NM	7/9/2013	6.05				
Merced River @ Santa Fe	MPM, NM	8/13/2013	6.20				
Merced River @ Santa Fe	NM	9/10/2013	6.82				
Unnamed Drain @ Hwy 140	NM	1/8/2013		8.94		250	4.7 (4.27)
Unnamed Drain @ Hwy 140	NM, SED	3/12/2013		9.06			
Unnamed Drain @ Hwy 140	High TSS, NM	4/2/2013				440	
Unnamed Drain @ Hwy 140	NM	5/14/2013	5.79				
Unnamed Drain @ Hwy 140	NM	6/11/2013				261.3	
Unnamed Drain @ Hwy 140	High TSS, NM	7/9/2013	5.70				

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

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

During 2013, Assessment Monitoring occurred at Miles Creek @ Reilly Rd, Core Monitoring took place at Duck Slough @ Gurr Rd and MPM occurred at both of these sites plus Deadman Creek @ Gurr Rd and Deadman Creek @ Hwy 59. In Zone 5, sites were dry during four monitoring events, Deadman Creek @ Hwy 59 (August, September) and Duck Slough @ Gurr Rd (February).

Field Parameters, Total Dissolved Solids, and E. coli

In Zone 5, exceedances of the WQTLs for DO (5), pH (4), SC (2), TDS (3), and *E. coli* (11) occurred from January through September 2013 (Table 49). Five exceedances of the WQTL of 7 mg/L for DO occurred; three at Duck Slough @ Gurr Rd, one at Deadman Creek @ Gurr Rd, and one at Miles Creek @ Reilly Rd ranging from 4.29 to 6.62 mg/L. All locations in Zone 5 (with the exception of Deadman Creek @ Hwy 59) had at least one measurement of pH above the upper pH WQTL ranging from 8.55 to 8.73. Two exceedances of the 700 µS/cm WQTL for SC occurred at Duck Slough @ Gurr Rd (Table 49). Three exceedances of the WQTLs for TDS occurred in Zone 5 and ranged from 460 to 1700 mg/L; two were from samples collected at Duck Slough @ Gurr Rd and one from Miles Creek @ Reilly Rd. The exceedance of the WQTL for TDS at Duck Slough @ Gurr Rd in July coincided with an exceedance of SC.

A total of 11 exceedances of the WQTL of 235 MPN/100 mL for *E. coli* occurred; four were from samples collected from Duck Slough @ Gurr Rd, and seven from Miles Creek @ Reilly Rd (two from field duplicates) ranging from 325.5 to >2419.6 MPN/100 mL. Both site subwatersheds contain numerous dairies and/or lands managed by dairies located upstream of the sample locations that receive applications of manure. Any runoff carrying bacteria from dairies in the subwatershed could have contributed to the exceedances of the WQTL for *E. coli*.

Diazinon

Diazinon is a non-systemic organophosphate insecticide, highly soluble in water, and is used to control a variety of soil and foliage insects and pests on orchards such as almonds, peaches, prunes, apples, and nectarines. Trademarked names include Gowan and Diazinon 50W. The water quality objective is 0.10 µg/L.

The field duplicate sample collected during the first storm event from Miles Creek @ Reilly Rd on February 20, 2013 resulted in an exceedance of the 0.10 µg/L WQTL for diazinon (0.18 µg/L; Table 49). This is the first exceedance of the WQTL for diazinon to occur in the Miles Creek @ Reilly Rd site subwatershed. The detection of diazinon was in the field duplicate sample only; the environmental sample result was non-detect. The Coalition called the laboratory to inquire about the diazinon results and the laboratory confirmed the detection in the field duplicated. No toxicity was associated with this sample. A substantial amount of rainfall occurred in the ESJWQC region from late January through February 19, 2013. The storm trigger limit was reached during a storm from February 18 through February 19, 2013 where 0.62 inches (Madera) of rainfall occurred in the Coalition region. This amount of rainfall may have mobilized some of the applied diazinon into Miles Creek. The PUR data associated with the February exceedance indicate there were no applications of diazinon for the 30 days prior to the detection. The last application of diazinon in the subwatershed was on December 12, 2012 (prunes). Diazinon applications have declined in the Miles Creek @ Reilly Rd site subwatershed since 2004 (13,850 lbs across 374 acres of squash and prunes) compared to 2012 (23 lbs across 9 acres of prunes). There are two explanations for the diazinon detection: 1) the December 12, 2012 diazinon application was persistent and ran off into the waterway and/or 2) pesticide use was not reported. All PUR data from 2013 are preliminary and additional PUR data may be received (Appendix V). During the 2014 WY, MPM will occur at Miles Creek @ Reilly Rd for diazinon during January and February.

Malathion

Malathion is an organophosphate insecticide applied to over 100 crops in the United States including alfalfa, rice, cotton, sorghum, wheat, and walnuts. It is also used for structural pest control (mosquito and fruit fly eradication in home settings). Malathion is easily mixed with water and can be found in both urban and agricultural runoff. Malathion is a prohibited discharge pesticide except under the Rice Coalition Management Plan and any detection is considered to be an exceedance. Malathion is known to be toxic to *C. dubia* (LC_{50} = 3.35 µg/L). In Zone 5, one detection of malathion occurred from January through September 2013 at Miles Creek @ Reilly Rd (Table 49).

Samples collected during the second storm event from Miles Creek @ Reilly Rd on April 2, 2013 resulted in a detection of malathion. Since there is a prohibition of discharge for malathion, the estimated concentration of 0.078 µg/L was an exceedance (Table 49). This is the first exceedance of the WQTL for malathion at Miles Creek @ Reilly Rd. From late February through April 1, 2013, the ESJWQC region received a substantial amount of rainfall which may have resulted in stormwater runoff within this subwatershed. The storm trigger limit was reached the day before samples were collected when 0.63 inches (Madera) of rainfall occurred in the Coalition region which may have mobilized some of the applied malathion into Miles Creek. The PUR data associated with the April exceedance indicate there were 11 applications of malathion associated with this exceedance ranging from 17 to 232 lbs AI (1099 lbs AI) across 913 acres of alfalfa and citrus from March 9, 2013 through April 2, 2013 (Appendix V). Applications were made by aerial and ground methods indicating a potential for spray drift from parcels being treated adjacent to Miles Creek.

Toxicity

In Zone 5, water column toxicity occurred three times, once to *C. dubia*, and twice to *S. capricornutum* (including field duplicate toxicity). Sediment was toxic to *H. azteca* during September MPM at Duck Slough @ Gurr Rd (Table 49).

Samples collected March 12, 2013 during MPM from Duck Slough @ Gurr Rd were toxic to *C. dubia* (0% survival compared to the control, Table 49). Since the percent control was 50% or less, a TIE was initiated. The TIE indicated that non-polar organics/organophosphates were the cause of the *C. dubia* toxicity. Samples were not collected for any other constituent during March MPM. The PUR data associated with the *C. dubia* toxicity in March indicate there were 183 applications of pesticides ranging from 0.27 to 1574 lbs AI (9509 lbs AI total) applied from October 4, 2012 through March 12, 2013 across

9308 acres of almonds, alfalfa, barley, cherry, corn, nectarine, peach, pistachio, and prunes (Appendix V). Applications were by aerial and ground methods indicating a potential for spray drift from treated parcels.

Sediment samples collected during MPM on September 10, 2013 from Duck Slough @ Gurr Rd were toxic to *H. azteca* (0% survival compared to the control, Table 49). Since the September sediment toxicity survival was less than 80% compared to the control, additional sediment chemistry analysis for pyrethroids and chlorpyrifos was required. Table 41 includes additional chemistry results detected in the September sample: bifenthrin (1.9 µg/kg dw), chlorpyrifos (3.3 µg/kg dw), cyfluthrin (J0.14 µg/kg), cyhalothrin lambda (46 µg/kg dw), esfenvalerate/fenvalerate (3.5 µg/kg), fenpropathrin (0.36 µg/kg), and permethrin (0.40 µg/kg). The results indicate enough TUs of pyrethroids (9.87 TUs) in the September sediment sample to account for complete mortality in the sediment sample (Table 50). The TOC concentration was 11,000 mg/kg for this sample with a median grain size of 0.010 mm (silt). The PUR data associated with the September *H. azteca* sediment toxicity indicate there were 567 applications of pesticides ranging from 0.001 to 1230 lbs AI. A total of 8911 lbs AI were applied from April 6, 2013 through September 10, 2013 across 28,391 acres of almonds, alfalfa, chicory, cherry, corn, cotton, peach, pistachio, tomato, walnut, and wheat (Appendix V). During the 2014 WY, *C. dubia* and *H. azteca* toxicity MPM will continue (Appendix IX).

Samples collected during the second winter monitoring event on February 12, 2013 during NM at Miles Creek @ Reilly Rd were toxic to *S. capricornutum* in both the environmental and field duplicate samples (50% and 0% growth compared to the control, respectively, Table 49). Algae growth was 50% or less compared to the control and therefore a TIE was initiated. The TIE baseline test did not detect toxicity, indicating the sample lost all detectable toxicity prior to initiation. There were no exceedance level detections of metals to coincide with this toxicity. The PUR data associated with the *S. capricornutum* toxicity in February indicate there were 155 applications of pesticides ranging between 0.056 and 9035 lbs AI (23,004 total lbs AI) across 10,320 acres of alfalfa, almonds, corn, cotton, oat, peaches, prune, tomato, and wheat from December 12, 2012 through February 12, 2013 (Appendix V). Applications were made by aerial and ground methods indicating a potential for spray drift from parcels being treated adjacent to the creek. Heavy rainfall from late January through February 8, 2013 occurred and increased flows in the Coalition region. Rainfall could have increased storm runoff transporting applied products to the waterways contributing to the February toxicity. During the 2014 WY, MPM for *S. capricornutum* toxicity will occur at Miles Creek @ Reilly Rd during February, April, and June (Appendix IX).

Table 49. Zone 5 (Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59, Duck Slough @ Gurr Rd and Miles Creek @ Reilly Rd) exceedances.
The WQTLs are listed below each constituent.

Zone 5 Station Name	Monitoring Type	Sample Date	DO, mg/L	pH, none	SC, µS/cm	TDS, mg/L	Ammonia, mg/L	*E. coli*, MPN/100 mL	Diazinon, µg/L	Malathion, µg/L	*C. dubia*, % Control	*H. azteca*, % Control	*S. capricornutum*, % Control
Deadman Creek @ Gurr Rd	MPM	2/12/2013		8.56									
Deadman Creek @ Gurr Rd	MPM	3/12/2013		8.55									
Deadman Creek @ Gurr Rd	MPM	8/13/2013	6.46										
Duck Slough @ Gurr Rd	MPM, NM	1/8/2013						>2400					
Duck Slough @ Gurr Rd	MPM	3/12/2013				460	1.7				0		
Duck Slough @ Gurr Rd	MPM, NM	4/2/2013			1823								
Duck Slough @ Gurr Rd	MPM, NM	5/14/2013		8.73									
Duck Slough @ Gurr Rd	MPM, NM	7/9/2013	6.62		871	530		325.5					
Duck Slough @ Gurr Rd	MPM, NM	8/13/2013	6.56					>2419.6					
Duck Slough @ Gurr Rd	MPM, NM, SED	9/10/2013	4.29					410.6				0	
Miles Creek @ Reilly Rd	MPM, NM	1/8/2013						>2400					
Miles Creek @ Reilly Rd (FD)	MPM, NM	1/8/2013						>2400					
Miles Creek @ Reilly Rd	MPM, NM	2/12/2013											50
Miles Creek @ Reilly Rd (FD)	MPM, NM	2/12/2013											0
Miles Creek @ Reilly Rd	High TSS, MPM, NM	2/20/2013		8.63				440					
Miles Creek @ Reilly Rd (FD)	High TSS, MPM, NM	2/20/2013						730	0.18				
Miles Creek @ Reilly Rd	NM, SED	3/12/2013						>2400					
Miles Creek @ Reilly Rd	High TSS, MPM, NM	4/2/2013								0.078J			
Miles Creek @ Reilly Rd	MPM, NM	5/14/2013						387.3					
Miles Creek @ Reilly Rd	High TSS, MPM, NM	7/9/2013				1700		325.5					
Miles Creek @ Reilly Rd	MPM, NM, SED	9/10/2013	4.97										

J-Estimated value
MPM- Management Plan Monitoring
NM-Normal Monitoring
SED-Sediment Monitoring

Table 50. Duck Slough @ Gurr Rd total TUs of sediment pyrethroids for September 2013 MPM.

Calculated TUs rounded to the nearest 100th and LC50 µg/g converted to µg/kg for calculating the TUs. The Percent TOC is converted to a numerical value for calculation. TU formula: Pesticide Concentration/%TOC/LC50 OC.

Station Name	*H. azteca*, % Control	Sediment Pesticide	Concentration (µg/kg DW)	LC50[1] (µg/kg OC)	Sample TOC (mg/kg DW)	TOC %	Calculated TU
Duck Slough @ Gurr Rd	0	Bifenthrin	1.9	520	11,000	1.1% (0.011)	0.33
		Cyfluthrin	J0.14	1080			0.01
		Cyhalothrin	46	450			9.29
		Esfenvalerate	3.5	1540			0.21
		Fenpropathrin	0.36	1600			0.02
		Permethrin	0.40	10830			0.003
						Total TUs of Pyrethroids	**9.87**

[1]- Normalized to TOC measurements in sediments collected for research (Amweg, et al., 2005 and Weston, et al., 2013).

DW-Dry Weight

OC-Organic Carbon

TOC-Total Organic Carbon

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

From January through September, Assessment Monitoring occurred at Dry Creek @ Rd 18, Core Monitoring occurred at Cottonwood Creek @ Rd 20, and MPM occurred at both of these sites plus Berenda Slough along Ave 18 ½. Dry sites included Berenda Slough along Ave 18 ½ (January, February, April through June, August through September), Cottonwood Creek @ Rd 20 (February through June, August), and Dry Creek @ Rd 18 (February 20). Samples were collected from the following subwatersheds when the waterways were non-contiguous: Berenda Slough along Ave 18 ½ (July), Cottonwood Creek @ Rd 20 (September), and Dry Creek @ Rd 18 (February).

Field Parameters and E. coli

In Zone 6, exceedances of the WQTLs for DO (5), pH (2), and *E. coli* (5) occurred from January through September 2013 (Table 51). Five exceedances of the WQTL for DO occurred in Zone 6 ranging from 3.66 to 6.54 mg/L; one was from Berenda Slough along Ave 18 ½ (non-contiguous), two from Cottonwood Creek @ Rd 20 (one non-contiguous), and two from Dry Creek @ Rd 18 (Table 51). Two detections of pH were slightly greater than the WQTL of pH 8.5 at Dry Creek @ Rd 18; including an exceedance of 9.09 (February; Table 51).

A total of five exceedances of the WQTL of 235 MPN/100 mL for *E. coli* occurred; three were from Cottonwood Creek @ Rd 20 and two from Dry Creek @ Rd 18, ranging from 307.6 to 1986.3 MPN/100 mL (Table 51). Several upstream dairies and/or lands managed by dairies receive manure in both site subwatersheds. Any runoff carrying bacteria from dairies in the subwatershed could have contributed to the exceedances of the WQTL for *E. coli*.

Copper

In Zone 6, there were 10 exceedances of the hardness based dissolved copper trigger limit (including four from field duplicates) from January through September 2013 (Table 51). One exceedance occurred in samples collected from Cottonwood Creek @ Rd 20, and all others were from samples collected from Dry Creek @ Rd 18 (Table 51). Toxicity was not associated with any of the exceedances. Exceedance level concentrations of dissolved copper are common in samples collected from sites in Zone 6 (Berenda Slough along Ave 18 ½, Cottonwood Creek @ Rd 20, and Dry Creek @ Rd 18). It is possible that geologic conditions and the transport of copper from closed mines upstream could be contributing to the elevated copper concentrations found in water column samples in Zone 6.

Samples collected during the first winter monitoring event on January 8, 2013 from Cottonwood Creek @ Rd 20 contained 13 µg/L dissolved copper (hardness based WQTL 6.84 µg/L) and Dry Creek @ Rd 18 contained 11 µg/L dissolved copper (hardness based WQTL 5.79 µg/L, Table 51). Toxicity was not associated with either exceedance. The PUR data associated with the January exceedance at Cottonwood Creek @ Rd indicate there were 31 applications of copper across 1222 acres of grapes, olive, citrus, and almonds ranging from 5.29 to 720 lbs AI (3471 lbs AI total) from October 21, 2012 through January 8, 2013 (Appendix V).

The PUR data associated with the January exceedance at Dry Creek @ Rd 18 indicate there were 14 ground applications of copper across 876 acres of olive and citrus ranging from 79 to 486 lbs AI (3181 lbs AI total) from October 30, 2012 through December 20, 2012. Heavy rainfall from January 5 through January 6, 2013 occurred and precipitation was reported at 0.87 inches (Madera) in Zone 6 of the Coalition region. This substantial amount of rainfall could result in storm runoff that might have transported copper from urban and agricultural land uses to the waterways contributing to the exceedances. During the 2014 WY, MPM for copper will continue at Cottonwood Creek @ Rd 20 (monthly) and Dry Creek @ Rd 18 (October through December 2013, January through February, and April through September 2014; Appendix IX).

Exceedances of the hardness based WQTL for copper at Dry Creek @ Rd 18 continued through the irrigation season and were associated with applications to grapes and pistachios (Table 51, Appendix V). The PUR data associated with the June exceedance indicate there were 102 applications across 6466 acres. A total of 2679 lbs AI were applied to grapes and pistachios ranging between 2.15 and 233 lbs AI per acre from March 20, 2013 through April 22, 2013 (Appendix V).

The PUR data associated with the July exceedance at Dry Creek @ Rd 18 indicate there were nine applications across 241 acres. A total of 178 lbs AI was applied to grapes and pistachios ranging between 2.15 and 85 lbs AI per acre from April 18, 2013 through June 17, 2013 (Appendix V).

The PUR data associated with the August exceedance at Dry Creek @ Rd 18 indicate there was only one application across 43 acres. A total of 48 lbs AI were applied to grapes on June 17, 2013 (Appendix V). Data from 2013 are preliminary and additional PUR data may be received. The PUR data associated with the September exceedance indicate there was a single application of 48 lbs AI across 43 acres of wine grapes on June 17, 2013 (Appendix V). Data from 2013 are preliminary and additional PUR data may be received.

Diuron

Diuron is a broad-spectrum herbicide used for weed control on agriculture, highway rights of way, railroads, industrial sites, and by homeowners. Diuron inhibits photosynthesis and also affects seed germination. Diuron has a half-life (in soil) of about 90 days and is very mobile. Diuron inhibits growth of *S. capricornutum* with an Effective Concentration of 50% of the measured endpoint (EC_{50}) of 2.4 µg/L. The WQTL for diuron is 2 µg/L. A single exceedance of the 2 µg/L WQTL occurred in Zone 6 at Dry Creek @ Rd 18 during MPM (Table 51).

The MPM samples collected on January 8, 2013 for diuron from Dry Creek @ Rd 18 contained an exceedance of the diuron WQTL (5.2 µg/L, Table 51). The PUR data associated with the January exceedance indicate there were 13 applications between 64 and 1184 lbs AI (4384 lbs AI total) of diuron (Karmex DF) across 1370 acres of oranges and tangerines from November 14, 2012 through December 8, 2012 (Appendix V). The Coalition queried the PUR database an additional month for diuron applications that could be associated with this exceedance. There were no applications within four weeks of the exceedance. The December 8, 2012 was the closest application to the date of the exceedance. No toxicity was associated with this exceedance. Heavy rainfall from January 5 through January 6, 2013 occurred in the Coalition region and precipitation was reported at 0.87 inches (Madera). This substantial amount of rainfall could result in storm runoff that might have transported diuron applied in the fields to the waterways, contributing to the exceedance during January 2013. During the 2014 WY, MPM for diuron will continue at Dry Creek @ Rd 18 during January through March (Appendix IX).

Toxicity

In Zone 6, water column toxicity occurred once to *S. capricornutum*. One sediment sample was toxic to *H. azteca* during September MPM at Dry Creek @ Rd 18 (Table 51).

Non-contiguous samples collected during the second winter monitoring event on February 12, 2013 for MPM at Dry Creek @ Rd 18 were toxic to *S. capricornutum* (4% growth compared to the control, Table 51). Algae growth was less than 50% compared to the control and therefore a TIE was initiated. However, the TIE baseline test did not detect toxicity, indicating the sample lost all detectable toxicity prior to initiation of the TIE. There were no exceedance level detections of any metals to coincide with this toxicity. The PUR data associated with the *S. capricornutum* toxicity in February indicate there were 410 applications of pesticides ranging between 0.0562 and 6787 lbs AI (106,818 total lbs AI) across 18,917 acres of almonds, cherry, fig, grape, oat, olive, orange, pistachios, tangerine, walnut, and wheat from November 20, 2012 through February 12, 2013 (Appendix V). Applications were made by aerial and ground methods indicating a potential for spray drift from parcels being treated adjacent to the creek. Heavy rainfall from late January through February 8, 2013 occurred and increased flows in the Coalition region. Rainfall could have increased storm runoff transporting applied products to the waterways contributing to the February toxicity. During the 2014 WY, MPM for toxicity to *S. capricornutum* is scheduled to occur at Dry Creek @ Rd 18 during January, February, and May (Appendix IX).

Sediment samples collected during MPM on September 10, 2013 from Dry Creek @ Rd 18 were toxic to *H. azteca* (92% survival compared to the control, Table 51). Since survival was not 80% or less compared to the control, additional sediment chemistry analysis for pyrethroids and chlorpyrifos was not required. Although survival was considered statistically different from the control, the survival was above 90% compared to the control and therefore the difference between the sample and the control survival was not considered ecologically relevant. In fact, if the sample was used as the control it would have passed the acceptability criteria for controls. The PUR data associated with the September *H. azteca* sediment toxicity indicate there were 907 applications across 44,004 acres. A total of 5445 lbs AI were applied to crops of almonds, beans, cherries, grapes, pistachios, and tangerines ranging between 0.0001 and 160 lbs AI per acre from April 1, 2013 through September 10, 2013 (Appendix V). During the 2014 WY, MPM for *H. azteca* toxicity will continue at Dry Creek @ Rd 18 during March and September (Appendix IX).

Table 51. Zone 6 (Berenda Slough along Ave 18 1/2, Cottonwood Creek @ Rd 20, and Dry Creek @ Rd 18) exceedances.

The WQTLs are listed below each constituent.

Zone 6 Station Name	Monitoring Type	Sample Date	DO, mg/L	pH, none	*E. coli*, mg/L	Copper Dissolved, µg/L (hardness based trigger limit)	Diuron, µg/L	*S. capricornutum*, % Control	*H. azteca*, % Control
Berenda Slough along Ave 18 1/2	MPM, Non-contiguous	7/9/2013	3.66						
Cottonwood Creek @ Rd 20	MPM, NM	1/8/2013			690	13 (6.84)			
Cottonwood Creek @ Rd 20	MPM, NM	7/9/2013	5.28		1203.3				
Cottonwood Creek @ Rd 20	MPM, NM, Non-contiguous	9/10/2013	5.34		1986.3				
Dry Creek @ Rd 18	MPM, NM	1/8/2013			1700	11 (5.79)	5.2		
Dry Creek @ Rd 18	MPM, NM, Non-contiguous	2/12/2013		9.09				4	
Dry Creek @ Rd 18	MPM, NM	4/2/2013		8.57					
Dry Creek @ Rd 18	MPM, NM	6/11/2013			307.6	6.8 (1.77)			
Dry Creek @ Rd 18 (FD)	MPM, NM	6/11/2013				6.5 (1.77)			
Dry Creek @ Rd 18	High TSS, MPM, NM	7/9/2013				3.7 (1.6)			
Dry Creek @ Rd 18 (FD)	High TSS, MPM, NM	7/9/2013				3.8 (1.6)			
Dry Creek @ Rd 18	High TSS, MPM, NM	8/13/2013	6.54			3.0 (1.67)			
Dry Creek @ Rd 18 (FD)	High TSS, MPM, NM	8/13/2013				2.9 (1.25)			
Dry Creek @ Rd 18	MPM, NM, SED	9/10/2013	5.17			2.3 (1.67)			92
Dry Creek @ Rd 18 (FD)	MPM, NM, SED	9/10/2013				2.4 (0.81)			

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

ACTIONS TAKEN TO ADDRESS EXCEEDANCES OF WATER QUALITY OBJECTIVES

The Coalition conducts monitoring of ambient surface waters to characterize discharges from irrigated agriculture. Monitoring results are analyzed to identify constituents, agricultural lands, crops, and/or specific pesticides that need to be managed to reduce or eliminate discharges from agriculture to surface water. Actions taken to determine the potential sources of chemicals causing exceedances may include the following: 1) the use of PUR data to identify relevant applications that occurred upstream of the sample site and within a specified time period prior to the sampling event, 2) an analysis of monitoring data and toxicity results to better understand the potential sources and toxicity of detected constituents, and 3) special studies where they are appropriate and cost effective.

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

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

SUMMARY OF OUTREACH, EDUCATION, AND COLLABORATION ACTIVITIES

Outreach and education activities are an important component of the Coalition monitoring program. The Coalition continues to provide information to growers through mailings, grower meetings and workshops, meetings conducted by the County Agricultural Commissioner and by personal contact. During grower meetings held from January through September 2013, the Coalition presented information to members concerning the Coalition's progress in achieving water quality goals, site subwatershed specific monitoring results and management practices proven to be effective to reduce the discharge of pesticides to waterbodies. All outreach and education activities are documented in Table 52.

Coalition representatives conducted or participated in three meetings from January through September 2013 to discuss topics including WDR requirements, irrigation and storm water quality, sediment runoff, management practices, and groundwater. Coalition representatives held 21 individual meetings with targeted growers in the fifth priority site subwatersheds as part of individual focused outreach and education from January through September 2013.

From January through September 2013 the Coalition sent out 18 mailings and/or emails. Of those mailings, all addressed irrigation/storm water quality and sediment runoff, 11 were related to meetings and sign-up clinics for new member enrollment as part of the new WDR regulations, two were quarterly monitoring results notifications, one reviewed management practices, and four were member update newsletters.

The Coalition sends several mailings and emails to inform growers of monitoring results, Coalition actions, and related news. The Coalition also notifies growers of exceedances that occurred during recent monitoring via Quarterly Monitoring Report Mailings. Quarterly Monitoring Report Mailings were mailed and emailed to hundreds of members on February 1, and July 1, 2013. The Coalition keeps members informed of Coalition news via the ESJWQC Newsletter. The February edition was mailed to 2,295 members and emailed to an additional 1,052 members on February 13, 2013. The May edition was mailed to 4,966 members and emailed to an additional 349 members on May 7, 2013. The June edition was mailed to 3,456 members and emailed to 162 members on July 1, 2013. The October edition was mailed to 2,649 members and emailed to 1,743 members on October 25, 2013.

The Coalition took several actions during 2013 to update members on the status of the new WDR requirements as well as inform non-members and new applicants of the Coalition's role in helping members comply with the new Order. The Coalition hosted three meetings on April 23, April 24, and April 25, 2013 in Madera, Merced, and Stanislaus Counties; respectively, to inform members of the WDR. The Coalition notified members via meeting announcement mailings sent on March 11, 2013 and included non-members that had been contacted by the Regional Water Board. Over 350 growers attended the three meetings. Coalition representatives and Regional Board staff discussed the new regulations and impact on growers, including the new requirements for groundwater monitoring and nitrogen management.

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

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 2013, the Coalition collaborated with each of these entities as needed to follow-up on exceedances, provide management practice information and prepare strategies for compliance under the WDR.

Table 52. ESJWQC education and outreach activities January through September 2013.

Outreach categories include Management Practice Tracking, Best Management Practice (BMP) Outreach and Education, Grower Notification, Collaborations, and Special Studies.

Area	Date	Category	Details	Who
Modesto Area	1/17/2013	Grower Notification	Modesto Bee Newspaper Article: *East San Joaquin farmer coalition on water quality urges membership.* Reviewed background and purpose of ILRP and ESJWQC. Urged non-members to enroll in the Coalition by the end of the sign-up period, May 13, 2013.	Parry Klassen
Merced Area	1/22/2013	Grower Notification	Merced Sun Star Newspaper Article: *Fees will rise unless Merced County farmers are part of a group, Water Board warns* RWB describes Coalition approach and benefits of Coalition. Cost of coalition membership and nitrogen reporting requirements.	Parry Klassen
Madera Area	1/31/2013	Grower Notification	Madera Farm Bureau Newsletter Article: *NEW Water Quality Regulations Require You To Act Now!* New Regulations and sign-up deadlines described.	Anja Raudabaugh
Coalition Region	2/1/2013	Grower Notification	Quarterly Monitoring Report Mailing: mailed to 262 and emailed to 255 members.	Parry Klassen
Coalition Region	2/13/2013	Grower Notification	February Member Update Newsletter: mailed to 2,295 and emailed to 1,052 members.	Parry Klassen
Coalition Region	2/15/2013	Grower Notification	Notice of Confirmation form including summary of grower requirements under the new WDR: mailed to all members upon renewal/enrollment.	Parry Klassen and Wayne Zipser
Fresno Area	2/17/2013	Grower Notification	Fresno Bee Newspaper Article: *Time to regulate underground water quality on farms.* Enforcement for new program information. Coalition information.	Parry Klassen
Coalition Region	3/11/2013	Grower Notification	New ILRP Informational Meetings and Sign Up Clinics Announcement: emailed to 1,165 members and mailed to 3,478 growers on the Regional Board's list of non-responders.	Parry Klassen and Wayne Zipser
Madera County	4/23/2013	BMP Outreach and Education	New ILRP Informational Meetings and Sign Up Clinics: 92 members attended. Meeting topics included new grower reporting requirements and groundwater monitoring programs. Regional Board Staff and Coalition representatives assisted new members in the sign up process.	Parry Klassen and Wayne Zipser
Merced County	4/24/2013	BMP Outreach and Education	New ILRP Informational Meetings and Sign Up Clinics: 138 members attended. Meeting topics included new grower reporting requirements and groundwater monitoring programs. Regional Board Staff and Coalition representatives assisted new members in the sign up process.	Parry Klassen and Wayne Zipser
Stanislaus County	4/25/2013	BMP Outreach and Education	New ILRP Informational Meetings and Sign Up Clinics: 123 members attended. Meeting topics included new grower reporting requirements and groundwater monitoring programs. Regional Board Staff and Coalition representatives assisted new members in the sign up process.	Parry Klassen and Wayne Zipser
Coalition Region	5/2/2013	Grower Notification	Letter warning landowners of May 13, 2013 deadline who have not enrolled with Coalition.	Parry Klassen and Wayne Zipser
Merced County	5/2/2013	Grower Notification	Merced Sun Star Newspaper Article: *San Joaquin Valley farmers lag as nitrogen program signup deadline loom.* Enforcement for new program information. Coalition information.	Parry Klassen
Coalition Region	5/7/2013	Grower Notification	May 2013 Member Update Newsletter: mailed to 4,966 and emailed to 349 members.	Parry Klassen
Coalition Region	6/3/2013	Grower Notification	Violation of Membership Agreement Mailing: sent to 2 growers who had yet to respond to initial Follow-up Contact Mailings (sent 12/13/2012). The letter informed the grower they would be in violation of their membership agreement if a response was not received by June 15, 2013.	Parry Klassen and Wayne Zipser
Coalition Region	7/1/2013	Grower Notification	June Member Update Newsletter including Nitrate Lab Information Sheet and Water Quality Monitoring Results January through March 2013 Document: mailed to 3,456 members.	Parry Klassen
Coalition Region	7/1/2013	Grower Notification	June Member Update Newsletter including Nitrate Lab Information link to website: emailed to 497 members.	Parry Klassen
Coalition Region	7/1/2013	Grower Notification	January through March 2013 Monitoring Results Emailed to 162 members.	Parry Klassen

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

Performance Goals and Schedules

The Coalition Strategic Plan is outlined in the original Management Plan (approved on November 25, 2008) in Table 18, Pages 77-79, and is designed to meet the following management goal:
"To continue to monitor and analyze the water and sediment quality of ESJWQC site subwatersheds and to facilitate the implementation of management practices by providing outreach and support to growers in order to effectively enhance water quality in the Coalition region."

The Coalition developed High Priority Site Subwatershed Performance Goals (hereafter referred to as Performance Goals) for its first six sets of high priority site subwatersheds: first priority (2008-2010), second priority (2010- 2012), third priority (2011-2013), fourth priority (2012-2014), fifth priority (2013-2015), and sixth priority (2014-2016). Performance Goals are submitted for approval each time a new set of subwatersheds rotates into high priority status. Performance Goals are built on the following actions essential to the Coalition's Management Plan strategy:

1. Determine number/type of management practices currently in place, based on Assessor Parcel Number (APN) associated with baseline survey responses
2. Grower Group Contacts / Individual Contacts to recommend additional practices
3. Implementation of new management practices by growers
4. Determine number/type of new management practices implemented
5. Evaluate effectiveness of new management practices using MPM data

Performance Goals were approved for each group of priority site subwatersheds by the Regional Board as amendments to the ESJWQC Management Plan on June 16, 2009 (first priority), June 8, 2010 (second priority), November 17, 2010 (third priority), November 14, 2011 (fourth priority), November 1, 2012 (fifth priority), and January 28, 2013 (sixth priority). Performance Goals 1-5 are complete and each goal was discussed in detail for the first priority (MPUR 2012, Pages 30-34), second priority (MPUR 2012, Pages 35-37), and third priority (MPUR 2013, Pages 34-36). The following sections describe Coalition actions to meet the approved Performance Goals and the status of each of the Performance Goals along with associated measures/outputs for the fourth, fifth and sixth high priority site subwatersheds. A site subwatershed analysis has been included in Appendix I and II for all high and low priority subwatersheds.

Fourth Priority Subwatersheds (2012 – 2014)

The fourth high priority subwatersheds include Black Rascal Creek @ Yosemite Rd, Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59 and Hilmar Drain @ Central Ave. Performance Goals for the fourth priority subwatersheds are similar to those formulated for the second priority subwatershed Performance Goals and were approved on November 14, 2011 (Table 53).

Performance Goal 1: Individually contact members on adjacent properties to waterways where discharges have been identified to fill out surveys.

The Coalition contacted 100% of targeted growers in the fourth priority subwatersheds by March 30, 2012 as scheduled (Table 53). The Coalition initiated contacts with the fourth priority subwatershed target members through conference calls to discuss member responsibilities, management plan strategies, and schedule visits with growers in 2012. Following the conference calls, the Coalition sent mailings to target growers in the fourth priority subwatersheds.

A total of 14 growers were contacted representing 4410 acres or 27% of the acreage with the potential for direct drainage in the fourth priority subwatersheds (Table 53). Of the four subwatersheds, Hilmar Drain @ Central Ave had the highest percentage of acreage with direct drainage represented by contacted growers (39%), followed by Deadman Creek @ Hwy 59 (30%), Black Rascal Creek @ Yosemite Rd (18%) and Deadman Creek @ Gurr Rd (9%).

Performance Goal 2: Establish current practices (beyond established baseline practices) on adjacent properties to waterways or where discharges are identified.

The Coalition met and documented current management practices for 100% of growers within the fourth priority subwatersheds (Table 53). As detailed in the Management Practices section of this report, surveys document management practices including irrigation management, storm water runoff, erosion and sediment management, pest management, and dormant sprays (when applicable). One hundred percent of the management practices documented on the surveys filled out by growers were recorded in an Access database. A complete review of current and recommended management practices is included in the Fourth Priority Subwatersheds Summary of Management Practices section of the 2013 MPUR.

Performance Goal 3: Encourage growers to implement additional management practices based on water quality results.

The Coalition conducts follow-up contacts with growers who received recommendations for additional management practices between February 1 and April 30 to record newly implemented practices (Table 53). One hundred percent of the management practices recommended to growers to implement in 2012 and 2013 were recorded in an Access database (Table 53). A summary of recommended and implemented management practices is included in the Fourth Priority Subwatersheds Summary of Management Practices section of this report.

Performance Goal 4: Evaluate effectiveness of the new management practices implemented during years that site is high priority.

The Coalition conducted Year 2 MPM in the fourth high priority sites during 2013 to assess changes in water quality. The Evaluation of Management Practice Effectiveness section includes the water quality results from 2013 monitoring in the fourth priority subwatersheds. The Coalition will also conduct MPM in the fourth priority subwatersheds in the 2014 WY.

Performance Goal 5: Consult with the CVRWQCB at least once to discuss Management Plan activities and consider if changes need to be made in the Management Plan strategy for high priority waterbodies.

The Coalition met with the Regional Board staff quarterly to discuss Coalition activities in 2013 (Table 56). The Coalition continues to discuss Management Plan activities with the Regional Board staff during meetings. Quarterly meeting dates with the Regional Board staff are to be determined and will occur as they are scheduled during 2014.

All Coalition activities that occurred from January through September 2013 related to outreach (including mailings, grower meetings, individual meetings, etc.), in the first, second, third, fourth, fifth, and sixth priority subwatersheds are listed in Table 52.

Table 53. High Priority Performance Goals status for 2012 - 2014 high priority subwatersheds (Black Rascal Creek @ Yosemite Rd, Deadman Creek @ Gurr Rd, Deadman Creek @ Hwy 59 and Hilmar Drain @ Central Ave), approved on November 14, 2011.

Performance Goal/Performance Measure	Outputs	Who	Status as of April 1, 2013[1]			
			Black Rascal Creek @ Yosemite Rd	Deadman Creek @ Gurr Rd	Deadman Creek @ Hwy 59	Hilmar Drain @ Central Ave
Performance Goal 1: Individually contact members on adjacent properties to waterways where discharges have been identified to fill out surveys.						
Performance Measure 1.1 – 100% of identified growers contacted to fill out surveys.	Report ratio of individual initial contacts made versus total growers identified to contact.	Parry Klassen	**1 of 1** (100%) March 30, 2012	**2 of 2** (100%) March 30, 2012	**8 of 8** (100%) March 30, 2012	**3 of 3** (100%) March 30, 2012
Performance Measure 1.2 – Contact owners/operators in the site subwatershed with direct drainage membership acreage.	Report ratio of acreage represented by individual contacts versus subwatershed acreage determined to have direct drainage.	MLJ-LLC	**301 of 1,639** (18%)	**240 of 2,582** (9%)	**3,414 of 11,223**[2] (30%)	**455 of 1,160** (39%)
Performance Goal 2: Establish current practices (beyond established baseline practices) on adjacent properties to waterways or where discharges are identified.						
Performance Measure 2.1 – Document current management practices of 100% of identified growers during individual contacts and encourage the adoption of new practices not currently implemented.	Record in an Access database current management practices used that may reduce agricultural impact on water quality.	Parry Klassen	**1 of 1** (100%)	**2 of 2** (100%)	**8 of 8** (100%)	**3 of 3** (100%)
Performance Measure 2.2 – Document management practices that the identified grower were encouraged to implement.	Summary of management practice evaluations on a site subwatershed level in the Management Plan update.	MLJ-LLC	**Complete**	**Complete**	**Complete**	**Complete**
Performance Goal 3: Encourage growers to implement additional management practices based on water quality results.						
Performance Measure 3.1 –Document (e.g. assess number/type) new management practices implemented by identified growers.	Record implemented management practices in an Access database.	Parry Klassen/ MLJ-LLC	**Complete**	**Complete**	**Complete**	**Complete**
	Summary of management practices implemented as a result of individual contacts.	MLJ-LLC	**Complete**	**Complete**	**Complete**	**Complete**
Performance Goal 4: Evaluate effectiveness of the new management practices implemented during years that site is high priority.						
Performance Measure 4.1 Update – Assess water quality results from Coalition monitoring location within the priority site subwatershed.	Summary of water quality data from Management Plan Monitoring.	MLJ-LLC	**Complete** May 1, 2014	**Complete** May 1, 2014	**Complete** May 1, 2014	**Complete** May 1, 2014
Performance Goal 5: Consult with CVRWQCB at least once to discuss Management Plan activities and consider if changes need to be made in Management Plan strategy for High Priority waterbodies.						

[1]Overall irrigated direct drainage acreage for fourth priority subwatersheds comes from 2011 parcel data layers.
[2]Overall irrigated direct drainage acreage for Deadman Creek @ Hwy 59 represents the Merced County portion of the subwatershed only.
*Contacts with growers to determine implemented practices will occur between February 1 and April 30; all information obtained by February 28th will be entered into an Access database and included in the following May 1 Annual Report; any additional information will be reported on during the quarterly meetings.

Fifth Priority Subwatersheds (2013 – 2015)

The fifth priority subwatersheds include Hatch Drain @ Tuolumne Rd, Highline Canal @ Lombardy Rd, Merced River @ Santa Fe, and Miles Creek @ Reilly Rd. Performance Goals for the fifth priority subwatersheds are similar to those formulated for the second priority subwatershed Performance Goals and were approved on November 1, 2012 (Table 54).

Performance Goal 1: Individually contact members on adjacent properties to waterways where discharges have been identified to fill out surveys.

The Coalition contacted 100% of targeted growers in the fifth priority subwatersheds (Table 54). As outlined in the Fifth Priority Subwatersheds Summary of Management Practices section of this report, the contact letters informed growers of member responsibilities, management plan strategies, and initiated the scheduling of individual meetings. Growers were encouraged to initiate the scheduling of individual contact meetings with the Coalition. All initial contacts were complete before March 30, 2013 (Table 54).

A total of 42 growers were contacted representing 9,947 acres or 33% of the acreage with the potential for direct drainage in the fifth priority subwatersheds (Table 54). Of the four subwatersheds, Highline Canal @ Lombardy Rd had the highest percentage of acreage with direct drainage represented by contacted growers (46%), followed by Merced River @ Santa Fe (34%), Hatch Drain @ Tuolumne Rd (13%), and Miles Creek @ Reilly Rd (18%).

Performance Goal 2: Establish current practices (beyond established baseline practices) on adjacent properties to waterways or where discharges are identified.

The Coalition met and documented current management practices for 100% of growers within the fifth priority subwatersheds (Table 54). One hundred percent of the management practices documented on the member surveys during the meetings were recorded in an Access database.

A summary of currently implemented and recommended management practices is included in the Fifth Priority Subwatersheds Summary of Management Practices section of this report.

Performance Goal 3: Encourage growers to implement additional management practices based on water quality results.

After the Coalition meets individually with targeted growers and discusses local water quality concerns, sufficient time is allowed for growers to implement new management practices before follow-up. The Coalition is in the process of following-up with 21 growers in the fifth priority subwatersheds to document newly implemented management practices. Results from follow ups will be reported in the Annual Report submitted on May 1, 2015 (Table 54). If the Coalition is aware of structural management practices that will take longer than two years to implement, this information will be included in the annual updates and may result in an extension to the final evaluation of management practice effectiveness.

Performance Goal 4: Evaluate effectiveness of the new management practices implemented during years that site is high priority.

The Coalition is conducting MPM in the fifth high priority sites during 2013 through 2015 to assess changes in water quality. It is anticipated that water quality will improve as new management practices are implemented.

Performance Goal 5: Consult with the CVRWQCB at least once to discuss Management Plan activities and consider if changes need to be made in the Management Plan strategy for high priority waterbodies.

The Coalition met with the Regional Board staff quarterly to discuss Coalition activities in 2013 (Table 56). Quarterly meetings with the Regional Board staff are to be determined and will occur as they are scheduled during 2014.

All Coalition activities that occurred from January through September 2013 related to outreach (including mailings, grower meetings, individual meetings, etc.), in the first, second, third, fourth, fifth, and sixth priority subwatersheds are listed in Table 52.

Table 54. High Priority Performance Goals status for 2013 - 2015 high priority site subwatersheds (Hatch Drain @ Tuolumne Rd, Highline Canal @ Lombardy Rd, Merced River @ Santa Fe and Miles Creek @ Reilly Rd) approved on November 1, 2012 (revised and approved on June 3, 2013 and September 23, 2013).

PERFORMANCE GOAL/PERFORMANCE MEASURE	OUTPUTS	WHO	STATUS AS OF MAY 1, 2014[1]			
			HATCH DRAIN @ TUOLUMNE RD	HIGHLINE CANAL @ LOMBARDY RD	MERCED RIVER @ SANTA FE	MILES CREEK @ REILLY RD
Performance Goal 1: Individually contact members on adjacent properties to waterways where discharges have been identified to fill out surveys.						
Performance Measure 1.1 – 100% of identified growers contacted to fill out surveys.	Report ratio of individual initial contacts made versus total growers identified to contact.	Parry Klassen	**1 of 1** (100%) March 30, 2013	**20 of 20** (100%) March 30, 2013	**12 of 12** (100%) March 30, 2013	**9 of 9** (100%) March 30, 2013
Performance Measure 1.2 – Contact owners/operators in the site subwatershed with direct drainage membership acreage.	Report ratio of acreage represented by individual contacts versus subwatershed acreage determined to have direct drainage.	MLJ-LLC	**36 of 275** (13%)	**4226 of 9228** (46%)	**4152 of 12,172** (34%)	**1533 of 8603** (18%)
Performance Goal 2: Establish current practices (beyond established baseline practices) on adjacent properties to waterways or where discharges are identified.						
Performance Measure 2.1 – Document current management practices of 100% of identified growers during individual contacts and encourage the adoption of new practices not currently implemented.	Record in an Access database current management practices used that may reduce agricultural impact on water quality.	Parry Klassen	**1 of 1** (100%)	**20 of 20** (100%)	**12 of 12** (100%)	**9 of 9** (100%)
Performance Measure 2.2 – Document management practices that the identified grower were encouraged to implement.	Summary of management practice evaluations on a site subwatershed level in the Management Plan update.	MLJ-LLC	**Complete**	**Complete**	**Complete**	**Complete**
Performance Goal 3: Encourage growers to implement additional management practices based on water quality results.						
Performance Measure 3.1 –Document (e.g. assess number/type) new management practices implemented by identified growers.	Record implemented management practices from returned surveys in an Access database.	Parry Klassen/ MLJ-LLC	**In Progress:** Feb. 28, 2014*	**In Progress:** Feb. 28, 2014*	**In Progress:** Feb. 28, 2014*	**In Progress:** Feb. 28, 2014*
	Summary of management practices implemented as a result of individual contacts.	MLJ-LLC	**In Progress:** May 1, 2014/2015	**In Progress:** May 1, 2014/2015	**In Progress:** May 1, 2014/2015	**In Progress:** May 1, 2014/2015
Performance Goal 4: Evaluate effectiveness of the new management practices implemented during years that site is high priority.						
Performance Measure 4.1 Update – Assess water quality results from Coalition monitoring location within the priority site subwatershed.	Summary of water quality data from Management Plan Monitoring.	MLJ-LLC	**In Progress:** May 1, 2014/2015	**In Progress:** May 1, 2014/2015	**In Progress:** May 1, 2014/2015	**In Progress:** May 1, 2014/2015
Performance Goal 5: Consult with CVRWQCB at least once to discuss Management Plan activities and consider if changes need to be made in Management Plan strategy for High Priority waterbodies.						

[1]Overall irrigated direct drainage acreage for fifth priority subwatersheds comes from 2010/2011 parcel data layers.

*Contacts with growers to determine implemented practices will occur between February 1 and April 30; all information obtained by February 28th will be entered into an Access database and included in the following May 1 Annual Report; any additional information will be reported on during the quarterly meetings.

Sixth Priority Subwatersheds (2015 – 2017)

The sixth priority subwatersheds include Ash Slough @ Ave 21, Mustang Creek @ East Ave and Westport Drain @ Vivian Rd. Performance Goals for the sixth priority subwatersheds are similar to those formulated for the second priority subwatershed Performance Goals and were approved on November 1, 2012 (Table 55).

Performance Goal 1: Individually contact members on adjacent properties to waterways where discharges have been identified to fill out surveys.

On November 4, 2013, targeted growers in Ash Slough @ Ave 21 (18 growers), Mustang Creek @ East Ave (6 growers), and Westport Drain @ Vivian Rd (5 growers) were mailed initial contact letters (Table 55). The contact letters informed growers of member responsibilities, management plan strategies, and initiated the scheduling of individual meetings. All initial contacts were complete before March 30, 2014 (Table 55).

Performance Goal 2: Establish current practices (beyond established baseline practices) on adjacent properties to waterways or where discharges are identified.

The Coalition is in the process of meeting with sixth priority growers to complete surveys that record their implemented and recommended management practices (Table 55). To address the water quality impairments in the sixth priority subwatersheds, the Coalition is concerned with management practices that apply to irrigation water management, storm water runoff, erosion and sediment management, pest management, and dormant sprays (when applicable). Upon completion, all surveys will be entered into an Access database. The Coalition is in the process of entering information about management practices into the database for growers in the sixth priority subwatersheds.

Performance Goal 3: Encourage growers to implement additional management practices based on water quality results.

After the Coalition meets individually with targeted growers and discusses local water quality concerns, sufficient time is allowed for growers to implement new management practices before follow-up. The Coalition will follow-up with growers in the sixth priority subwatersheds between February 1 and April 30, 2015 to document newly implemented management practices and will report its findings in future MPURs submitted annually on May 1 (Table 55). If the Coalition is aware of structural management practices that will take longer than two years to implement, this information will be included in the annual updates and may result in an extension to the final evaluation of management practice effectiveness.

Performance Goal 4: Evaluate effectiveness of the new management practices implemented during years that site is high priority.

The Coalition is conducting MPM in the sixth high priority sites from 2015 through 2017 to assess changes in water quality. It is anticipated that water quality will improve as new management practices are implemented.

Performance Goal 5: Consult with the CVRWQCB at least once to discuss Management Plan activities and consider if changes need to be made in the Management Plan strategy for high priority waterbodies.

The Coalition met with the Regional Board staff quarterly to discuss Coalition activities in 2013. Quarterly meetings with the Regional Board staff are to be determined and will occur as they are scheduled during 2014.

All Coalition activities that occurred from January through September 2013 related to outreach (including mailings, grower meetings, individual meetings, etc.), in the first, second, third, fourth, fifth, and sixth priority subwatersheds are listed in Table 52.

Table 55. High Priority Performance Goals status for 2014–2016 high priority site subwatersheds (Ash Slough @ Ave 21, Mustang Creek @ East Ave, and Westport Drain @ Vivian Rd), approved on February 13, 2014.

Performance Goal/Performance Measure	Outputs	Who	Completion Deadlines		
			Ash Slough @ Ave 21	Mustang Creek @ East Ave	Westport Drain @ Vivian Rd
Performance Goal 1: Individually contact members on adjacent properties to waterways where discharges have been identified to fill out surveys.					
Performance Measure 1.1 – 100% of identified growers contacted to fill out surveys.	Report ratio of individual initial contacts made versus total growers identified to contact.	Parry Klassen	**18 of 18** (100%) March 30, 2014	**6 of 6** (100%) March 30, 2014	**5 of 5** (100%) March 30, 2014
Performance Measure 1.2 – Contact owners/operators in the site subwatershed with direct drainage membership acreage.	Report ratio of acreage represented by individual contacts versus subwatershed acreage determined to have direct drainage.	MLJ-LLC	**5970 of 10,730** (56%) Quarterly	**3472 of 4218** (82%) Quarterly	**553 of 1359** (41%) Quarterly
Performance Goal 2: Establish current practices (beyond established baseline practices) on adjacent properties to waterways or where discharges are identified.					
Performance Measure 2.1 – Document current management practices of 100% of identified growers during individual contacts and encourage the adoption of new practices not currently implemented.	Record in an Access database current management practices used that may reduce agricultural impact on water quality.	Parry Klassen	**In Progress:** September 30, 2014	**In Progress:** September 30, 2014	**In Progress:** September 30, 2014
Performance Measure 2.2 – Document management practices that the identified grower were encouraged to implement.	Summary of management practice evaluations on a site subwatershed level in the Management Plan Update Report.	MLJ-LLC	**In Progress:** October 31, 2014	**In Progress:** October 31, 2014	**In Progress:** October 31, 2014
Performance Goal 3: Encourage growers to implement additional management practices based on water quality results.					
Performance Measure 3.1 – Document (e.g. assess number/type) new management practices implemented by identified growers.	Record implemented management practices from returned surveys in an Access database.	Parry Klassen/ MLJ-LLC	**In Progress:** Feb. 28, 2015*	**In Progress:** Feb. 28, 2015*	**In Progress:** Feb. 28, 2015*
	Summary of management practices implemented as a result of individual contacts.	MLJ-LLC	**In Progress:** May 1, 2015/2016	**In Progress:** May 1, 2015/2016	**In Progress:** May 1, 2015/2016
Performance Goal 4: Evaluate effectiveness of the new management practices implemented during years that site is high priority.					
Performance Measure 4.1 – Assess water quality results from Coalition monitoring location within the priority site subwatershed.	Summary of water quality data from Management Plan Monitoring.	MLJ-LLC	**In Progress:** May 1, 2015/2016	**In Progress:** May 1, 2015/2016	**In Progress:** May 1, 2015/2016
Performance Goal 5: Consult with CVRWQCB at least once to discuss Management Plan activities and consider if changes need to be made in Management Plan strategy for High Priority waterbodies.					

*Contacts with growers to determine implemented practices will occur between February 1 and April 30; all information obtained by February 28th will be entered into an Access database and included in the following May 1 Management Plan Update Report; any additional information will be reported on during the quarterly meetings.

Table 56. Regional Board Quarterly Meeting dates in 2013 and 2014.

QUARTERLY MEETINGS	MEETING DATE
First Quarter Meeting	March 12, 2013
Second Quarter Meeting	June 11, 2013
Third Quarter Meeting	October 1, 2013
Fourth Quarterly Meeting	January 22, 2014

MANAGEMENT PRACTICES

The Coalition obtains information about management practices used by growers through conducting focused outreach in high priority site subwatersheds. The Coalition provides growers with information through mailings and meetings concerning various management practices that are designed to 1) reduce storm water runoff, 2) manage discharge of irrigation tailwater, 3) manage spray applications, and 4) avoid mobilization of sediment and that could transport to receiving waters. The purpose of focused outreach is to review local water quality concerns, document practices implemented prior to focused outreach (current practices), recommend additional practices if applicable (recommended practices), and document practices implemented following focused outreach (newly implemented practices). The Coalition identified eight general classifications of management practices that would be effective at reducing the impacts of agricultural discharges on water quality including:

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

Non-structural practices (practices 1-4 above) can be implemented sooner than structural practices (practices 5-8) as structural practices may require that the grower secure additional resources for implementation. The Coalition makes efforts to inform growers of resources available for management practice implementation (discussed in past AMRs in the Actions Taken to Address Exceedances sections and summarized briefly in the Evaluation of Management Practice Effectiveness). In addition, the Coalition was mindful of the implementation timeline when planning the strategy and schedule to contact growers.

The Coalition completed focused outreach in the first, second, and third set of priority subwatersheds: Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99, and Prairie Flower Drain @ Crows Landing Rd (2008-2010), Bear Creek @ Kibby Rd, Cottonwood Creek @ Rd 20, Duck Slough @ Gurr Rd, and Highline Canal @ Hwy 99 (2010-2012), and Berenda Slough along Ave 18 ½, Dry Creek @ Rd 18, Lateral 2 ½ near Keyes Rd and Livingston Drain @ Robin Ave (2011-2013). Individual grower meetings, during which current management practices and any recommended practices were documented, and follow-up meetings, which assessed the implementation of new management practices, are complete for 100% of targeted growers in all eleven subwatersheds. The Coalition reported final results of current and recommended management practices for first priority site subwatersheds in the 2011 MPUR (Pages 50-54, 57-65), and newly implemented practices were reported in the 2012 MPUR (Pages 54-65). The Coalition reported the final results of current, recommended, and newly implemented management practices for the second priority subwatersheds in the 2012 MPUR Management Practices section (Pages 67-99). The 2013 MPUR Management Practices section provides a complete analysis of implemented management practices in the third priority site subwatersheds (Pages 54-69).

The Coalition continued with its management plan tracking process during 2013 in the fourth set of high priority subwatersheds (2012-2014): Black Rascal Creek @ Yosemite Rd, Deadman Creek @ Hwy 59, Deadman Creek @ Gurr Rd, and Hilmar Drain @ Central Ave. The Coalition completed individual interviews with 100% of targeted growers by March 30, 2012. Results were reported in the 2013 MPUR Management Practices section (Pages 70-89). The Coalition conducted follow-up contacts with growers who received recommendations for additional management practices between February 1 and April 30, 2013 to record newly implemented practices. The Coalition has received and recorded 100% of the follow-up surveys. A final analysis of the fourth priority follow-up contacts is reported in the following management practice sections.

Management plan tracking continues in the fifth set of high priority subwatersheds (2013-2015): Hatch Drain @ Tuolumne Rd, Highline Canal @ Lombardy Rd, Merced River @ Santa Fe and Miles Creek @ Reilly Rd. The Coalition notified targeted growers of the management plan tracking process and the requirement to schedule an individual meeting with Coalition representatives to review their operations via mailings sent on January 24, 2012. A Violation of Membership Agreement mailing was sent on June 3, 2013 to the two growers who had not yet scheduled their individual meeting (Table 52). The Coalition has since completed 100% of initial contact meetings and all targeted growers were sent a copy of their individual meeting survey results on October 23, 2012 and were instructed to review the results for accuracy. The Coalition is in the process of sending follow-up mailings to all targeted growers; the mailing included a survey with instructions for growers to indicate any newly implemented management practices. All follow-up contacts will be reported in the 2015 Annual Report.

In late 2013, the Coalition began the management plan tracking process for the sixth set of high priority subwatersheds (2014-2016): Ash Slough @ Ave 21, Mustang Creek @ East Ave, and Westport Drain @ Vivian Rd. A summary of currently implemented and recommended management practices will be included in the 2015 Annual Report.

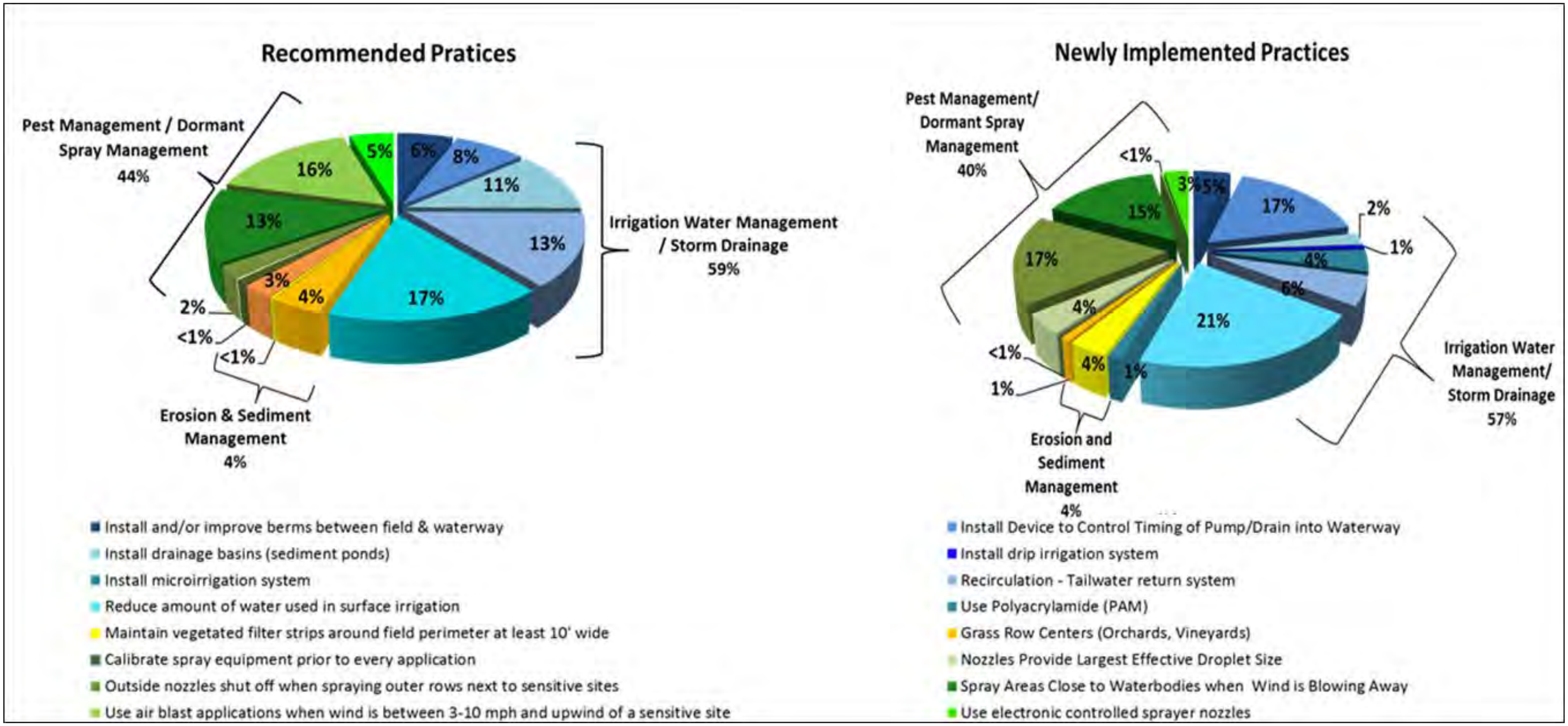
Summary of Focused Outreach in Priority Subwatersheds

The Coalition completed its focused outreach strategy in the first through fourth priority site subwatersheds, which included recommending management practices to improve water quality and documenting newly implemented practices. Figure 14 illustrates the management practices recommended by Coalition representatives to growers and the newly implemented management practices within first through fourth priority site subwatersheds. These practices are color coded in the figure by management practice category: Irrigation Water Management/Storm Drainage (blue shades), Erosion and Sediment Management (yellow/orange shades) and Pest Management/Dormant Spray Management (green shades). Of the acres with recommended practices, Irrigation Water Management / Storm Drainage practices accounted for 51% of the acres, Erosion & Sediment Management practices accounted for 5% of the acres, and Pest Management / Dormant Spray Management practices accounted for 44% of the acres (Figure 14). Several practices are designed to address multiple aspects of agricultural operations (i.e. filter strips aid in irrigation tailwater management and reducing erosion).

Overall, growers implemented most of the recommended management practices in addition to practices not recommended based on the Coalition's focused outreach. Of the acres with newly implemented practices, growers implemented Irrigation Water Management / Storm Drainage Management practices the most frequently (57% of acres, Figure 14). These practices also indirectly affect Erosion and Sediment Management. For example, the use of microirrigation systems improves management of irrigation runoff and also reduces or eliminates sediment erosion caused by offsite movement of irrigation tailwater. Practices more specifically designed to address Erosion and Sediment Management, such as grass row centers or vegetation filter strips, account for 4% of the acres with newly implemented management practices. Pest Management /Dormant Spray Management practices accounted for 40% of the acres with newly implemented practices (Figure 14). In addition to recommended management practices, growers implemented practices not recommended by the Coalition such as adjusting spray nozzles to match crop canopy profile.

During follow-up contacts, Coalition representatives noted the most common reason growers were unable to implement recirculation/tailwater return systems and drainage basins/sediment ponds (two of the more expensive recommended management practices) was due to lack of resources. In an effort to assist growers in securing financial resources, the Coalition will continue to provide members with additional information regarding funding opportunities for management practice implementation including the following programs: Agricultural Water Enhancement Program (AWEP), Environmental Quality Incentives Program (EQIP), and Proposition 84. Growers that indicated on their follow-up surveys that they were interested in additional information about funding will be contacted directly by a Coalition representative to assist with their individual operation's needs. More information regarding financial resources for management practice implementation can be found in the Coalition Wide Evaluation section.

Figure 14. Percentage of acreage associated with each recommended and newly implemented management practice in the first through fourth priority site subwatersheds. Irrigation Water Management/Storm Drainage practices (blue shades), Erosion & Sediment Management practices (yellow/orange shades), and Pest Management/Dormant Spray Management practices (green shades) are included.



FOURTH PRIORITY SUBWATERSHEDS SUMMARY OF MANAGEMENT PRACTICES (2012-2014)

The Coalition began focused outreach in the fourth priority site subwatersheds in January 2012. The Coalition completed individual meetings and documented current management practices in 2012 for 14 targeted growers (Table 53). Follow-up contacts were conducted in 2013 to document any additional practices implemented in 2012 and/or 2013. The mailing included a survey with instructions for growers to indicate any newly implemented management practices. The surveys were identical to the surveys used to record newly implemented management practices in second priority subwatersheds (amendment to the 2011 MPUR, Table 1). The Coalition recommended practices to five growers in the Deadman Creek @ Hwy 59 site subwatershed and two growers in the Hilmar Drain @ Central Ave site subwatershed (Table 57). The Coalition completed follow-up contacts with 100% of growers by December 13, 2013 and growers implemented recommended management practices.

Table 57. Tally of growers who participated in focused outreach in the fourth set of high priority site subwatersheds (2012-2014).

	Black Rascal Creek @ Yosemite Rd	Deadman Creek @ Gurr Rd	Deadman Creek @ Hwy 59	Hilmar Drain @ Central Ave
Targeted Growers	1	2	8	3
Completed Individual Meeting	1	2	8	3
Growers with Recommended Practices	0	0	5	2
Dropped Coalition Membership	0	0	0	0
Completed Follow-up Contact	1	2	8	3
Percent Complete (Initial Contact)	**100%**	**100%**	**100%**	**100%**
Percent Complete (Follow-up Contact)	**100%**	**100%**	**100%**	**100%**

Black Rascal Creek @ Yosemite Rd

The Coalition contacted the single targeted grower who farms on 301 acres within the Black Rascal Creek @ Yosemite Rd site subwatershed (Table 53). Management practices were documented for 18% of the acreage identified as direct drainage (Figure 15). The Coalition reported current management practices for the site subwatershed in the 2013 MPUR (Pages 70-73). The grower reported irrigation runoff from his 301 acre orchard. The Coalition representative discussed with the grower local water quality concerns and the importance of preventing the offsite movement of all agricultural constituents but did not recommend any specific, additional management practices be implemented as the grower currently implements several practices. The grower indicated on the follow-up survey he did not implement any new management practices.

Deadman Creek @ Gurr Rd

The Coalition contacted two targeted growers who farm on 240 acres within the Deadman Creek @ Gurr Rd site subwatershed (Table 53). Management practices were documented for 9% of the acreage identified as direct drainage (Figure 16). The Coalition reported current management practices for the site subwatershed in the 2013 MPUR (Pages 74-76). Coalition representatives discussed local water quality concerns and the importance of preventing the offsite movement of all agricultural constituents but did not recommend any specific, additional management practices be implemented as the grower currently implements several practices. Both growers indicated on the follow-up surveys they did not implement any new management practices.

Figure 15. Black Rascal Creek @ Yosemite Rd member parcels with direct drainage potential.

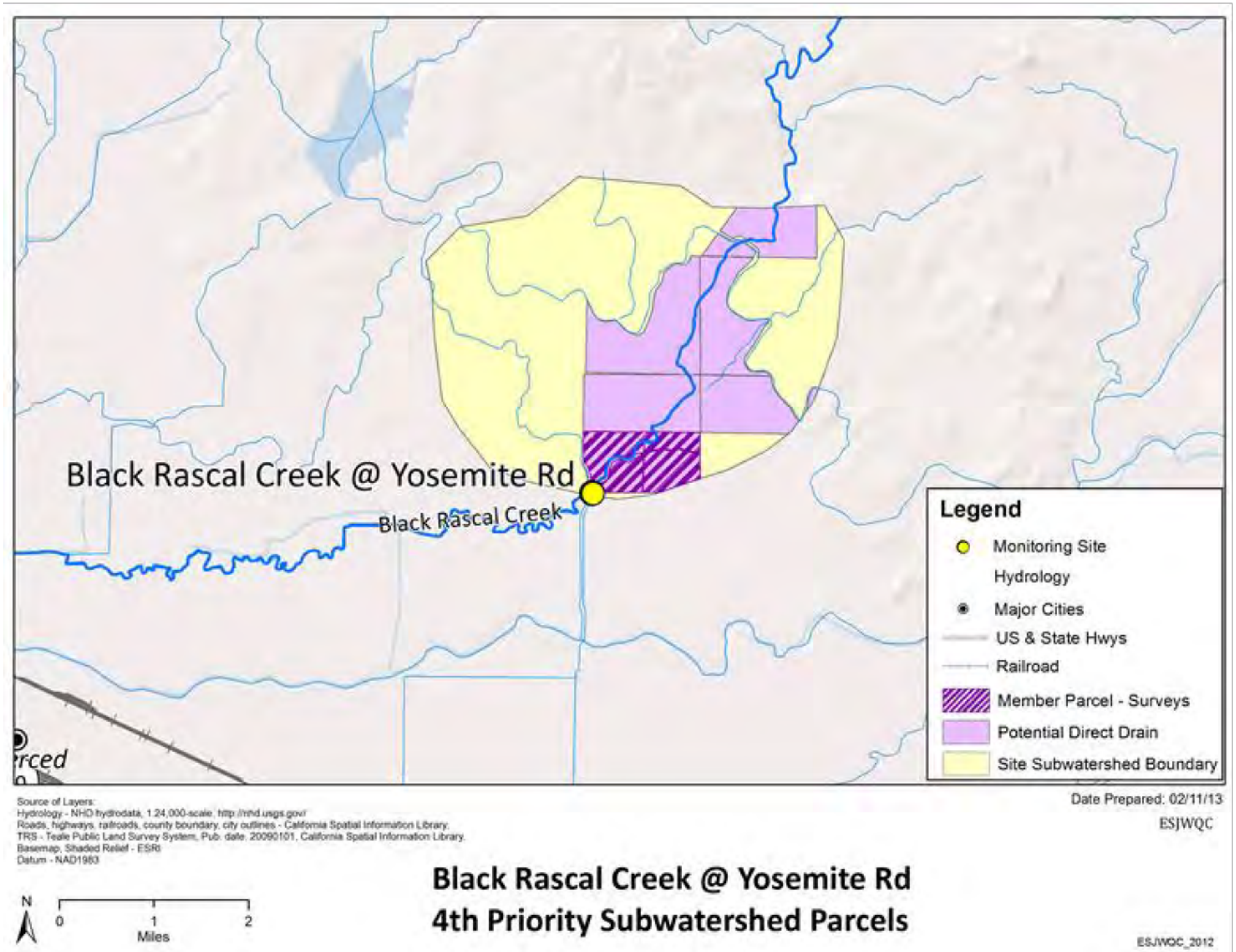
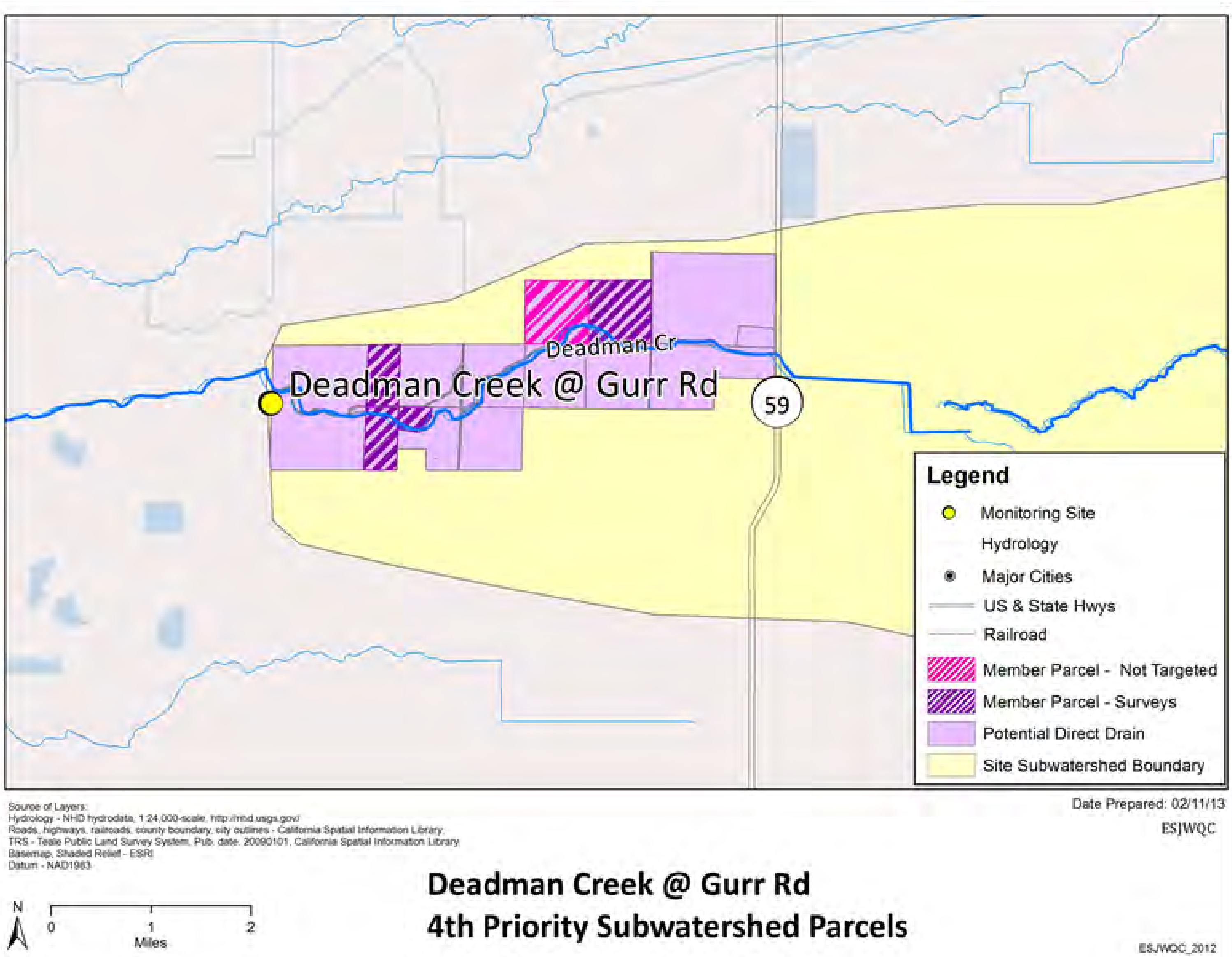


Figure 16. Deadman Creek @ Gurr Rd member parcels with direct drainage potential.

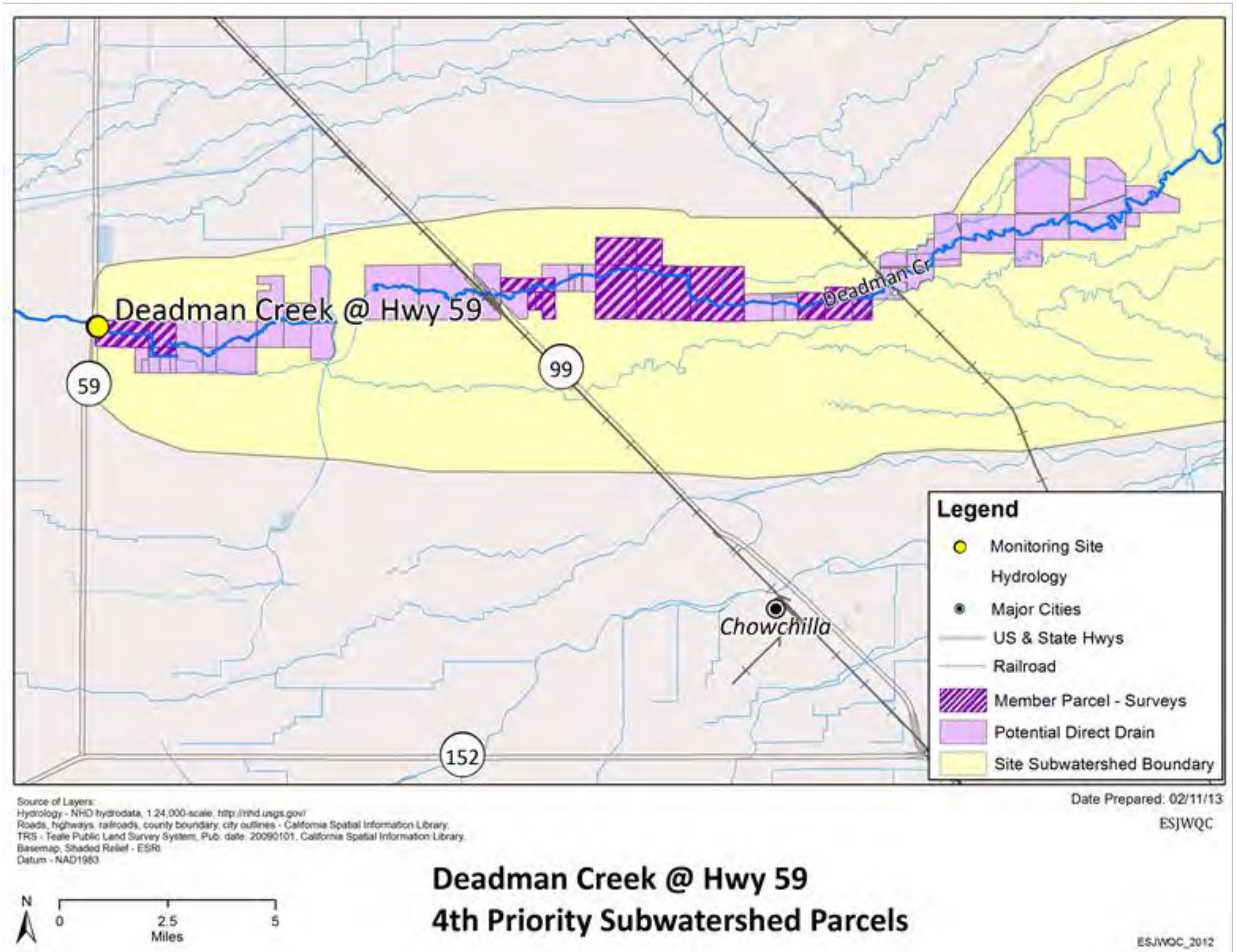


Deadman Creek @ Hwy 59

The Coalition contacted eight targeted growers who farm on 3,414 acres within the Deadman Creek @ Hwy 59 site subwatershed (Table 53). Management practices were documented for 30% of the acreage identified as direct drainage (Figure 17). The Coalition met individually with growers to discuss water quality concerns, document current management practices, and recommend additional practices. The Coalition recommended five growers install and/or improve berms between fields and waterways, install a device to control timing of pump/drain into waterway, install recirculation/tailwater return systems, and/or install and maintain vegetated filter strips at least 10 feet wide around the perimeter of fields. The Coalition reported current and recommended management practices for the site subwatershed in the 2013 MPUR (Pages 77-84).

One hundred percent of targeted growers completed follow-up surveys in 2013 (Table 57). Four out of the five targeted growers implemented the Coalition's recommended management practices. One grower was recommended to install recirculation/tailwater return systems, however the grower indicated during follow-up contacts the recommended management practice was not implemented because the grower is in the process of applying for funding.

Figure 17. Deadman Creek @ Hwy 59 member parcels with direct drainage potential.



Summary of Implemented Management Practices (2012/2013)

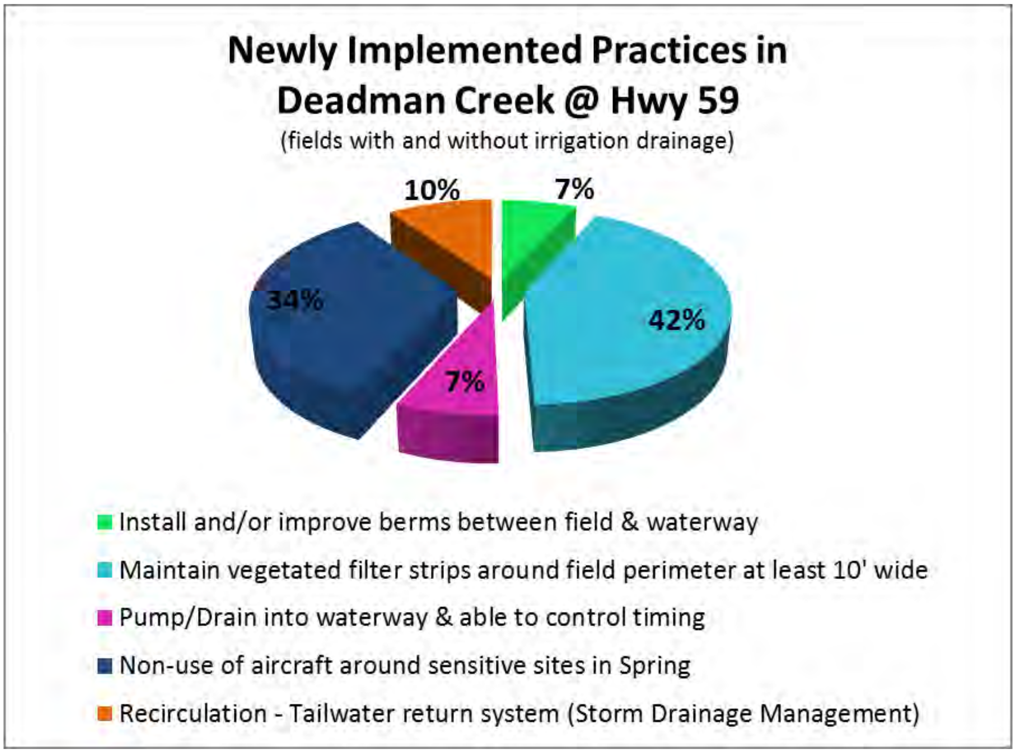
Table 58 is a comparison of recommended management practices and newly implemented practices for the Deadman Creek @ Hwy 59 site subwatershed. Four out of five growers implemented all recommended management practices and one grower implemented an additional practice not recommended by the Coalition. Growers installed and/or improve berms between fields and waterways, install a device to control timing of pump/drain into waterway, installed recirculation/tailwater return systems, and/or installed and maintain vegetated filter strips at least 10 feet wide around the perimeter of fields to properties with no irrigation drainage (Figure 18). One targeted grower representing 87 acres with irrigation drainage installed recirculation/tailwater return (Table 58).

Table 58. Comparison of recommended and implemented management practices in the Deadman Creek @ Hwy 59 site subwatershed.

Management Practice	Recommended Practices		Implemented Practices		% Recommended Acreage with Implemented Practices
	# Growers	Acres	# Growers	Acres	
No irrigation drainage from property					
Install and/or improve berms between field & waterway	1	62	1	62	100%
Install Device to Control Timing of Pump/Drain into Waterway	1	62	1	62	100%
Maintain vegetated filter strips around field perimeter at least 10' wide	1	383	1	383	100%
Recirculation - Tailwater return system	1	157	0	0	0%
Other[1]	0	0	1	303	NA
Yes, irrigation drainage from property					
Recirculation - Tailwater return system	1	87	1	87	100%

[1]Grower indicated in their follow-up survey that they implemented non-use of aircraft around sensitive sites spring 2013.

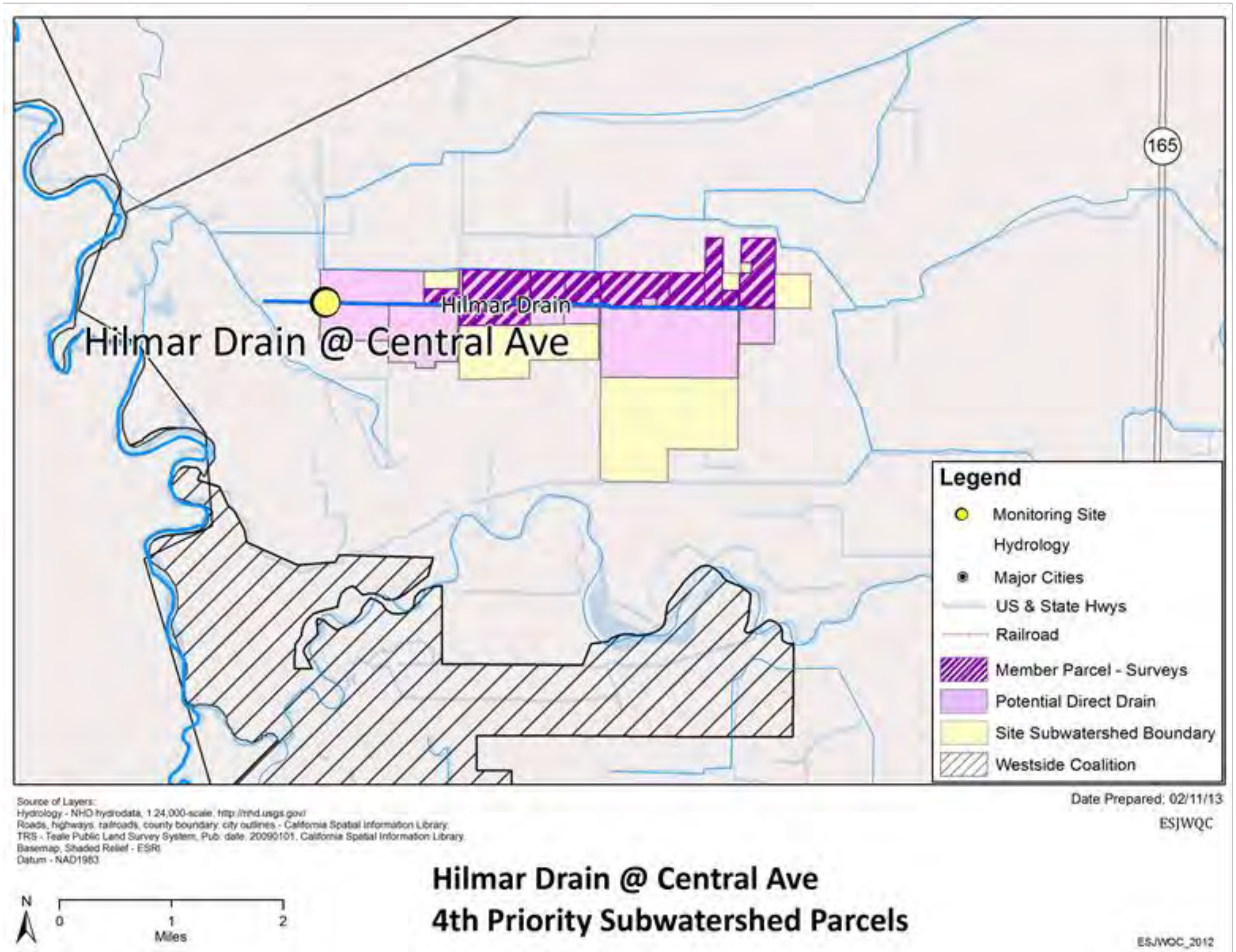
Figure 18. Percentage of acreage represented by newly implemented management practices in the Deadman Creek @ Hwy 59 site subwatershed.



Hilmar Drain @ Central Ave

The Coalition contacted three targeted growers who farm on 455 acres within the Hilmar Drain @ Central Ave site subwatershed (Table 53). Management practices were documented for 39% of the acreage identified as direct drainage (Figure 19). The Coalition met individually with growers to discuss water quality concerns, document current management practices, and recommend additional practices. All parcels surveyed in the site subwatershed contain field/row crops; 31% of the parcels have irrigation runoff. The Coalition reported current management practices for the site subwatershed in the 2013 MPUR (Pages 84-90). One hundred percent of targeted growers completed the follow-up surveys in 2013 (Table 57). The Coalition recommended new management practices to two out of the three targeted growers; growers implemented all the Coalition's recommended management practices.

Figure 19. Hilmar Drain @ Central Ave member parcels with direct drainage potential.



Summary of Implemented Management Practices (2012/2013)

Table 59 presents a comparison of recommended management practices and newly implemented management practices for the Hilmar Drain @ Central Ave site subwatershed. Growers installed and/or improve berms between fields and waterways, installed a device to control timing of pump/drain into waterway and/or installed recirculation/tailwater return systems to a total of 175 acres with one or more recommended practices implemented. One grower farming 139 acres, in addition to the Coalition's recommended management practices, adjusted spray nozzles to match crop canopy profile (Table 59). Figures 20 and 21 demonstrate the percentage of acreage represented by newly implemented management practices with no irrigation drainage and the percentage of acreage with irrigation drainage from properties in the Hilmar Drain @ Central Ave site subwatershed.

Table 59. Comparison of recommended and implemented management practices in the Hilmar Drain @ Central Ave site subwatershed.

Management Practice	Recommended Practices		Implemented Practices		% Recommended Acreage with Implemented Practices
	# Growers	Acres	# Growers	Acres	
No irrigation drainage from property					
Device controls timing of pump/drain into waterway	1	18	1	18	100%
Install and/or improve berms between field & waterway	1	18	1	18	100%
Yes, irrigation drainage from property					
Recirculation - Tailwater return system	1	139	1	139	100%
Adjust spray nozzles to match crop canopy profile[1]	0	0	1	139	NA

[1]Management practice not specifically recommended by Coalition representative for grower's operation.
NA – Not applicable; no recommendations for the management practice in the site subwatershed.

Figure 20. Percentage of acreage represented by newly implemented management practices in the Hilmar Drain @ Central Ave site subwatershed.

Parcels with no irrigation drainage.

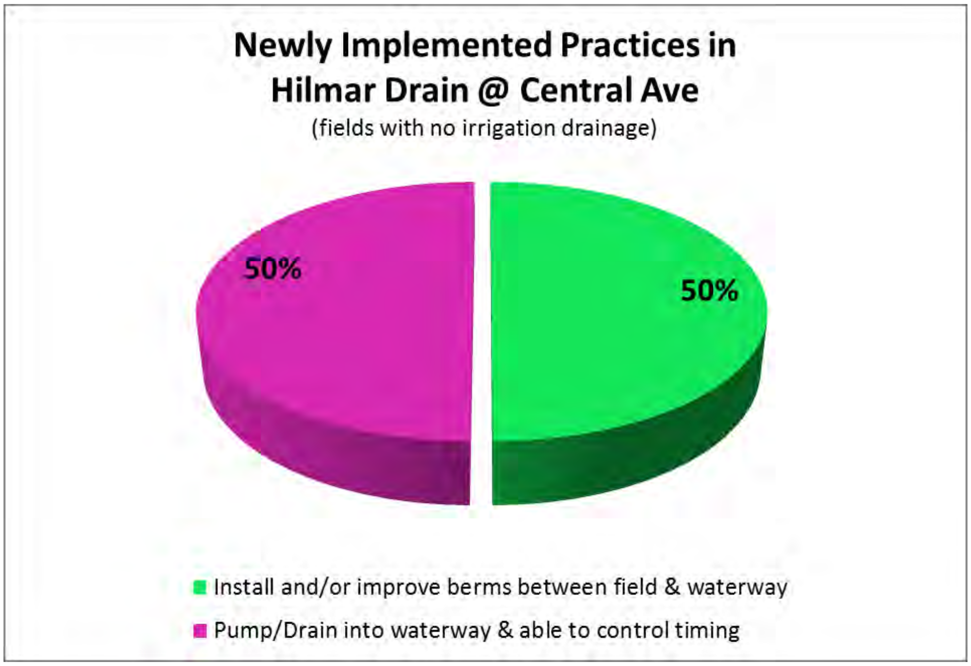
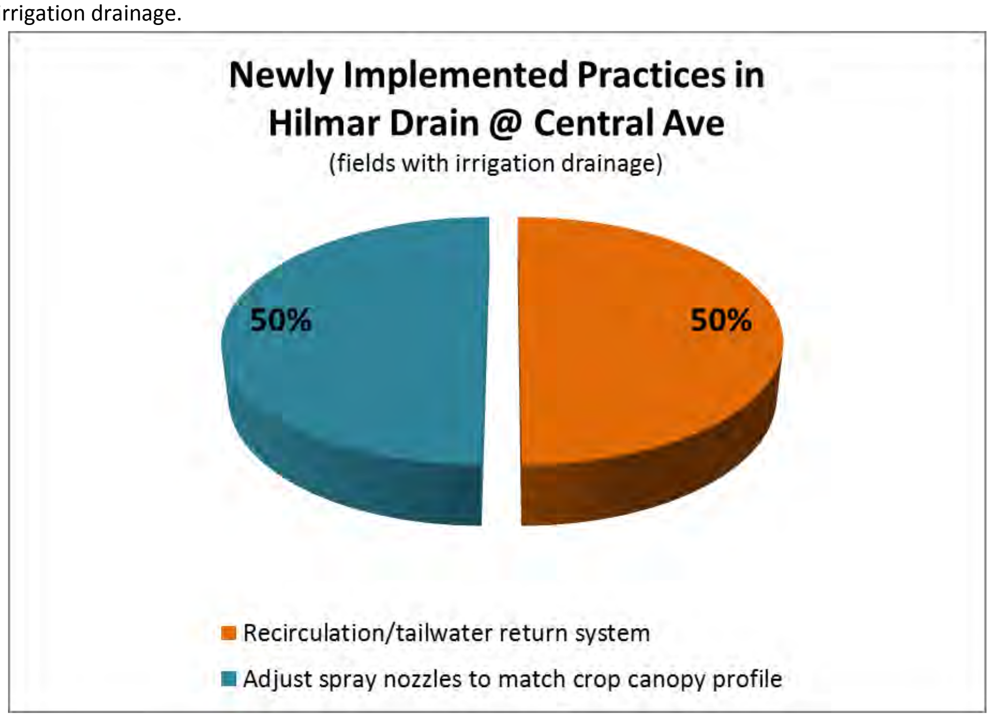


Figure 21. Percentage of acreage represented by newly implemented management practices in the Hilmar Drain @ Central Ave site subwatershed.

Parcels with irrigation drainage.



FIFTH PRIORITY SUBWATERSHEDS SUMMARY OF MANAGEMENT PRACTICES (2013-2015)

The Coalition began focused outreach in fifth priority site subwatersheds in January 2013. The Coalition mailed initial contact letters November 2, 2012 informing growers of the high priority site subwatershed Management Plan process, including growers' responsibilities, and requesting that members contact the Coalition to schedule an individual grower meeting. The Coalition completed individual meetings with the 42 targeted growers in 2013, during which Coalition representatives discussed water quality concerns, documented currently implemented management practices and recommended additional management practices designed to address the water quality concerns (Table 60). The Coalition is in the process of following up with fifth priority targeted growers with recommended management practices. Follow-up mailings include a survey with instructions for growers to record any newly implemented management practices; surveys were identical to those used for follow-up in the second priority subwatersheds, which are recorded in the amendment to the 2011 MPUR, Table 1. Prior to April 30, 2014, the Coalition received follow-up surveys from one targeted grower in the Highline Canal @ Lombard Ry site subwatershed. The results from outstanding follow-up contacts will be reported during the quarterly meetings, and a final analysis of newly implemented management practices will be presented in the 2015 Annual Report.

Table 60. Tally of growers who participated in focused outreach in the fifth set of high priority site subwatersheds (2013-2015).

	Hatch Drain @ Tuolumne Rd	Highline Canal @ Lombardy Rd	Merced River @ Santa Fe	Miles Creek @ Reilly Rd
Targeted Growers	1	20	12	9
Completed Individual Meeting	1	20	12	9
Growers with Recommended Practices	1	8	7	2
Follow-up Contact by April 30, 2014	0	1	0	0
Percent Complete (Initial Contact)	**100%**	**100%**	**100%**	**100%**
Percent Complete (Follow-up Contact)	**0%**	**12.5%**	**0%**	**0%**

Hatch Drain @ Tuolumne Rd

Hatch Drain @ Tuolumne Rd site subwatershed is a smaller site subwatershed and contains relatively few irrigated acres with direct drainage. The Coalition completed the initial contact with the single targeted grower farming 36 acres within the site subwatershed (Table 54). Management practices were documented for 13% of the acreage identified as direct drainage (Figure 22). The Coalition representative discussed with the grower local water quality concerns and the importance of preventing the offsite movement of all agricultural constituents and recommend additional management practices be implemented in addition to the several practices currently implemented by the grower.

Table 61 lists all the management practices recorded as implemented in the Hatch Drain @ Tuolumne Rd site subwatershed. The Coalition will provide an analysis of all follow-up survey results in the 2015 Annual Report.

The single parcel surveyed in the site subwatershed is an orchard; the grower reported no irrigation runoff.

Irrigation Water Management

The grower has laser leveled the property and installed a drainage basin (sediment pond) to capture and retain runoff. In addition, the grower also indicated that they utilize recirculation/ tailwater return systems to manage any irrigation runoff. The grower surface irrigates based on the actual moisture levels in the soil and crop needs and based on irrigation district deliveries (Table 61).

Storm Drainage / Erosion & Sediment Management

The grower indicated he has no storm water runoff and applies glyphosate and Goal (oxyflurofen) during the winter to control weeds. The grower implements grass row centers in the orchard as an erosion and sediment management (Table 61).

Pest Management

The grower implements several spray management practices, such as calibrating equipment prior to every application, adjusting spray nozzles to match crop canopy profiles, shutting off outside nozzles when spraying outer rows next to sensitive sites and using nozzles that provide the largest effective droplet size to minimize drift (Table 61). In addition, the Coalition recommended to the grower that he spray areas close to waterbodies when the wind is blowing away from them.

Dormant Spray Management

The single member applies pesticides to 36 acres of dormant orchards. The grower implements several management practices during dormant sprays, including checking weather condition and ensuring soil moisture is not at field capacity. Additionally, fields have vegetative cover prior to applications (Table 61).

Figure 22. Hatch Drain @ Tuolumne Rd member parcels with direct drainage potential.

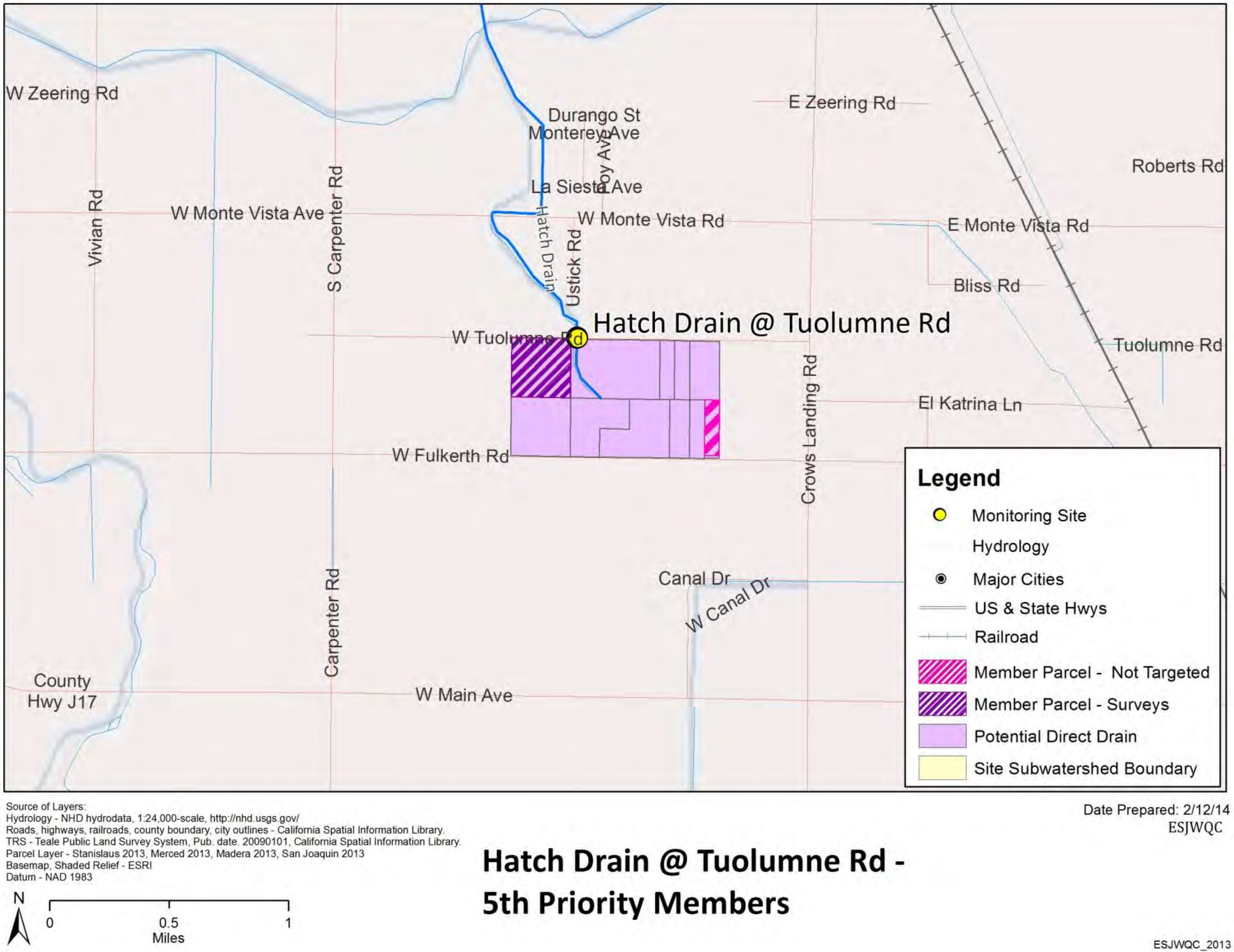


Table 61. Hatch Drain @ Tuolumne Rd site subwatershed current management practices (2013).

Checklist	Question	Answer	Count of Answers	% Respondents	Sum of Associated Acreage
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	1	100%	36
	Irrigation System	Surface	1	100%	36
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	1	100%	36
		Irrigation District Deliveries	1	100%	36
Section 2: Storm Drainage	How are you able to manage storm drainage?	No Storm Drainage	1	100%	36
	When do you have storm water draining from your field?	No Storm Drainage	1	100%	36
Section 3: Erosion & Sediment Management	Do you apply herbicides during winter months?	Glyphosate (Round-Up)	1	100%	36
		Goal	1	100%	36
		Paraquat	1	100%	36
	If waterway crosses or borders pasture, how is livestock managed?	N/A - Not Pasture	1	100%	36
	Sediment management practices:	Grass Row Centers (Orchards, Vineyards)	1	100%	36
Section 4: Pest Management	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	Yes	1	100%	36
	How often is spray equipment calibrated?	Prior to each application	1	100%	36
	Spray management practices:	Adjust spray nozzles to match crop canopy profile	1	100%	36
		Outside nozzles shut off when spraying outer rows next to sensitive sites	1	100%	36
		Uses of nozzles that provide largest effective droplet size to minimize drift	1	100%	36
Section 5: Dormant Spray Management	Do you apply when soil moisture is at field capacity?	No	1	100%	36
	Dormant spray management practices:	Check weather conditions prior to spraying (i.e. storm status)	1	100%	36
	Have you been informed of DPR's Dormant Spray Regulations?	Yes	1	100%	36
	How many acres are sprayed with pesticides on dormant acres?	36 Acres	1	100%	36
	Prior to applying winter dormant sprays, what is the condition of your orchard floor?	Vegetative cover	1	100%	36

Highline Canal @ Lombardy Rd

The Coalition completed initial contacts with the 20 targeted growers farming 4,226 acres within the Highline Canal @ Lombardy Rd site subwatershed (Table 54). Management practices were documented for 46% of the acreage identified as direct drainage (Figure 23). Coalition representatives discussed local water quality concerns and the importance of preventing the offsite movement of all agricultural constituents and recommend additional management practices to be implemented to eight growers.

Table 62 lists all the management practices recorded as implemented in the Highline Canal @ Lombardy Rd site subwatershed at this time. The Coalition will provide an analysis of all follow-up survey results in the 2015 Annual Report.

Summary of Current Management Practices (2013)

All parcels surveyed in the site subwatershed contain field/row crops and orchards; 100% of the parcels reported no irrigation runoff (Figure 24).

Irrigation Water Management

The majority of the growers use microirrigation (60%) and the remaining growers use a variety of drip, flood, sprinkler and/or surface irrigation.

Twelve growers implemented irrigation management practices such as laser leveled fields, utilizing recirculation/ tailwater return systems to manage irrigation runoff and/or drainage basins (sediment ponds) to capture and retain runoff. The growers all irrigate based on the actual moisture levels in the soil and crop needs and based on irrigation district deliveries (Table 62).

Storm Drainage

Seventy percent of the targeted growers, whose properties account for 76% of the acreage, report no storm water runoff and 30% of growers report that storm water runoff from fields can occur after the soil is saturated in late winter. All parcels with storm drainage have at least one management practice implemented to manage storm water runoff, either berms between the field and waterway, recirculation/ tailwater return systems and/or settling ponds (Table 62). The Coalition recommended to one grower who farms 574 acres to install a device to control timing of pump/drain into the waterway (Figure 25).

Erosion & Sediment Management

Four growers (20%) with 987 acres indicated that they do not apply herbicides during winter months. The remaining growers apply glyphosate, Goal (oxyflurofen), paraquat (Gramaxone), simazine (Princep), and herbicides (Prowl and Surflan) during the winter to control weeds. However, 17 growers implement one or more erosion and sediment management practices, including constructing wetlands, maintaining vegetation along ditches and filter strips around field perimeters at least 10 feet wide, grass row centers and planting vegetation along ditches (Table 62).

Pest Management

Nineteen growers reported that they implement several spray management practices including calibrating equipment prior to every application, adjusting spray nozzles to match crop canopy profiles, shutting off outside nozzles when spraying outer rows next to sensitive sites, spraying areas close to waterbodies when the wind is blowing away from the waterbody, using air blast applications when the wind is between 3-10 mph and spraying takes place upwind of sensitive sites, and using nozzles that provide the largest effective droplet size to minimize drift. In addition, 13 growers have also considered alternative strategies to using diazinon or chlorpyrifos (Table 62). The Coalition recommended additional spray management practices to eight growers (Figure 25).

Dormant Spray Management

Out of the 20 targeted growers, only seven reported applying pesticides to dormant orchards; however, all seven growers check weather conditions prior to spraying and five maintain setback zones. Additionally, four out of the seven fields have vegetative cover/vegetative cover with sprayed berms or some vegetation prior to applications (Table 62).

Figure 23. Highline Canal @ Lombardy Rd member parcels with direct drainage potential.

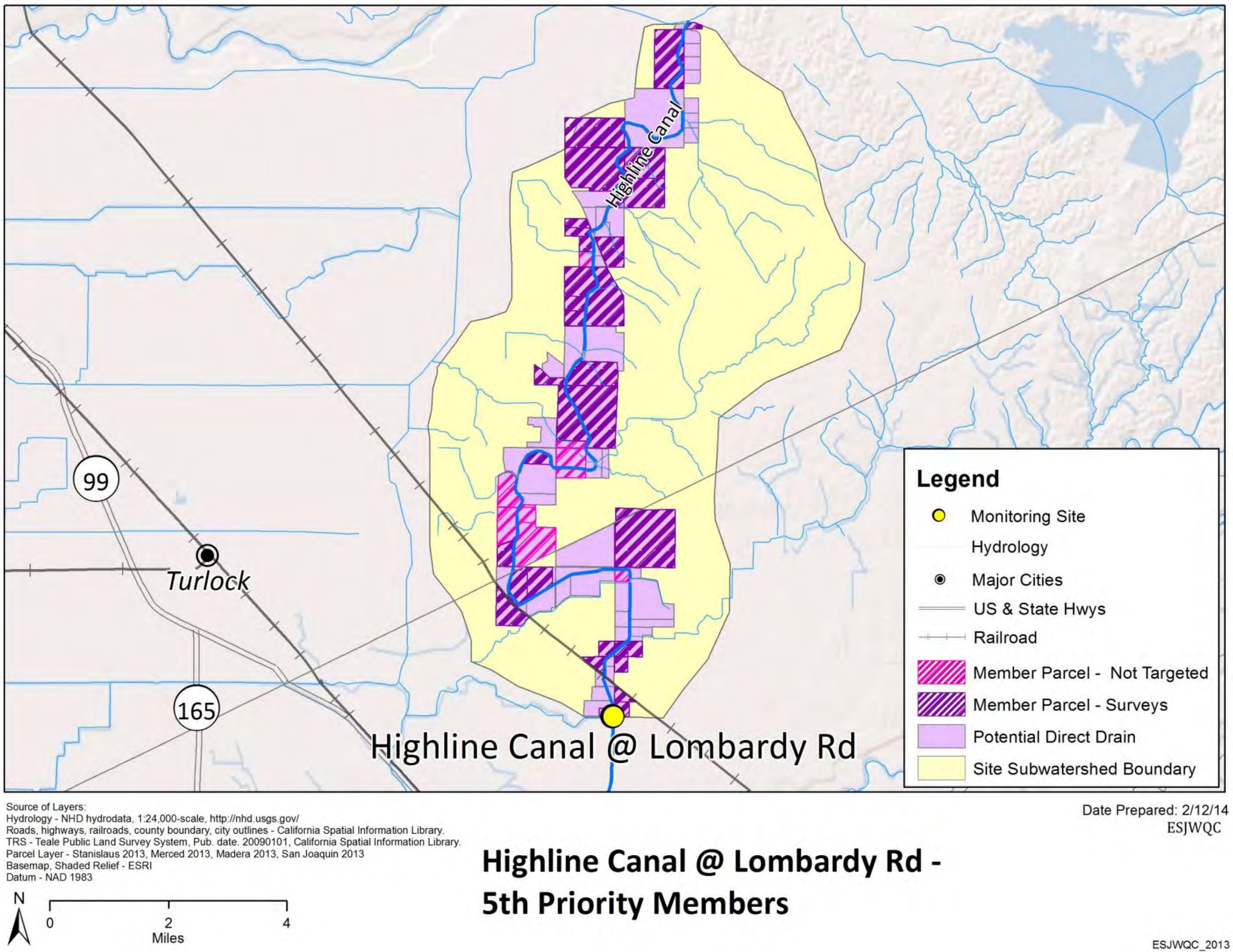


Table 62. Highline Canal @ Lombardy Rd site subwatershed current management practices (2013).

Checklist	Question	Answer	Count of Answers	% Respondents	Sum of Associated Acreage
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	7	35%	400
		Recirculation - Tailwater return system	2	10%	1815
		Use drainage basins (sediment ponds) to capture and retain runoff	4	20%	1717
	Irrigation System	Microirrigation	12	60%	4310
		Other: Drip	3	15%	269
		Other: Flood	1	5%	59
		Sprinkler	4	20%	200
		Surface	3	15%	364
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	20	100%	4914
		Irrigation District Deliveries	1	5%	59
Section 2: Storm Drainage	How are you able to manage storm drainage?	Berms Between Field & Waterway (Install and/or Improve)	5	25%	2656
		No Storm Drainage	14	70%	3227
		Pump/Drain into waterway & unable to control timing	1	5%	43
		Recirculation - Tailwater return system (Storm Drainage Management)	2	10%	1815
		Settling Pond	2	10%	2015
	When do you have storm water draining from your field?	After soil is saturated-late winter	6	30%	1687
		No Storm Drainage	14	70%	3226
Section 3: Erosion & Sediment Management	Do you apply herbicides during winter months?	Do not apply	4	20%	987
		Glyphosate (Round-Up)	15	75%	3868
		Goal	12	60%	2818
		Other: Prowl, Surtlan	2	10%	72
		Paraquat (Gramaxone)	6	30%	1236
		Simazine (Princep)	2	10%	72
	If waterway crosses or borders pasture, how is livestock managed?	N/A - Not Pasture	20	100%	4914
	Sediment management practices:	Constructed wetlands	1	5%	115
		Grass Row Centers (Orchards, Vineyards)	16	80%	4593
		Maintain vegetated filter strips around field perimeter at least 10' wide	5	25%	1290
		Vegetation is planted along or allowed to grow along ditches	7	35%	2054
Section 4: Pest Management	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	N/A	4	20%	911
		No	3	15%	462
		Yes	13	65%	3540
	How often is spray equipment calibrated?	Never	2	10%	60
		Once per year	2	10%	72
		Prior to each application	16	80%	4782
	Spray management practices:	Adjust spray nozzles to match crop canopy profile	18	90%	4711
		Outside nozzles shut off when spraying outer rows next to sensitive sites	19	95%	4901
		Spray areas close to waterbodies when the wind is blowing away from them	12	60%	4394
		Use air blast applications when wind is between 3-10 mph and upwind	10	50%	3381

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	% RESPONDENTS	SUM OF ASSOCIATED ACREAGE
		of a sensitive site			
		Uses of nozzles that provide largest effective droplet size to minimize drift	19	95%	4901
Section 5: Dormant Spray Management	Do you apply when soil moisture is at field capacity?	N/A	2	10%	103
		No	5	25%	2077
	Dormant spray management practices:	Check weather conditions prior to spraying (i.e. storm status)	7	35%	2180
		Maintain setback zones	5	25%	2108
	Have you been informed of DPR's Dormant Spray Regulations?	N/A	5	25%	518
		Yes	2	10%	1662
	How many acres are sprayed with pesticides to dormant orchards?	305 Acres	1	5%	305
		31 Acres	1	5%	66
		36 Acres	3	15%	109
		80 Acres	1	5%	75
		820 Acres	1	5%	1625
		No Dormant Sprays	13	65%	2734
	Prior to applying winter dormant sprays, what is the condition of your orchard floor?	No Vegetation & Not Disked	3	15%	109
		Some vegetation	1	5%	75
		Vegetated Cover w/Sprayed Berms	1	5%	66
		Vegetative cover	2	10%	1930

Figure 24. Highline Canal @ Lombardy Rd crop acreage information from member surveys (2013).

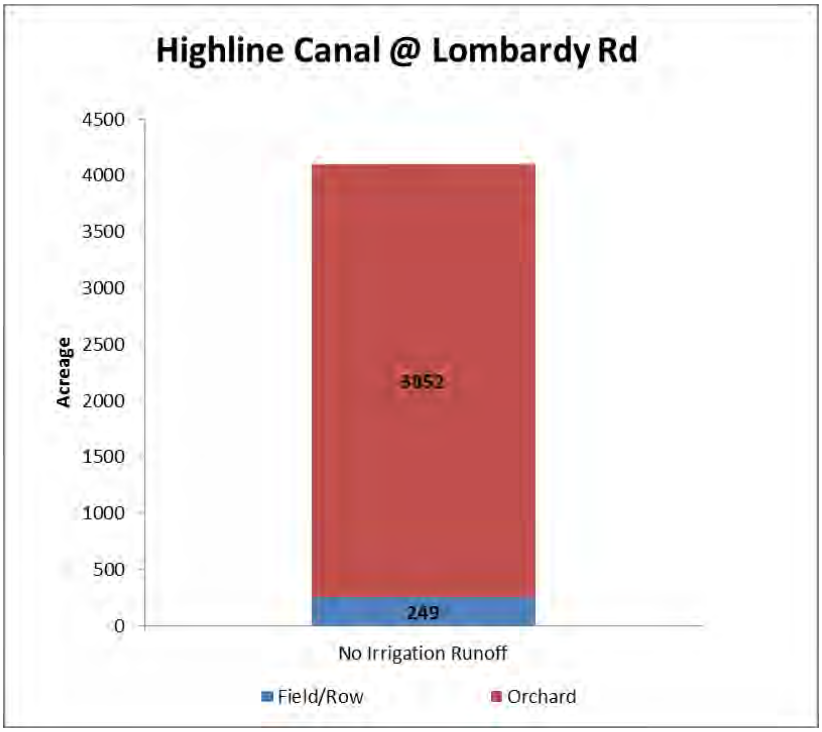
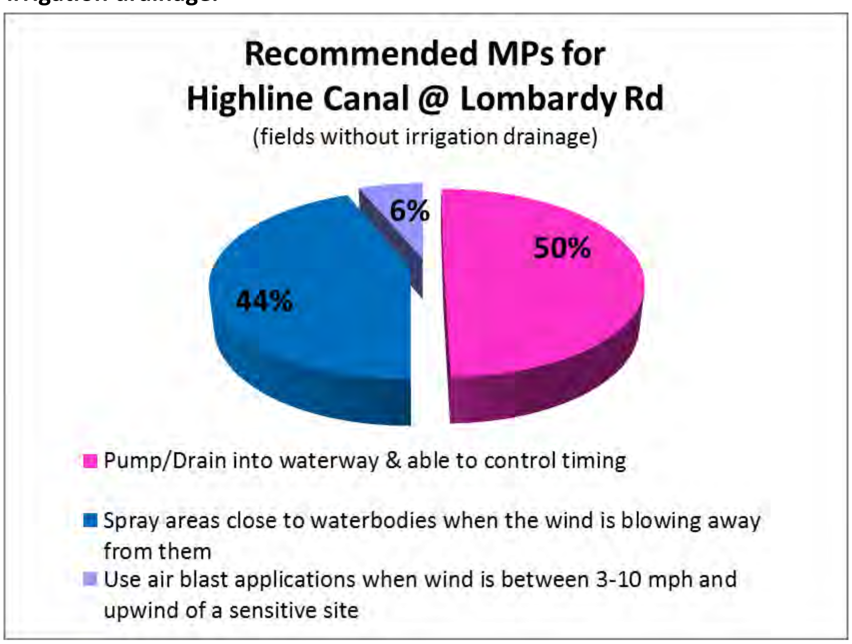


Figure 25. Highline Canal @ Lombardy Rd recommended management practice (2013) acreage percentage for members without irrigation drainage.



Merced River @ Santa Fe

The Coalition completed initial contacts with the twelve targeted growers farming 4,151 acres within the Merced River @ Santa Fe site subwatershed (Table 54). Management practices were documented for 34% of the acreage identified as potentially having direct drainage (Figure 26). Coalition representatives discussed local water quality concerns and the importance of preventing the offsite movement of all agricultural constituents and recommend additional management practices to be implemented to seven growers.

Table 63 lists all the management practices recorded as implemented in the Merced River @ Santa Fe site subwatershed at this time. The Coalition will provide an analysis of all follow-up survey results in the 2015 Annual Report.

Summary of Current Management Practices (2013)

The majority of the targeted acreage in the site subwatershed contains vineyards and orchards (Figure 27). Twenty-nine percent of the acreage is field/row crops (1,755 acres, Figure 27). Irrigation runoff occurs from one hundred percent of the vineyards and sixty-six percent of the field/row crops; all operators of orchards reported no irrigation drainage (Figure 27). Coalition representatives discussed local water quality concerns and reviewed currently implemented management practices.

Irrigation Water Management

Growers in the site subwatershed employ a mixture of irrigation systems on their parcels. The majority of growers use microirrigation techniques (58%, Table 63); however growers also use either sprinklers or surface irrigation. Nine growers have laser leveled fields and all but one grower irrigates according to actual moisture levels in the soil and crop needs. Three growers, accounting for 40% of the acreage, utilize recirculation/ tailwater return systems to manage irrigation runoff. Four growers, representing 44% of the acreage, installed drainage basins (sediment ponds) to capture and retain runoff (Table 63).

Storm Drainage

All growers reported no storm drainage on their fields. However, three growers implement either berms between the field and waterway, recirculation/ tailwater return systems, and/or settling ponds to manage any storm water runoff (Table 63).

Erosion & Sediment Management

The growers in the site subwatershed have at least one of the following sediment and erosion practices installed: grass row centers, vegetated filter strips at least 10 feet wide around field perimeter, and vegetation maintained along ditches. Nine growers apply herbicides during the winter; all nine growers implement at least two sediment and erosion management practices (Table 63).

Pest Management

Targeted growers implement several spray management practices including calibrating prior to each spray application, adjusting spray nozzles to match the canopy profile, shutting off outside nozzles when spraying outer rows next to sensitive sites (92% of growers), spraying areas close to waterbodies when the wind is blowing away from them (33% of growers), and using nozzles that provide the largest effective droplet size to minimize drift (83% of growers). Ten growers have considered alternative strategies to applying chlorpyrifos and diazinon (Table 63). The Coalition recommended for seven growers to spray areas close to waterbodies when the wind is blowing away from them (Figure 28).

Dormant Spray Management

Nine growers do not apply pesticides to dormant orchards; the remaining growers apply pesticides to 1,125 acres of dormant orchards. The three growers applying pesticides to dormant orchards implement several management practices during dormant sprays, including checking weather condition, maintaining setback zones and ensuring soil moisture is not at field capacity. Additionally, fields have vegetative cover prior to applications (Table 63).

Figure 26. Merced River @ Santa Fe member parcels with direct drainage potential.

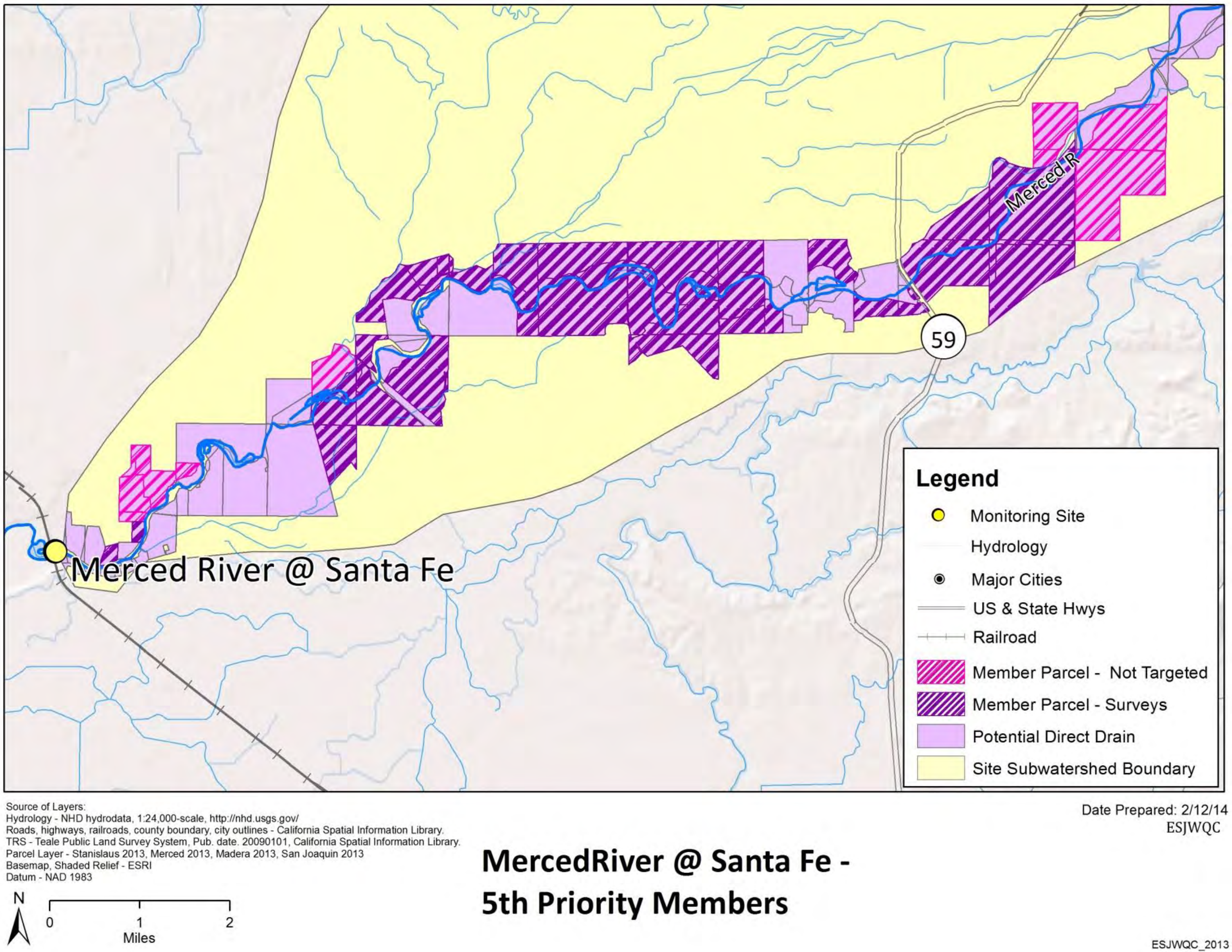


Table 63. Merced River @ Santa Fe site subwatershed current management practices (2013).

Checklist	Question	Answer	Count of Answers	% Respondents	Sum of Associated Acreage
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	9	75%	4252
		Recirculation - Tailwater return system	3	25%	1659
		Use drainage basins (sediment ponds) to capture and retain runoff	4	33%	1845
		Use of Polyacrylamide (PAM) to increase water infiltration and reduce furrow erosion	1	8%	90
	Irrigation System	Microirrigation	7	58%	4186
		Sprinkler	5	42%	1877
		Surface	4	33%	2636
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	11	92%	5154
		Irrigation District Deliveries	2	17%	1926
Section 2: Storm Drainage	How are you able to manage storm drainage?	Berms Between Field & Waterway (Install and/or Improve)	2	17%	2458
		No Storm Drainage	12	100%	6035
		Recirculation - Tailwater return system (Storm Drainage Management)	2	17%	1569
		Settling Pond	3	25%	1755
	When do you have storm water draining from your field?	No Storm Drainage	12	100%	6035
Section 3: Erosion & Sediment Management	Do you apply herbicides during winter months?	Do not apply	3	25%	2931
		Glyphosate (Round-Up)	9	75%	3104
		Goal	6	50%	2010
		Other: Rely	1	8%	30
	If waterway crosses or borders pasture, how is livestock managed?	N/A - Not Pasture	12	100%	6035
	Sediment management practices:	Grass Row Centers (Orchards, Vineyards)	10	83%	4466
		Maintain vegetated filter strips around field perimeter at least 10' wide	10	83%	3628
		Vegetation is planted along or allowed to grow along ditches	12	100%	6035
Section 4: Pest Management	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	N/A	2	17%	41
		Yes	10	83%	5994
	How often is spray equipment calibrated?	Never	1	8%	22
		Prior to each application	11	92%	6013
	Spray management practices:	Adjust spray nozzles to match crop canopy profile	11	92%	6013
		Outside nozzles shut off when spraying outer rows next to sensitive sites	11	92%	6013
		Spray areas close to waterbodies when the wind is blowing away from them	4	33%	4064
		Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site	7	58%	2474
		Uses of nozzles that provide largest effective droplet size to minimize drift	10	83%	4968
Section 5: Dormant Spray Management	Do you apply when soil moisture is at field capacity?	N/A	1	8%	881
		No	2	17%	798
	Dormant spray management practices:	Check weather conditions prior to spraying (i.e. storm status)	2	17%	971
		Maintain setback zones	1	8%	90

Checklist	Question	Answer	Count of Answers	% Respondents	Sum of Associated Acreage
	Have you been informed of DPR's Dormant Spray Regulations?	Yes	3	25%	1679
	How many acres are sprayed with pesticides on dormant orchards?	685 Acres	1	8%	881
		90 Acres	1	8%	90
		No Dormant Sprays	9	75%	4356
		350 Acres	1	8%	708
	Prior to applying winter dormant sprays, what is the condition of your orchard floor?	Some vegetation	1	8%	881
		Vegetative cover	2	17%	798

Figure 27. Merced River @ Santa Fe crop acreage information from member surveys (2013).

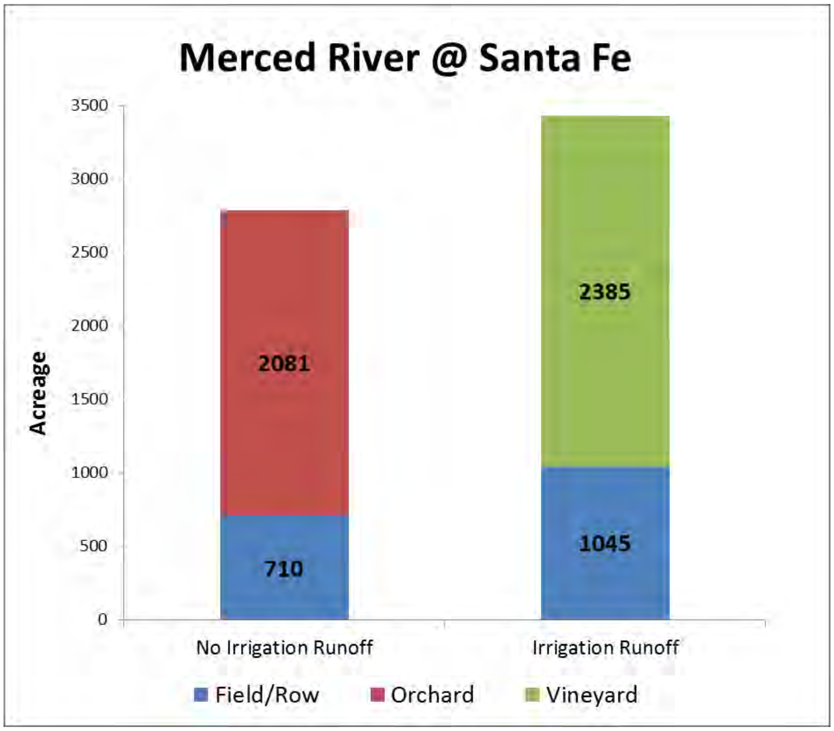
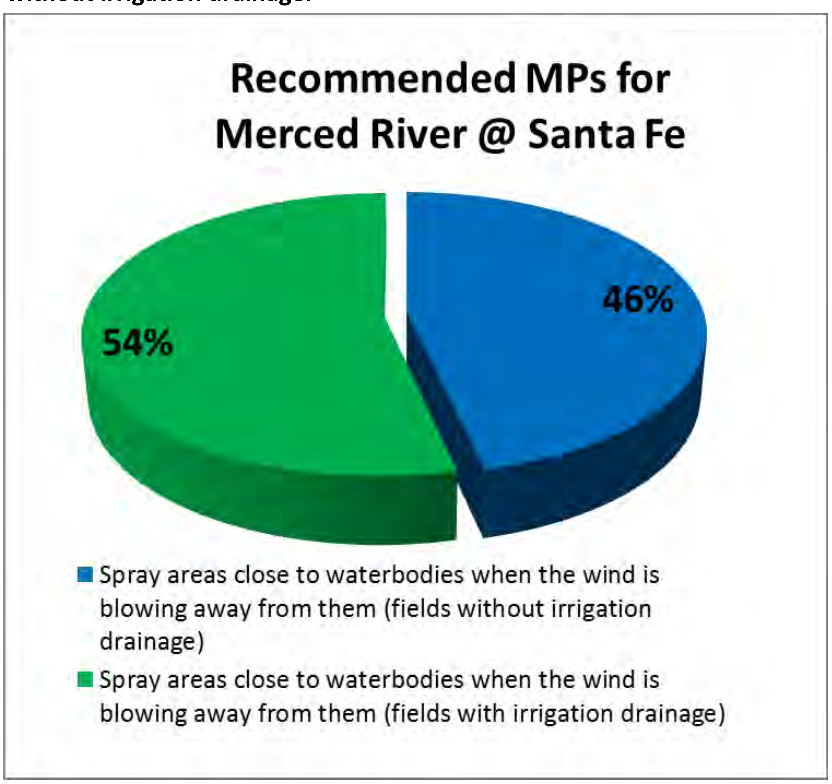


Figure 28. Merced River @ Santa Fe recommended management practice (2013) acreage percentage for members with and without irrigation drainage.



Miles Creek @ Reilly Rd

The Coalition completed initial contacts with the nine targeted growers farming 1,540 acres within the Miles Creek @ Reilly Rd site subwatershed (Table 54). Coalition representatives discussed local water quality concerns and the importance of preventing the offsite movement of all agricultural constituents with growers. Management practices were documented for 18% of the acreage identified as direct drainage (Figure 29). The Coalition recommended spray management practices to five growers in the site subwatershed. The Coalition will provide an analysis of all follow-up survey results in the 2015 Annual Report.

Summary of Current Management Practices (2013)

All parcels surveyed in the site subwatershed contain field/row crops and orchards; 66% of the parcels have irrigation runoff (Figure 30).

Irrigation Water Management

Five targeted growers utilize microirrigation and four use surface and/or flood irrigation; all nine growers and have laser leveled their fields. In addition, one grower uses drainage basins (sediment ponds) to capture and retain runoff and one grower indicated that they utilize recirculation/ tailwater return systems to manage irrigation runoff. All nine growers scheduled irrigation based on actual moisture levels in the soil and crop needs; and six growers also based their irrigation schedules on irrigation district deliveries (Table 64).

Storm Drainage Management

Six growers farming 1,058 acres indicated no storm drainage occurs on their parcels. Two growers indicated storm drainage occurs after the soil is saturated in the late winter and the remaining two growers indicated storm drainage only occurs during heavy (100 year) storms. Eight growers implement storm drainage management practices including installing and/or improving berms between fields and waterways, utilizing recirculation or a tailwater return system and settling ponds.

Erosion & Sediment Management

Two growers, farming 293 acres, indicated that they do not apply herbicides during winter months. The remaining growers apply glyphosate, Goal (oxyflurofen) and Karmex during the winter to control weeds. However, all nine growers implement one or more erosion and sediment management practices, including maintaining vegetation along ditches and filter strips around field perimeters at least 10 feet wide and/or planting grass row centers and vegetation along ditches (Table 64).

Pest Management

All nine growers reported that they implement several spray management practices, including adjusting spray nozzles to match crop canopy profiles, shutting off outside nozzles when spraying outer rows next to sensitive sites, spraying areas close to waterbodies when the wind is blowing, using air blast applications when the wind is between 3-10 mph and upwind of sensitive sites, using nozzles that provide the largest effective droplet size to minimize drift and spraying by hand. In addition, seven growers have also considered alternative strategies to using diazinon or chlorpyrifos (Table 64). Two growers indicated they do not use chlorpyrifos. One grower added they use orchard sanitation to avoid pesticide use. The Coalition recommended additional spray management practices to five growers for fields with and without irrigation drainage (Figure 31).

Dormant Spray Management

Of the nine targeted growers, only one reported applying pesticides to 220 acres of dormant orchards; however, the single growers does not apply when the soil moisture is at field capacity, checks weather conditions prior to spraying and maintains setback zones (Table 64).

Figure 29. Miles Creek @ Reilly Rd member parcels with direct drainage potential.

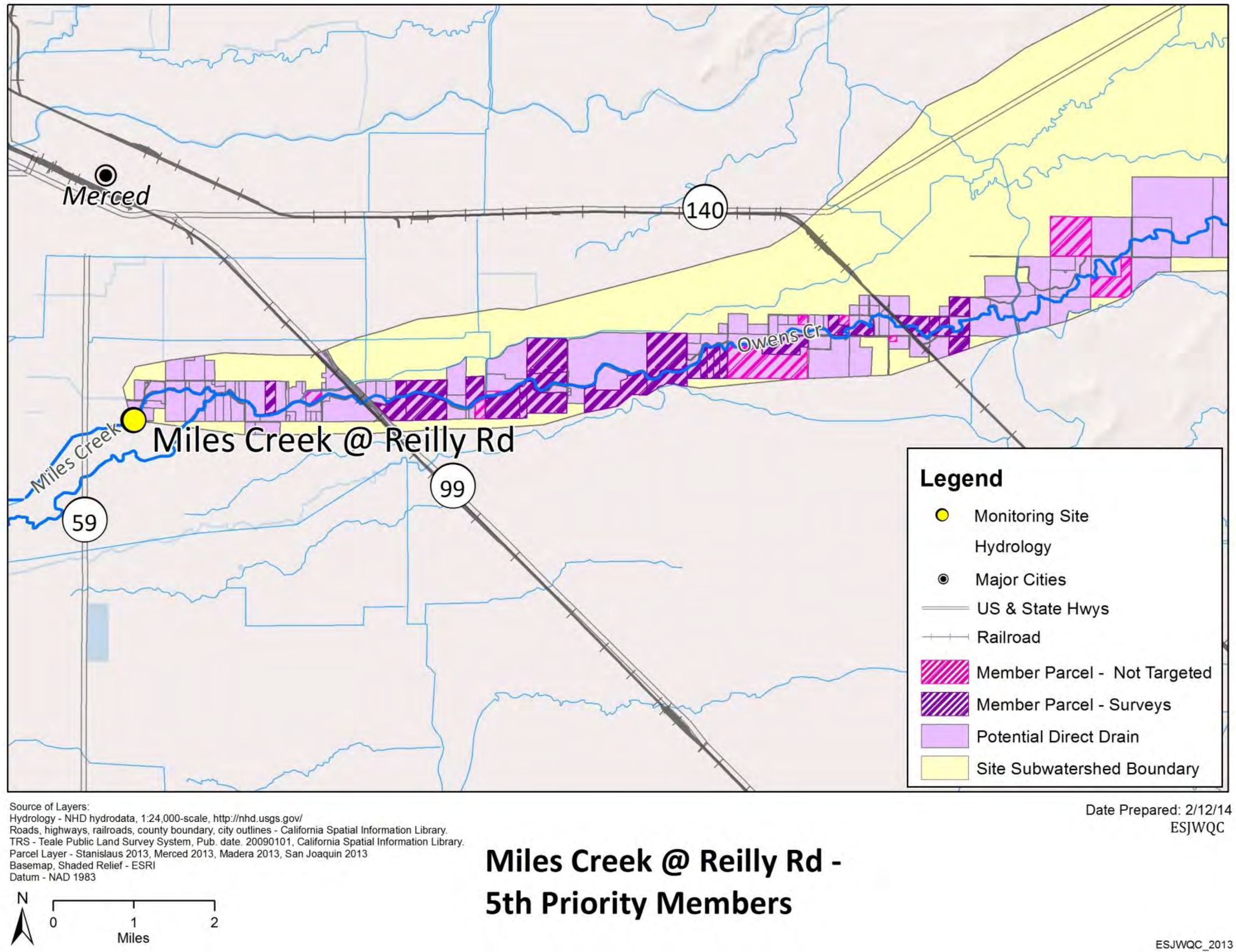


Table 64. Miles Creek @ Reilly Rd site subwatershed current management practices (2013).

Checklist	Question	Answer	Count of Answers	% Respondents	Sum of Associated Acreage
Section 1: Irrigation Water Management	Irrigation management practices:	Laser leveled fields	9	100%	1791
		Recirculation - Tailwater return system	1	11%	90
		Use drainage basins (sediment ponds) to capture and retain runoff	1	11%	204
	Irrigation System	Microirrigation	5	56%	919
		Surface	4	44%	873
		Other: Flood	1	11%	204
	Which do you base your irrigation schedule on:	Actual Moisture Levels in soil/crop needs	9	100%	1791
		Irrigation District Deliveries	6	67%	1034
Section 2: Storm Drainage	How are you able to manage storm drainage?	Berms Between Field & Waterway (Install and/or Improve)	6	67%	1409
		No Storm Drainage	6	67%	1058
		Recirculation - Tailwater return system (Storm Drainage Management)	1	11%	90
		Settling Pond	1	11%	204
	When do you have storm water draining from your field?	After soil is saturated-late winter	2	22%	579
		No Storm Drainage	5	56%	855
		Only in heavy (100 year) storms	2	22%	358
Section 3: Erosion & Sediment Management	Do you apply herbicides during winter months?	Do not apply	2	22%	294
		Glyphosate (Round-Up)	5	56%	919
		Goal	2	22%	132
		Other: Karmex	1	11%	348
		Other: None	1	11%	231
	If waterway crosses or borders pasture, how is livestock managed?	N/A - Not Pasture	9	100%	1791
	Sediment management practices:	Grass Row Centers (Orchards, Vineyards)	5	56%	919
		Maintain vegetated filter strips around field perimeter at least 10' wide	8	89%	1701
		Vegetation is planted along or allowed to grow along ditches	9	100%	1791
Section 4: Pest Management	Have you considered alternative strategies to using diazinon or chlorpyrifos either during the dormant or growing season?	N/A	2	22%	552
		Yes	7	78%	1240
	How often is spray equipment calibrated?	Prior to each application	8	89%	1443
	Spray management practices:	Adjust spray nozzles to match crop canopy profile	7	78%	1240
		Outside nozzles shut off when spraying outer rows next to sensitive sites	9	100%	1791
		Spray areas close to waterbodies when the wind is blowing away from them	4	44%	597
		Use air blast applications when wind is between 3-10 mph and upwind of a sensitive site	3	33%	864
		Uses of nozzles that provide largest effective droplet size to minimize drift	9	100%	1791
Section 5: Dormant Spray Management	Do you apply when soil moisture is at field capacity?	No	1	11%	196

CHECKLIST	QUESTION	ANSWER	COUNT OF ANSWERS	% RESPONDENTS	SUM OF ASSOCIATED ACREAGE
	Dormant spray management practices:	Check weather conditions prior to spraying (i.e. storm status)	1	11%	196
		Maintain setback zones	1	11%	196
	Have you been informed of DPR's Dormant Spray Regulations?	Yes	1	11%	196
	How many acres are sprayed with pesticides on dormant orchards?	220 Acres	1	11%	196
		No Dormant Sprays	8	89%	1595
	Prior to applying winter dormant sprays, what is the condition of your orchard floor?	Some vegetation	1	11%	196

Figure 30. Miles Creek @ Reilly Rd crop acreage information from member surveys (2013).

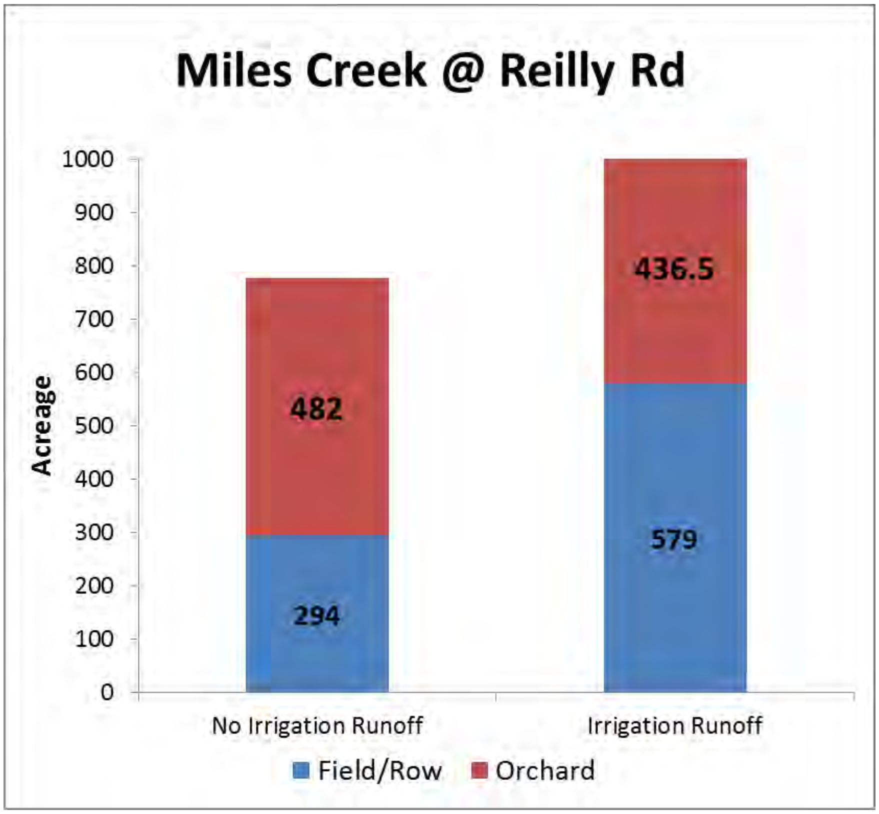
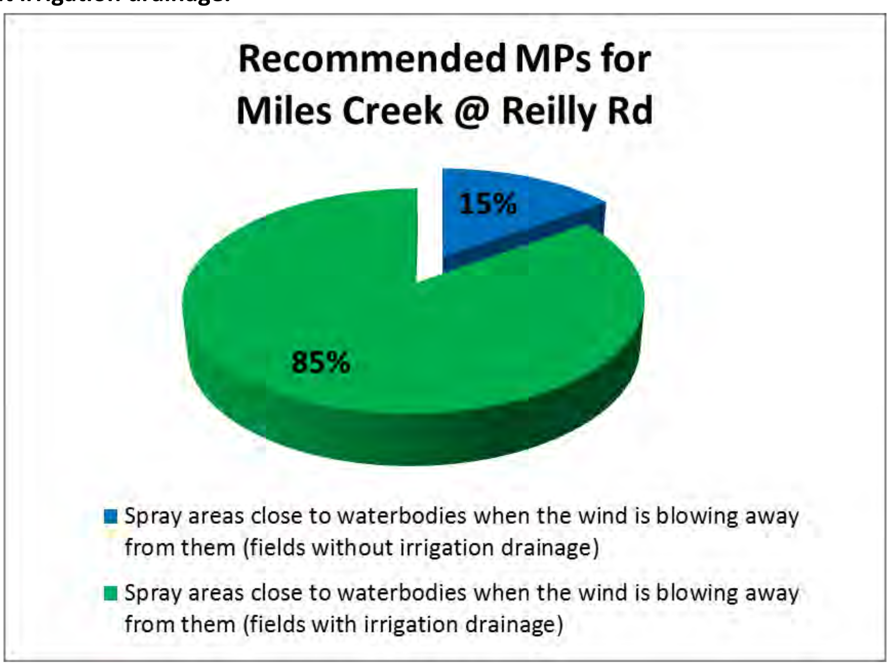


Figure 31. Miles Creek @ Reilly Rd recommended management practice (2013) acreage percentage for members with and without irrigation drainage.



SIXTH PRIORITY SUBWATERSHEDS SUMMARY OF MANAGEMENT PRACTICES (2014-2016)

The Coalition began focused outreach in sixth priority site subwatersheds in November and December of 2013. The Coalition compiled a list of targeted growers in the Ash Slough @ Ave 21 (18), Mustang Creek @ East Ave (6), and Westport Drain @ Vivian Rd (5) site subwatersheds. On November 19, 2013, the Coalition mailed targeted growers a letter requesting that the grower contact the Coalition to schedule a required meeting with a Coalition representative (Table 55). The Coalition began conducting individual grower meetings in late 2013 and will complete individual grower meetings by September 30, 2014. The Coalition will report the results of individual grower meetings and currently implemented management practices in the 2015 Annual Report. Follow-up contacts will occur during the fall of 2014 and winter of 2015.

EVALUATION OF MANAGEMENT PRACTICE EFFECTIVENESS

The Coalition has documented management practices implemented from 2008 through 2013 for the priority subwatersheds listed in Table 65.

Table 65. Years of MPM and current and newly implemented management practices in high priority site subwatersheds with two or more years of focused outreach.

Priority Group	Site Name	Year(s) of Current MPs	Year(s) of Newly Implemented MPs	Year(s) of WQ Assessment for Evaluation[1]
First (2008-2010)	Dry Creek @ Wellsford	2008-2009	2009-2011	2009-2013
	Duck Slough @ Hwy 99[2]	2008	2009-2010	2009-2013
	Prairie Flower Drain @ Crows Landing Rd	2008	2009-2010	2009-2013
Second (2010-2012)	Bear Creek @ Kibby Rd	2009	2010-2011	2009-2013
	Cottonwood Creek @ Rd 20	2009	2010-2011	2010-2013
	Duck Slough @ Gurr Rd	2009	2010-2011	2010-2013
	Highline Canal @ Hwy 99	2009	2010-2011	2010-2013
Third (2011-2013)	Berenda Slough along Ave 18 ½	2010-2011	2011-2012	2011-2013
	Dry Creek @ Rd 18	2010-2011	2011-2012	2011-2013
	Lateral 2 ½ near Keyes Rd	2010-2011	2011-2012	2011-2013
	Livingston Drain @ Robin Ave	2010-2011	2011-2012	2011-2013
Fourth (2012-2014)	Black Rascal Creek @ Yosemite Rd	2012-2013	2013-2014	2013
	Deadman Creek @ Gurr Rd	2012-2013	2013-2014	2013
	Deadman Creek @ Hwy 59	2012-2013	2013-2014	2013
	Hilmar Drain @ Central Ave	2012-2013	2013-2014	2013

[1] In 2012, MPM was suspended April through December in all site subwatersheds except at Bear Creek @ Kibby Rd.
[2] On April 26, 2012, the Coalition received approval to remove Duck Slough @ Hwy 99 from the Coalition's monitoring program. All remaining active management plan constituents will be addressed at the Duck Slough @ Gurr Rd site.
MP – Management Practice
WQ – Water Quality

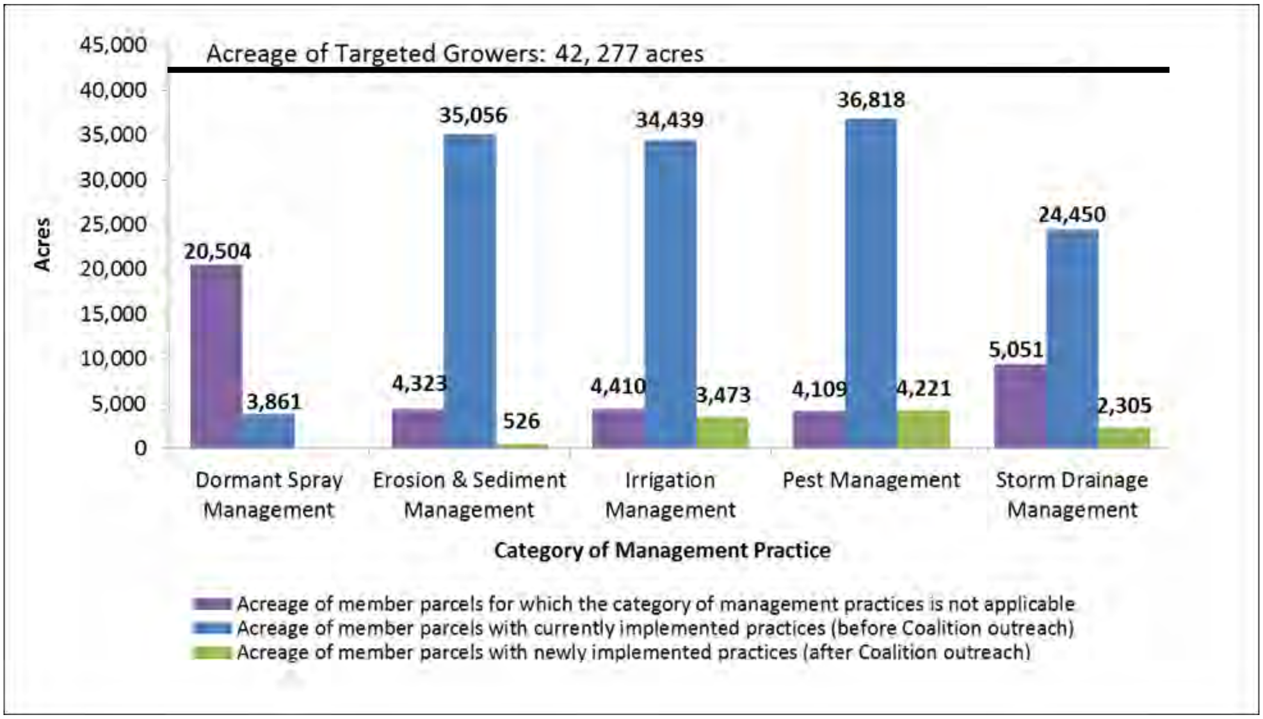
Summary of Management Practices

During initial focused outreach meetings, the Coalition documented numerous management practices currently implemented by members. The survey completed during the initial contact is organized into Checklist Sections which categorize management practices into five categories: Irrigation Water Management, Storm Drainage, Erosion and Sediment Management, Pest Management, and Dormant Spray Management. The Coalition reports each currently implemented management practice per each site subwatershed in the Management Practice sections of MPURs (first priority in the 2011 MPUR, Pages 50-80; second, third priority in 2012 MPUR, Pages 67-124; fourth priority in this report). The Coalition then summarizes currently implemented practices by category.

Figure 32 compares the acreage associated with currently implemented practices (before outreach) to newly implemented practices (after outreach) for the subwatersheds listed in Table 65. In some cases, management practices are not applicable. For example, if a grower does not need to apply dormant sprays, dormant spray management activities are not applicable. Pest Management Practices have been implemented by members across the largest amount of acreage before and after outreach (Figure 32).

Figure 32. Targeted acreage of categories of current and newly implemented management practices in the first, second, third, and fourth priority site subwatersheds.

Targeted acreage associated with grower displayed if one or more practice(s) are implemented per category. Several practices serve multiple purposes and fall into more than one category, but practices are counted only once with their primary category.



As a result of focused outreach, 49% of targeted growers in 15 subwatersheds implemented new management practices. Thirty-eight growers implemented additional management practices from 2009 through 2013 (Table 66). The number and type of practices implemented by members varies among site subwatersheds because each location is unique in both water quality impairments and causes of the impairments. Table 67 lists the number of acres associated with each newly implemented management practice. Growers implemented several new practices in the Pest Management and Dormant Spray Management categories to manage spray drift. Growers took additional steps to better manage irrigation tailwater and storm drainage. The most common practices include reducing the volume of water used for irrigation and installing a device to control the timing of discharge (tailwater and/or storm water runoff, Table 67).

Table 66. Count of targeted growers implementing new management practices in first, second, third, and fourth priority site subwatersheds.

Priority Group	Site Name	Number of Growers Implementing:			Number of Growers:		% Targeted Growers Implementing New MPs	Count of New MPs Implemented
		1 New MP	2 New MPs	3 New MPs	Implementing new MPs	Targeted (Follow-up)		
First (2008-2010)	Dry Creek @ Wellsford Rd	7	1	0	8	22	36%	9
	Duck Slough @ Hwy 99	3	3	1	7	20	35%	12
	Prairie Flower Drain @ Crows Landing	2	1	1	4	10	40%	7
	1st Priority Total	**12**	**5**	**2**	**19**	**52**	**37%**	**28**
Second (2010-2012)	Bear Creek @ Kibby Rd	2	1	0	3	14	21%	4
	Cottonwood Creek @ Rd 20	5	1	0	6	24	25%	7
	Duck Slough @ Gurr Rd	2	0	0	2	6	33%	2
	Highline Canal @ Hwy 99	2	2	0	4	8	50%	6
	2nd Priority Total	**11**	**4**	**0**	**15**	**52**	**29%**	**19**
Third (2011-2013)	Berenda Slough along Ave 18 ½	1	1	0	2	3	67%	3
	Dry Creek @ Rd 18	1	2	0	3	3	100%	5
	Lateral 2 ½ near Keyes Rd	2	0	1	3	3	100%	5
	Livingston Drain @ Robin Ave	1	0	1	2	3	67%	4
	3rd Priority Total	**5**	**3**	**2**	**10**	**12**	**83%**	**17**
Fourth (2012-2014)	Black Rascal Creek @ Yosemite Rd	0	0	0	0	1	0%	0
	Deadman Creek @ Gurr Rd	0	0	0	0	2	0%	0
	Deadman Creek @ Hwy 59	4	1	0	5	8	62%	5
	Hilmar Drain @ Central Ave	2	2	0	4	3	133%	4
	4the Priority Total	**6**	**3**	**0**	**9**	**14**	**64%**	**9**
	1st, 2nd, 3rd, and 4th Priority Total	**23**	**11**	**4**	**38**	**78**	**49%**	**54**

MP – Management Practice

Table 67. Summary of first, second, third, and fourth priority subwatershed targeted acreage with newly implemented management practices.
First, second, third, and fourth subwatersheds have been reported on in previous MPURs, and summarized in this table.

Practice Category	Management Practices	1st Priority Subwatersheds	2nd Priority Subwatersheds	3rd Priority Subwatersheds	4th Priority Subwatersheds: Black Rascal Creek @ Yosemite Rd	Deadman Creek @ Gurr Rd	Deadman Creek @ Hwy 59	Hilmar Drain @ Central Ave	Sum of Acreage	% of Targeted Acres with New Practices Implemented
	Targeted Acreage:	11,273	10,084	10,974	301	240	3414	455	36,741	NA
Irrigation, Storm Runoff	Berms between field & waterway			402			62	18	482	1%
	Drainage Basins (Sediment Ponds)	271							271	1%
	Install device to control amount/timing of discharge to waterway	1,660		402			62	18	2,142	6%
	Microirrigation system	279	207	71					557	2%
	Recirculation - Tailwater return system	443					470	139	1,052	3%
	Reduce amount of water used in surface irrigation	1,197	1,028	308					2,533	7%
	Use Polyacrylamide (PAM)	150							150	<1%
Sed. and Erosion	Filter strips at least 10' wide around field perimeter	28	8				383		419	1%
	Grass row centers	107							107	<1%
Pest, Dormant Spray	Calibrate spray equipment prior to every application			44					44	<1%
	Shut off outside nozzles when spraying outer rows next to sensitive sites	1,170	622	251					2,043	6%
	Spray areas close to waterbodies when the wind is blowing away from them		1,223	528					1,751	5%
	Use air blast applications when wind is 3-10 mph and upwind of sensitive sites		25						25	<1%
	Use electronic controlled sprayer nozzles		375						375	1%
	Use nozzles that provide largest effective droplet size to minimize drift		121	215				139	475	1%
Other[1]	Other (Not specified)	4,102					303		4,405	12%
	Total Acres of Implemented Management Practices	**9,407**	**3,609**	**2,221**	**0**	**0**	**1280**	**314**	**16,831**	**46%**

[1]Management practices implemented other than those specifically recommended by Coalition representatives for growers.

Evaluation of Water Quality (2013 Results)

Starting in 2009, the Coalition conducted MPM to evaluate the effectiveness of newly implemented management practices. High priority management plan constituents include chlorpyrifos, copper, diazinon, diuron, *C. dubia* water column toxicity, *S. capricornutum* water column toxicity, and *H. azteca* sediment toxicity. As growers have implemented new management practices, the number of exceedances of high priority constituent WQTLs have decreased. The improved water quality in the first through fourth site subwatersheds demonstrates the effectiveness of management practices. Due to management practices implemented by growers, the Coalition has removed 28 constituents from 14 site subwatershed management plans in the first through fourth priority subwatersheds (Table 70).

Tables 68 and 69 include the number of exceedances per year (from 2006 through September 2013) and the ratio of the number of exceedances relative to the number of samples collected (as a percentage) for the first through fourth high priority site subwatersheds; the percentage is graphed in Figure 33. The number of samples collected for these constituents varied from year to year due to changes in MPM schedules and the rotating Assessment Monitoring schedule.

Table 68. Count of exceedances and samples collected for high priority pesticides in first, second, third, and fourth priority subwatersheds.

The 2013 data are from January through September.

Year	Chlorpyrifos				Copper[1]				Diazinon				Diuron			
	Count of Exceedances	Count of Samples[2]	% Exceedance	Lbs Applied[3]	Count of Exceedances	Count of Samples[2]	% Exceedance	Lbs Applied[3]	Count of Exceedances	Count of Samples[2]	% Exceedance	Lbs Applied[3]	Count of Exceedances	Count of Samples[2]	% Exceedance	Lbs Applied[3]
2006	12	81	15%	88,931	13	50	26%	310,403	0	81	0%	4,100	0	65	0%	13,440
2007	13	114	11%	68,454	41	94	44%	214,930	1	110	1%	4,275	6	106	6%	19,564
2008	13	129	10%	41,387	28	119	24%	170,622	2	120	2%	2,355	7	121	6%	10,703
2009	3	36	8%	95,088	1	42	2%	164,149	0	29	0%	1,855	0	24	0%	10,703
2010	7	41	17%	49,164	3	72	4%	231,103	0	26	0%	1,148	0	29	0%	14,639
2011	3	98	3%	40,362	25	170	15%	271,524	0	85	0%	1,131	0	86	0%	22,386
2012	0	31	0%	43,080	5	40	13%	225,009	0	24	0%	4,10	0	29	0%	14,950
2013	1	35	3%	59,633	7	44	16%	205,239	0	10	0%	376	1	12	8%	6,344

[1]Since October 2008, the Coalition analyzes for both the total and dissolved fraction of copper in every event. For counting exceedances and samples scheduled for copper analysis, this table ignores fraction (e.g. if a site is scheduled for copper total and copper dissolved analysis, only one sample is counted for copper). Concentrations from a single sample collected from one site during one event have never exceeded both the total and dissolved copper WQTLs.

[2] Refers to all samples scheduled for constituent analysis (dry sites are included).

[3] All PUR data are considered preliminary until received from California Pesticide Information Portal (CalPIP); CalPIP data are available through December 2011.

Table 69. Count of toxicities and samples collected for high priority toxic analysis in first, second, third, and fourth priority subwatersheds.

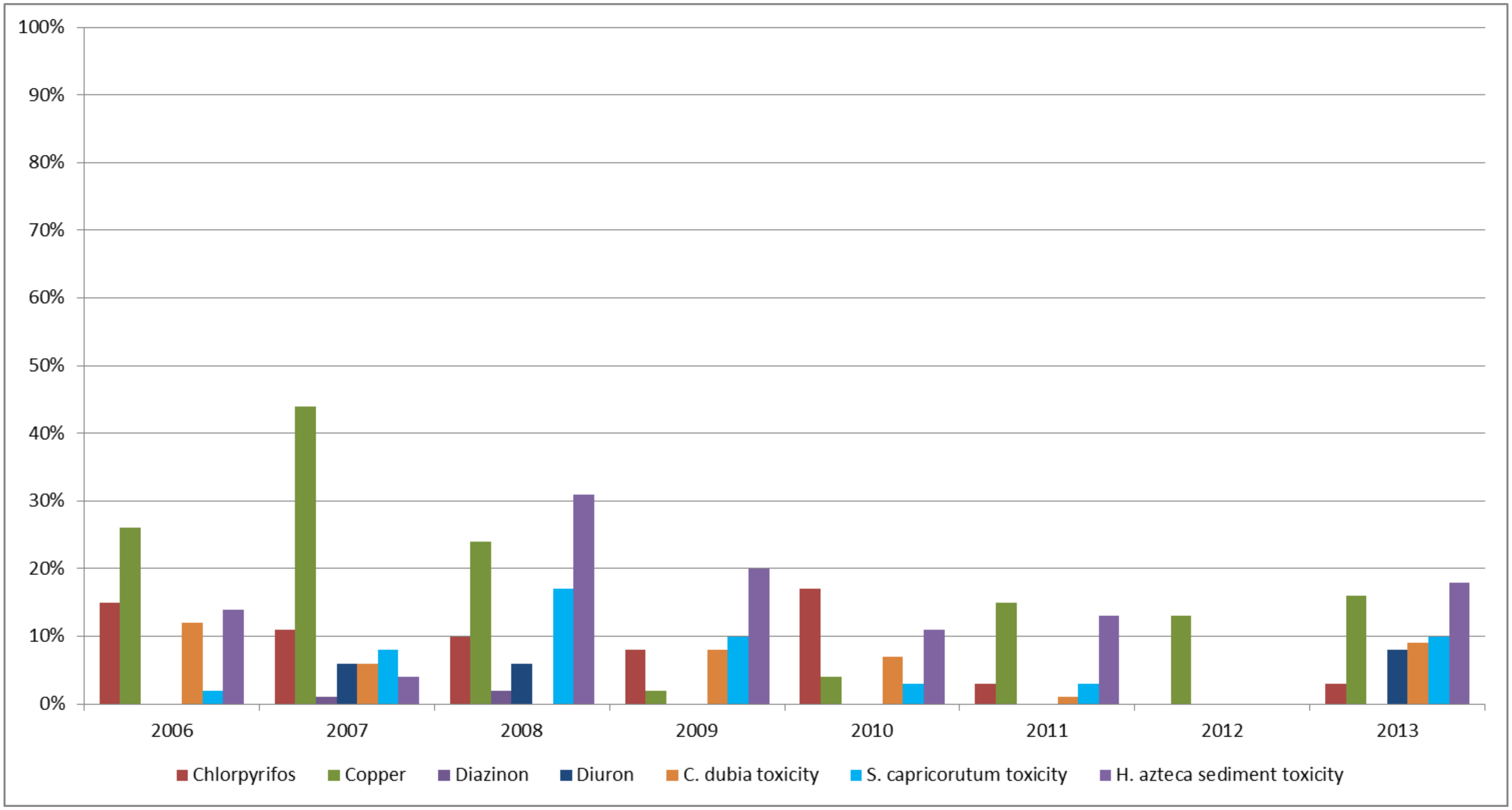
The 2013 data are from January through September.

Year	*C. dubia* Toxicity			*S. capricornutum* Toxicity			*H. azteca* Sediment Toxicity		
	Count of Toxicities	Count of Samples[1]	% Toxic	Count of Toxicities	Count of Samples[1]	% Toxic	Count of Toxicities	Count of Samples[1]	% Toxic
2006	10	84	12%	2	82	2%	3	22	14%
2007	7	113	6%	9	113	8%	1	25	4%
2008	0	125	0%	22	128	17%	9	29	31%
2009	2	24	8%	3	31	10%	1	5	20%
2010	2	27	7%	1	37	3%	1	9	11%
2011	1	86	1%	3	92	3%	2	16	13%
2012	0	30	0%	0	32	0%	0	9	0%
2013	2	23	9%	3	30	10%	2	11	18%

[1] Samples refers to all samples scheduled for constituent analysis (dry sites are included). Resampling events are not scheduled monitoring events and are not included.

NA – Not applicable, no samples were collected for the constituent during the year.

Figure 33. Percentage of exceedances of WQTLs for high priority constituents in first, second, third, and fourth priority site subwatersheds.
The 2013 exceedances are from January through September.



Chlorpyrifos

Chlorpyrifos has been removed from Bear Creek @ Kibby Rd, Cottonwood Creek @ Rd 20, Duck Slough @ Gurr Rd, Highline Canal @ Hwy 99, Hilmar Drain @ Central Ave, and Prairie Flower Drain @ Crows Landing Rd management plans (Table 68). Seven site subwatersheds remain in a management plan for chlorpyrifos. Forty-nine percent of targeted growers are implementing new management practices based on the Coalition's focused outreach in first through fourth site subwatersheds. As a result, the amount of chlorpyrifos entering the waterways has decreased and exceedances of the WQTL for chlorpyrifos have gone from 13 exceedances in 2008 to one exceedance in 2013 (Table 68).

Samples collected for MPM on September 10, 2013 had an exceedance of the WQTL for chlorpyrifos at Dry Creek @ Wellsford (0.14 µg/L; Table 38). PUR data associated with the September exceedance at indicate that from August 24, 2013 through September 10, 2013, 11 applications ranging between 0.31 and 80.80 lbs AI were made. A total of 280 lbs of chlorpyrifos applied across 214 acres of corn and walnuts were associated with this exceedance. According to the PUR data, there were applications of chlorpyrifos across three parcels associated with the September 2013 exceedance. Two of the three parcels (corn and walnut crops) are farmed by Coalition members; however, these parcels are located too far away to have contributed to the exceedance since they do not directly drain to the creek (Figure 13). Chlorpyrifos applications to corn were made to a non-member parcel and likely caused the exceedance (Figure 13). Of the 35 samples analyzed for chlorpyrifos in 2013, this was the only sample that had an exceedance. The Coalition believes that practices implemented by members in the first through fourth subwatersheds have prevented offsite movement of chlorpyrifos form their properties.

Copper

Copper has been removed from Bear Creek @ Kibby Rd, Deadman Creek @ Gurr Rd, and Dry Creek @ Wellsford Rd management plans. Copper is included in management plans for Berenda Slough along Ave 18 ½, Cottonwood Creek @ Rd 20, Dry Creek @ Rd 18, Duck Slough @ Gurr Rd, Highline Canal @ Hwy 99, Hilmar Drain @ Central Ave, and Livingston Drain @ Robin Ave.

The PUR data indicate that applications of copper remain consistent over time throughout the first through fourth site subwatersheds. The majority of exceedances of the hardness based WQTL for copper that occurred in the first through fourth high priority site subwatersheds in 2013 occurred at Dry Creek @ Rd 18 during Assessment Monitoring (71% of the exceedances). The Coalition discussed copper during focused outreach in 2011 and 2012 at the site, and growers implemented management practices designed to reduce the offsite movement of copper (i.e. eliminate spray drift and reduce runoff of storm water and irrigation tailwater; Table 68). Sources of copper in waterways within the ESJWQC region include naturally elevated concentrations of copper in the soils or source waters and anthropogenic sources including applications by growers and applications by water districts. Therefore, management practices implemented by growers can be effective and still not eliminate exceedances of the hardness based WQTL for copper. The Coalition will continue to monitor for copper in the first through fourth priority site subwatersheds in a management plan for copper to assess water quality improvements.

Diazinon

Diazinon has been removed from the all management plans for first through fourth high priority site subwatersheds (Cottonwood Creek @ Rd 20 and Dry Creek @ Rd 18). Management practices implemented by growers are effective in improving water quality and are successful in preventing diazinon from entering the waterways. A single exceedance of the diazinon WQTL occurred in a field duplicate collected from a fifth priority site subwatershed (Miles Creek @ Reilly Rd). Management practices have not yet been completely documented in this subwatershed.

Diuron

Diuron has been removed from three site subwatershed management plans for Cottonwood Creek @ Rd 20, Dry Creek @ Wellsford Rd, and Highline Canal @ Hwy 99. There are two site subwatersheds with management plans for diuron, Dry Creek @ Rd 18 (third priority) and Hilmar Drain @ Central Ave (fourth priority). One sample collected on January 8, 2013 for diuron from Dry Creek @ Rd 18 resulted in an exceedance of the diuron WQTL (5.2 µg/L, Table 51). The PUR data associated with the January exceedance indicate there were 13 applications between 64 and 1,184 lbs AI (4384 lbs AI total) of diuron across 1,370 acres of oranges and tangerines from November 14, 2012 through December 8, 2012 (Appendix V). Heavy rainfall from January 5 through January 6, 2013 was reported at 0.87 inches (Madera). This substantial amount of rainfall could have resulted in storm runoff that might have transported diuron applied on the fields to the waterways, contributing to the exceedance. Growers implemented several management practices designed to address storm water runoff and dormant spray applications (e.g. maintaining filter strips at least 10 feet wide, spray areas close to waterbodies when the wind is blowing away from them; Table 68). These management practices are effective in reducing the offsite movement of diuron; prior to 2013, the last exceedance of the WQTL occurred in 2008. The applications of diuron closest to the sample date of the exceedance (December 8 and November 22) were made on TRS' that are not associated with a management practice survey. The Coalition will continue to monitor for diuron at Dry Creek @ Rd 18 and provide growers with general outreach.

C. dubia toxicity

The Coalition received approval on February 27, 2013 to remove *C. dubia* toxicity from the Bear Creek @ Kibby Rd management plan. Site subwatershed management plans remain for *C. dubia* toxicity in Dry Creek @ Wellsford Rd, Deadman Creek @ Gurr Rd, Prairie Flower Drain @ Crows Landing Rd, Duck Slough @ Gurr Rd, Highline Canal @ Hwy 99, and Black Rascal @ Yosemite Rd. Across the ESJWQC region, water toxicity to *C. dubia* has been associated with organophosphates in surface waterways. Samples collected on August 13, 2013 from Prairie Flower Drain @ Crows Landing Rd were toxic to *C. dubia*; the TIE indicated non-polar organics/organophosphates were the cause of the toxicity. Additional lab analysis ran outside of hold time on left over sample water confirmed that the August sample from Prairie Flower Drain @ Crows Landing Rd contained chlorpyrifos. The PUR data associated with the *C. dubia* toxicity in August indicate there were 23 applications of chlorpyrifos ranging from 0.14 to 60 lbs AI. A total of 286 lbs AI were applied from May 11, 2013 through August 12, 2013 across 1,107 acres of almonds and corn (Appendix V).

Samples collected on March 12, 2013 during MPM from Duck Slough @ Gurr Rd were toxic to *C. dubia*; the TIE indicated that non-polar organics/organophosphates were the cause of the toxicity. The PUR data associated with the *C. dubia* toxicity in March indicate there were 10 applications of malathion on March 9, 2013 to alfalfa and barley (Appendix V).

S. capricornutum toxicity

The Coalition received approval to remove *S. capricornutum* toxicity from the Dry Creek @ Wellsford Rd, Deadman Creek @ Hwy 59, Duck Slough @ Hwy 99, Duck Slough @ Gurr Rd, and Berenda Slough along Ave 18 ½ site subwatershed management plans.

Management plans were implemented for *S. capricornutum* toxicity in the remaining first through fourth priority site subwatersheds: Deadman Creek @ Gurr Rd, Dry Creek @ Rd 18, Highline Canal @ Hwy 99, Hilmar Drain @ Central Ave, Livingston Drain @ Robin Ave, and Prairie Flower Drain @ Crows Landing Rd. Toxicity to *S. capricornutum* occurred at Prairie Flower Drain @ Crows Landing Rd in January 2013. No TIE was conducted on the sampled due to low DO values, high suspended solids, and high ammonia levels. Prairie Flower Drain @ Crows Landing Rd contains both irrigated agricultural and dairy parcels that discharge to the drain. Management practices implemented by members within the Prairie Flower site subwatershed may be effective and still not eliminate all exceedances.

Samples collected in February from Dry Creek @ Rd 18 and Highline Canal @ Hwy 99 were toxic to algae (4% and 50% growth compared to the control, respectively). Both waterbodies were non-contiguous and did not connect to a downstream waterbody. Dry Creek @ Rd 18 had no WQTL exceedances of any metals to coincide with the algae toxicity. The PUR data associated with the *S. capricornutum* toxicity at Dry Creek @ Rd 18 in February indicate there were 410 applications of herbicides ranging between 0.0562 and 6787 lbs AI (106,818 total lbs AI) across 18,917 acres of almonds, cherry, fig, grape, oat, olive, orange, pistachios, tangerine, walnut, and wheat from November 20, 2012 through February 12, 2013. The PUR data associated with the February toxicity at Highline Canal @ Hwy 99 indicate there were 600 applications of herbicides ranging between 0.0096 and 17,552 lbs AI (188,806 total lbs AI) across 40,504 acres of alfalfa, almonds, grape, kiwi, peaches, pistachios, walnuts, and wheat from November 27, 2012 through February 12, 2013 (Appendix V). Compared to 2008, there has been a decrease in the percent of algae toxicities from 17% to 10% in 2013.

H. azteca toxicity

Site subwatershed management plans were implemented for sediment toxicity to *H. azteca* in the Dry Creek @ Wellsford Rd, Prairie Flower Drain @ Crows Landing Rd, Duck Slough @ Gurr Rd, Highline Canal @ Hwy 99, Dry Creek @ Rd 18, and Hilmar Drain @ Central Ave site subwatersheds. The Coalition discussed management practices to address sediment toxicity during its focused outreach to growers in the first through fourth priority site subwatersheds. Two out of 11 sediment samples were toxic to *H. azteca* from first through fourth priority subwatersheds. One sample had survival greater than 90% compared to the control (Dry Creek @ Rd 18) and the second had 0% survival compared to the control (Table 40). Although survival was considered statistically different from the control, the percentage of survival was above 90% compared to the control and therefore the difference between the sample and the control survival was not considered ecologically relevant. Sediment samples collected on September 10, 2013 from Duck Slough @ Gurr Rd were toxic to *H. azteca* (0% survival compared to the control, Table 40). The PUR data indicate both chlorpyrifos and various pyrethroids were applied prior to toxicity. The management practices recommended by the Coalition to reduce the offsite movement of storm water, irrigation tailwater, and/or sediment are effective in that, overall, there was a reduction in the percentage of *H. azteca* toxicities from 2008 through 2013 (31% in 2008 compared to 18% in 2013, Table 69).

STATUS OF SPECIAL PROJECTS

Special projects in the ESJWQC region include MPM and TMDL compliance monitoring. During January through September 2013, the ESJWQC monitored in accordance with the Regional Board's Basin Plan for the Sacramento and San Joaquin River basins, the ILRP MRP for Coalition Groups (Order No. R5-2008-0005), and the 2008 Management Plan.

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

MANAGEMENT PLANS

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

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

The Coalition received approval on May 30, 2012 and October 15, 2013 to remove specific site/constituent pairs from active management plans. Table 70 lists all of the specific site/constituent pairs approved for removal from active management plans. Three years of monitoring at a site subwatershed with no exceedances of a specific constituent indicates improved water quality due to grower reduction/elimination of the offsite movement of agricultural constituents and/or newly implemented management practices.

Table 70. Status of management plan constituents at ESJWQC site subwatersheds.

Active - X, removed – dark grey cell, or reinstated – light grey cell with 'X'.

Site Subwatershed	Most Recent Assessment Monitoring	Dissolved Oxygen (DO)*	pH*	Specific Conductance (SC)*	Total Dissolved Solids (TDS)	Ammonia	Nitrate/Nitrite	*E. coli*	Arsenic	Copper (Total & Dissolved)	Lead (Total & Dissolved)	Molybdenum	Chlorpyrifos	DDE	Diazinon	Dimethoate	Diuron	Simazine	*C. dubia* toxicity	*H. azteca toxicity*	*P. promelas toxicity*	*S. capricornutum* toxicity	Total Removed Per Site
Ash Slough @ Ave 21	2010									X													3
Bear Creek @ Kibby Rd	2008†		X					X															4
Berenda Slough along Ave 18 1/2	2012	X						X		X			X										1
Black Rascal Creek @ Yosemite Rd	2008†	X	X					X			X		X						X				0
Cottonwood Creek @ Rd 20	2011	X						X		X	X												3
Deadman Creek @ Gurr Rd	2010	X	X	X	X	X		X	X				X						X		X	X	1
Deadman Creek @ Hwy 59	2012	X						X	X				X										1
Dry Creek @ Rd 18	2013	X	X					X		X	X		X				X			X		X	1
Dry Creek @ Wellsford Rd	2011	X	X		X			X					X						X	X			4
Duck Slough @ Gurr Rd**	2011	X	X	X				X		X	X								X	X			3
Hatch Drain @ Tuolumne Rd	2008†	X		X	X		X	X	X											X		X	0
Highline Canal @ Hwy 99	2011		X					X		X	X								X	X		X	5
Highline Canal @ Lombardy Rd	2011		X					X		X	X									X		X	3
Hilmar Drain @ Central Ave	2008†	X	X	X	X	X	X	X		X							X			X		X	1
Howard Lateral @ Hwy 140	2010		X	X	X			X		X			X										0
Lateral 2 ½ near Keyes Rd	2010		X										X										1
Levee Drain @ Carpenter Rd	2013	X		X	X	X	X	X											X				0
Livingston Drain @ Robin Ave	2008†		X					X		X			X									X	1
McCoy Lateral @ Hwy 140	2012		X							X													0
Merced River @ Santa Fe	2011	X						X			X		X						X				0
Miles Creek @ Reilly Rd	2013	X						X		X	X		X		X				X	X		X	0
Mootz Drain downstream of Langworth Pond	2013	X				X		X					X				X						0
Mustang Creek @ East Ave	2013	X		X	X		X	X		X				X									2
Prairie Flower Drain @ Crows Landing Rd	2011	X		X	X	X	X	X				X				X			X	X	X	X	2
Rodden Creek @ Rodden Rd	2012							X															0
Unnamed Drain @ Hwy 140	2013	X	X					X															0
Westport Drain @ Vivian Rd	2008†	X		X	X		X	X					X									X	0
Total Approved Management Plan Completion (Grey Cells)		**1**	**1**	**3**	**2**	**1**	**0**	**2**	**0**	**3**	**2**	**0**	**9**	**0**	**2**	**0**	**3**	**1**	**2**	**0**	**0**	**4**	**36**
Total Reinstated Management Plans (Light Grey Cells)		**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
Total Management Plan Constituents Remaining (X)		**18**	**14**	**9**	**9**	**5**	**6**	**24**	**3**	**13**	**8**	**1**	**13**	**1**	**1**	**1**	**3**	**0**	**9**	**9**	**2**	**10**	

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

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

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

Overview of Management Plan Monitoring and Results

This is the sixth annual update of Management Plan actions. In this report, monitoring data for the previous year are evaluated for exceedances and water quality improvements. This update includes an assessment of water quality based on January through September 2013 monitoring results including new exceedances and new site/constituents requiring management plans.

The Coalition conducted monitoring from January through September 2013 as outlined in the Coalition's Monitoring and Reporting Program Plan (MRPP, Pages 33-59) and Management Plan. During this monitoring period, MPM was conducted at high priority locations for constituents requiring a management plan. In some cases, these constituents were already being monitored under the MRPP monitoring schedule (Table 10, Pages 51-52). Table 10 lists the locations and type of sampling conducted from January through September 2013; Table 6 includes the MPM schedule.

Table 10 includes the ESJWQC MPM schedule for January through September 2013. Based on the prioritization of constituents with exceedances, MPM was conducted for copper, lead, chlorpyrifos, diazinon, dimethoate, diuron, water column toxicity (*Ceriodaphnia dubia, Pimephales promelas,* and *Selenastrum capricornutum*), and sediment toxicity (*Hyalella azteca*).

Management Plan Monitoring Results

Table 71 includes all MPM sites and monitoring results from January through September 2013. During this monitoring period, exceedances of the WQTL for copper occurred in 11 of 65 MPM samples collected or 17% (Table 71). One exceedance of the WQTL for chlorpyrifos occurred out of 38 MPM samples collected or 3%. There were no other exceedances of management plan constituent WQTLs during 2013 MPM. Samples collected for toxicity MPM were toxic to *S. capricornutum* three times out of 37 or 8% and to *H. azteca* four times out of 16 or 25%.

Each high priority subwatershed is discussed in more detail including water quality exceedances, sourcing of exceedances, outreach, and evaluation of management practice effectiveness in the High Priority Site Subwatershed Analysis in Appendix I and II.

Table 71. January through September 2013 MPM results including percentage of samples with exceedances. "X" Indicates that a sample was collected for a management plan constituent and no exceedance of a WQTL occurred. Red numbers are exceedances of a WQTL in a MPM sample. Grey shaded cells indicate that no MPM was conducted on that date for that constituent.

Site Name	Month	Copper	Lead	Chlorpyrifos	Diazinon	Dimethoate	Diuron	*Ceriodaphnia % CONTROL*	*Pimephales % CONTROL*	*Selenastrum % CONTROL*	*Hyalella % CONTROL*
Bear Creek @ Kibby Rd	1/8/2013	X									
Berenda Slough along Ave 18 1/2	1/8/2013	X*									
Cottonwood Creek @ Rd 20	1/8/2013	13 (6.84)	X	X							
Deadman Creek @ Gurr Rd	1/8/2013								X		
Deadman Creek @ Hwy 59	1/8/2013									X	
Dry Creek @ Rd 18[1]	1/8/2013	11 (5. 79)					5.2			X	
Duck Slough @ Gurr Rd	1/8/2013	X	X								
Hatch Drain @ Tuolumne Rd	1/8/2013									X	
Highline Canal @ Hwy 99	1/8/2013	11 (8.42)									
Highline Canal @ Lombardy Rd	1/8/2013	11 (9.72)		X				X			
Livingston Drain @ Robin Ave	1/8/2013	X	X	X							
McCoy Lateral @ Hwy 140	1/8/2013	3.2 (1.87)									
Merced River @ Santa Fe	1/8/2013			X				X			
Miles Creek @ Reilly Rd[1]	1/8/2013	X	X					X			
Prairie Flower Drain @ Crows Landing Rd	1/8/2013									16	
Bear Creek @ Kibby Rd	2/12/2013	X									
Berenda Slough along Ave 18 1/2	2/12/2013	X*									
Cottonwood Creek @ Rd 20	2/12/2013	X*	X*	X*							
Deadman Creek @ Gurr Rd	2/12/2013							X	X	X	
Dry Creek @ Rd 18[1]	2/12/2013	X		X	X		X			4	
Duck Slough @ Gurr Rd	2/12/2013	X*	X*					X*			
Hatch Drain @ Tuolumne Rd	2/12/2013									X	
Highline Canal @ Hwy 99	2/12/2013	X	X							12	
Highline Canal @ Lombardy Rd	2/12/2013	X						X		X	
Hilmar Drain @ Central Ave	2/12/2013	X									
Livingston Drain @ Robin Ave	2/12/2013	X*	X*							X*	
Miles Creek @ Reilly Rd[1]	2/12/2013	X	X								
Prairie Flower Drain @ Crows Landing Rd	2/12/2013									X	
Deadman Creek @ Gurr Rd	3/12/2013			X				X	X		
Dry Creek @ Rd 18[1]	3/12/2013										X
Dry Creek @ Wellsford Rd	3/12/2013										X
Duck Slough @ Gurr Rd	3/12/2013							0			
Hatch Drain @ Tuolumne Rd	3/12/2013										72
Highline Canal @ Hwy 99	3/12/2013							X		X	X
Highline Canal @ Lombardy Rd	3/12/2013	X		X				X		X	X
Hilmar Drain @ Central Ave	3/12/2013										X
Merced River @ Santa Fe	3/12/2013							X			
Prairie Flower Drain @ Crows Landing Rd	3/12/2013							X			X
Berenda Slough along Ave 18 1/2	4/9/2013	X*		X							
Deadman Creek @ Hwy 59	4/9/2013			X						X	
Black Rascal Creek @ Yosemite Rd	4/9/2013		X								
Cottonwood Creek @ Rd 20	4/9/2013	X									
Miles Creek @ Reilly Rd[1]	4/2/2013									X	
Deadman Creek @ Gurr Rd	4/9/2013			X							

Site Name	Month	Copper	Lead	Chlorpyrifos	Diazinon	Dimethoate	Diuron	*Ceriodaphnia % CONTROL*	*Pimephales % CONTROL*	*Selenastrum % CONTROL*	*Hyalella % CONTROL*
Dry Creek @ Rd 18[1]	4/2/2013	X		X							
Duck Slough @ Gurr Rd	4/9/2013	X	X								
Hatch Drain @ Tuolumne Rd	4/9/2013									X	
Highline Canal @ Hwy 99	4/9/2013	X	X							X	
Highline Canal @ Lombardy Rd	4/9/2013									X	
Hilmar Drain @ Central Ave	4/9/2013						X			X	
Howard Lateral @ Hwy 140	4/9/2013	7.2 (4.95)									
Lateral 2 1/2 near Keyes Rd	4/9/2013			X							
Livingston Drain @ Robin Ave	4/9/2013									X	
Prairie Flower Drain @ Crows Landing Rd	4/9/2013								X	X	
Berenda Slough along Ave 18 1/2	5/14/2013	X*								X*	
Black Rascal Creek @ Yosemite Rd	5/14/2013			X				X			
Cottonwood Creek @ Rd 20	5/14/2013	X*									
Deadman Creek @ Gurr Rd	5/14/2013								X		
Dry Creek @ Rd 18[1]	5/14/2013	X	X							X	
Duck Slough @ Gurr Rd	5/14/2013	X	X								
Hatch Drain @ Tuolumne Rd	5/14/2013									X	
Highline Canal @ Hwy 99	5/14/2013		X					X		X	
Highline Canal @ Lombardy Rd	5/14/2013	X								X	
Livingston Drain @ Robin Ave	5/21/2013	X								X	
Miles Creek @ Reilly Rd[1]	5/14/2013	X									
Prairie Flower Drain @ Crows Landing Rd	5/14/2013									X	
Berenda Slough along Ave 18 1/2	6/11/2013	X*									
Cottonwood Creek @ Rd 20	6/11/2013	X*	X*								
Deadman Creek @ Gurr Rd	6/11/2013								X		
Dry Creek @ Rd 18[1]	6/11/2013	6.8 (1.77)	X								
Duck Slough @ Gurr Rd	6/11/2013	X	X								
Highline Canal @ Hwy 99	6/11/2013	X	X								
Highline Canal @ Lombardy Rd	6/11/2013							X			
Hilmar Drain @ Central Ave	6/11/2013						X				
Howard Lateral @ Hwy 140	6/11/2013			X							
Livingston Drain @ Robin Ave	6/11/2013	X		X							
Miles Creek @ Reilly Rd[1]	6/11/2013	X	X							X	
McCoy Lateral @ Hwy 140	6/11/2013	X									
Berenda Slough along Ave 18 1/2	7/9/2013	X		X						X	
Black Rascal Creek @ Yosemite Rd	7/9/2013			X				X			
Cottonwood Creek @ Rd 20	7/9/2013	X									
Deadman Creek @ Gurr Rd	7/9/2013									X	
Dry Creek @ Rd 18[1]	7/9/2013	3.7 (1.60)		X							
Dry Creek @ Wellsford Rd	7/9/2013			X							
Duck Slough @ Gurr Rd	7/9/2013	X	X								
Hatch Drain @ Tuolumne Rd	7/9/2013									X	
Highline Canal @ Hwy 99	7/9/2013	X	X								
Highline Canal @ Lombardy Rd	7/9/2013			X							
Hilmar Drain @ Central Ave	7/9/2013	X								X	
Howard Lateral @ Hwy 140	7/9/2013	X									
Lateral 2 1/2 near Keyes Rd	7/9/2013			X							
Livingston Drain @ Robin Ave	7/9/2013	X		X							
Merced River @ Santa Fe	7/9/2013			X				X			

Site Name	Month	Copper	Lead	Chlorpyrifos	Diazinon	Dimethoate	Diuron	*Ceriodaphnia % CONTROL*	*Pimephales % CONTROL*	*Selenastrum % CONTROL*	*Hyalella % CONTROL*
Miles Creek @ Reilly Rd[1]	7/9/2013	X	X	X							
Prairie Flower Drain @ Crows Landing Rd	7/9/2013					X			X		
Bear Creek @ Kibby Rd	8/13/2013	X									
Berenda Slough along Ave 18 1/2	8/13/2013	X*									
Deadman Creek @ Hwy 59	8/13/2013			X*							
Black Rascal Creek @ Yosemite Rd	8/13/2013			X				X*			
Cottonwood Creek @ Rd 20	8/13/2013	X*									
Deadman Creek @ Gurr Rd	8/13/2013			X							
Duck Slough @ Gurr Rd	8/13/2013	X	X								
Dry Creek @ Rd 18[1]	8/13/2013	3.0 (1.67)	X								
Dry Creek @ Wellsford Rd	8/13/2013			X							
Hatch Drain @ Tuolumne Rd	8/13/2013									X	
Highline Canal @ Hwy 99	8/13/2013	X	X								
Highline Canal @ Lombardy Rd	8/13/2013	X		X						X	
Livingston Drain @ Robin Ave	8/13/2013			X							
Merced River @ Santa Fe	8/13/2013							X			
Miles Creek @ Reilly Rd[1]	8/13/2013	X	X	X							
Prairie Flower Drain @ Crows Landing Rd	8/13/2013					X		0			
Berenda Slough along Ave 18 1/2	9/10/2013	X*		X*							
Black Rascal Creek @ Yosemite Rd	9/10/2013		X	X							
Cottonwood Creek @ Rd 20	9/10/2013	X									
Deadman Creek @ Hwy 59	9/10/2013			X*							
Deadman Creek @ Gurr Rd	9/10/2013			X							
Dry Creek @ Rd 18[1]	9/10/2013	2.3 (1.67)	X								92
Dry Creek @ Wellsford Rd	9/10/2013			0.14							X
Duck Slough @ Gurr Rd	9/10/2013	X	X								0
Hatch Drain @ Tuolumne Rd	9/10/2013										85
Highline Canal @ Hwy 99	9/10/2013							X			X
Highline Canal @ Lombardy Rd	9/10/2013							X		X	X
Hilmar Drain @ Central Ave	9/10/2013									X	X
Livingston Drain @ Robin Ave	9/10/2013	X*									
McCoy Lateral @ Hwy 140	9/10/2013	2.1 (1.87)									
Miles Creek @ Reilly Rd[1]	9/10/2013			X				X			X
Prairie Flower Drain @ Crows Landing Rd	9/10/2013					X		X			X
Total MPM Exceedances		**11**	**0**	**1**	**0**	**0**	**1**	**2**	**0**	**3**	**4**
Total MPM Samples Collected		**65**	**30**	**38**	**1**	**3**	**4**	**24**	**7**	**37**	**16**
% Exceedances		**17%**	**0%**	**3%**	**0%**	**0%**	**25%**	**8%**	**0%**	**8%**	**25%**

Grey cells- No MPM conducted for that site and constituent
MPM- Management Plan Monitoring
[1] Assessment Monitoring and all MPM constituents are analyzed monthly.
'X'- Sample was taken for MPM for toxicity, but there was no toxicity or, the sample was taken for Management Plan Monitoring for exceedance, but there was no exceedance.
'X*'-Indicates site was 'Dry' during sampling event

2004-2013 Exceedances

Monitoring from January through September 2013 resulted in exceedances of the WQTL for constituents previously removed from site specific management plans at Merced River @ Santa Fe for DO (May, July, August, and September 2013), and at Duck Slough @ Gurr Rd for SC (April and July) and TDS (March and July). The Coalition reevaluated the WQTLs for DO based on criteria outlined in the Fourth Edition of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins (Page III-5) which indicates the lower DO trigger limit of 5 mg/L should be utilized for Delta waterways that are 'warm' and/or not considered a resource for fisheries (Table 72). The WQTLs for SC were reevaluated based on the San Francisco Bay/Sacramento-San Joaquin Delta Basin Plan (Table 2, Page 13) which indicates the WQTL for SC is 700 µmhos/cm from April through August, and 1,000 µmhos/cm from September through March (Table 73). Following the April and July exceedances of the WQTL for SC, the Coalition reinstated the SC management plan at Duck Slough @ Gurr Rd; however, since the Coalition no longer analyzes for TDS under the new WDR, the TDS management plan was not reinstated at the site following elevated levels of TSD in March and July 2013. Both SC and TDS are measurements of salts; the Coalition believes eliminating elevated levels of SC will also improve water quality where TDS is concerned. Therefore, TDS remains a removed constituent in the Duck Slough @ Gurr Rd site subwatershed based on the May 30, 2012 approval letter. Furthermore, the Lower San Joaquin River TMDL for Salt and Boron should provide guidelines and objectives for managing salt in the ESJWQC region. It is expected the ESJWQC will become involved in a real-time management program for Salt and Boron which will aid in addressing the management of salts across the entire San Joaquin basin.

Table 72. Criteria for reevaluation of DO upper and lower WQTLs.

Zone	Monitoring Site	Site located in legal Delta?	Aquatic life BU[1]	Waterbody (section)[1]	Decision[2]	DO Criteria mg/L	Justification[1]
4	Merced River @ Santa Fe Rd	No	COLD	Merced River, Lower (McSwain Reservoir to San Joaquin River)	Sample location is designated COLD or SPAWN Aquatic Use	7	Merced River is designated as COLD Aquatic Use, therefore DO criteria is 7 mg/L.

[1] –Information provided by State Water Resources Control Board 2010 Integrated Report on Water Quality http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml.

[2] –Decision based on DO criteria outlined in the Basin Plan Water Quality Objectives for DO, Page III-5.00.

Table 73. Criteria for reevaluation of SC upper and Lower WQTLs.

Zone	Monitoring Site	SC Criteria µS/cm	Comments
5	Duck Slough @ Gurr Rd	700 (Apr-Aug)	The levels of SC measured at Duck Slough @ Gurr Rd on both April 2, and July 9, 2013 (1823 and 871 µs/cm; respectively) were above the WQTL of 700 µs/cm required for Apr-Aug and are considered exceedances based on the Basin Plan requirements.
		1,000 (Sep-Mar)	

Table 74 is a tally of exceedances of WQTLs for 2004 through 2013. Sites removed from the ESJWQC MRPP (approved June 3, 2010) and sites monitored for upstream MPM in 2008 are not included in Table 74. Upstream monitoring locations and associated exceedances were included in the MPUR submitted on April 1, 2009 and are referenced in Appendix I. Table 75 is a tally of January through September 2013 exceedances that occurred since the last update (April 1, 2013). In both Tables 74 and 75, cells with blue highlights indicate constituents that are currently in management plans. In Table 74, dark grey cells indicate sites/constituents that have been removed from active management plans and light grey cells indicate sites/ constituents previously removed from management plans but were reinstated due to exceedances in January through September 2013. In Table 75, green highlights indicate sites/constituents that have been added to a management plan due to 2013 exceedances and light green highlights indicate sites/ constituents previously removed from management plans but were reinstated due to exceedances in January through September 2013.

Table 74. ESJWQC exceedance tally based on results through September 2013.

Sites are listed alphabetically by site name and constituents are listed alphabetically within each of the following groups: field parameters (F), inorganics (I), bacteria (B), metals (M), pesticides (P) and toxicity (T). Constituents under a management plan are highlighted blue, constituents removed from management plan are highlighted grey, and constituents reinstated into a management plan are highlighted light grey. The tally only includes field duplicate exceedances if no exceedances occurred in the environmental sample.

	F		I					B	M						P																			T			
Site Name	Oxygen, Dissolved	pH	Specific Conductivity	Dissolved Solids	Ammonia	Nitrate as N	Nitrite as N	Nitrate + Nitrite as N	*E. coli*	Arsenic	Copper Dissolved†	Copper Total†	Lead	Molybdenum	Zinc	Aldicarb	Carbaryl	Carbofuran	Chlorpyrifos	Cyanazine	DDD (p,p')	DDE (p,p')	DDT (p,p')	Diazinon	Dieldrin	Dimethoate	Diuron	HCH, delta	Malathion	Methidathion	Methoxychlor	Methyl Parathion	Thiobencarb	Simazine	*C. dubia*	*P. promelas*	*S. capricornutum*	*H. azteca*
Ash Slough @ Ave 21	1								3		2	5	2						4																		1	
Bear Creek @ Kibby Rd	2	5							7	1		4							2				1												3		2	2
Berenda Slough along Ave 18 ½	12	1							7		13								4								1								1		3	
Black Rascal Creek @ Yosemite Rd	21	3							11			1	2						4																5		1	1
Cottonwood Creek @ Rd 20	21	1							22		10	12	3						3	1				1			2							1		1	2	1
Deadman Creek @ Gurr Rd	28	5	6	6	5				41	11		4							4				1		1				1						4	7	3	
Deadman Creek @ Hwy 59	20	6							18	6									6		1		1				1							1			3	1
Dry Creek @ Rd 18	5	7							6		12	21	5		1				3					2			3								1		5	3
Dry Creek @ Wellsford Rd	42	7	1	1					47			3	1						9								2						1		2		4[1]	3
Duck Slough @ Gurr Rd	7	8	4	3	1			1	27		1	8	4					1	1														2		4	1	2	8
Duck Slough @ Hwy 99	2	3							12			11	11						4																1		3	2*
Hatch Drain @ Tuolumne Rd	30		29	12	1	13	1		12	12													1			1					1						10	8
Highline Canal @ Hwy 99	1	20	1	2	2				12		3	7	7						5				1				2								4		5	6
Highline Canal @ Lombardy Rd	1	8	1		1				6		5	5	8		1				6								1		1			1		1	6	2*	6	7
Hilmar Drain @ Central Ave	6	3	44	26	2	12			20			2							1		1	1					3								1		6	4
Howard Lateral @ Hwy 140	1	6	1	1				1	3		5								1																		1	
Lateral 2 ½ near Keyes Rd		7			1			1	2										3									1									1	1
Levee Drain @ Carpenter Rd	11		20	21	4			18	13																										2	1	1	1
Livingston Drain @ Robin Ave	1	17				1			2		3	9	2						4																		4	
McCoy Lateral @ Hwy 140		7							1		7																											
Merced River @ Santa Fe	8	1		1					5			1	2						3				1					1							5		1	
Miles Creek @ Reilly Rd	11	1		1					12			7	5			1			4					1					1	1					3		4	3
Mootz Drain @ Langworth Rd	10	1			1[2]				9										2								1[2]										1	
Mootz Drain downstream of Langworth Pond	15	1			1[2]				16																		1[2]											
Mustang Creek @ East Ave	12		9	6	1			2	10		5								2			3												2	2*		1	1
Prairie Flower Drain @ Crows Landing Rd	22	6	97	80	14	18	1	46	58	1				5			1		4				1			3			1						4	3[3]	13	6
Rodden Creek @ Rodden Rd	1								6														1				1											
Unnamed Drain @ Hwy 140	2	2							3		1																											
Westport Drain @ Vivian Rd	7		19	13		13			7										2																		4	1
Grand Total	**300**	**126**	**232**	**173**	**34**	**57**	**2**	**69**	**398**	**31**	**67**	**100**	**52**	**5**	**2**	**1**	**1**	**1**	**81**	**1**	**2**	**4**	**8**	**4**	**1**	**4**	**18**	**2**	**4**	**1**	**1**	**1**	**3**	**5**	**48**	**15**	**87**	**59**

Grey cells- dark grey cells indicate the constituent has been approved for management plan completion, light grey cells indicate the constituent has been reinstated into a management plan.

*Not prioritized for MPM; both toxic samples were from the same sampling event (sample and resample to test for persistence).

[1]The total toxic samples to *S. capricornutum* at Dry Creek @ Wellsford Rd was updated from 5 to 4, the previous total counted a sample that was not considered statistically different and therefore was not toxic from March 7, 2007.

[2]Exceedances from Mootz Drain @ Langworth Rd count toward management plan for Mootz Drain Downstream of Langworth Pond if within a three year period (site moved in December 2010, as approved on November 18, 2009).

[3]Two of the *P. promelas* toxic samples at Prairie Flower Drain @ Crows Landing Rd were from the same sampling event (sample and resample to test for persistence).

† Exceedances of the hardness based WQTL for dissolved and total copper are evaluated under the same management plan.

Table 75. ESJWQC exceedance tally based on January through September 2013 monitoring.

All sites listed have had at least one exceedance in January through September 2013. Sites are listed alphabetically by site name and constituents are listed alphabetically within each of the following groups: field parameters (F), inorganics (I), bacteria (B), metals (M), pesticides (P) and toxicity (T). Green highlighted cells refer to constituents that require a management plan due to January through September 2013 exceedances; blue highlights refer to constituents already in a management plan; light green highlights refer to reinstated management plans for constituents due to January through September 2013 exceedances. The tally only includes field duplicate exceedances if no exceedance occurred in the environmental sample.

		F			I			B	M	P				T			
Zones	**Site Name**	**Oxygen, Dissolved**	**pH**	**Specific Conductivity**	**Dissolved Solids**	**Ammonia**	**Nitrate + Nitrite as N**	***E. coli***	**Copper Dissolved[1]**	**Chlorpyrifos**	**Diazinon**	**Diuron**	**Malathion**	***C. dubia***	***P. promelas***	***S. capricornutum***	***H. azteca***
6	Berenda Slough along Ave 18 ½	1															
4	Black Rascal Creek @ Yosemite Rd	4	1														
6	Cottonwood Creek @ Rd 20	2						3	1								
5	Deadman Creek @ Gurr Rd	1	2														
6	Dry Creek @ Rd 18	2	2					2	5			1				1	1
1	Dry Creek @ Wellsford Rd	5						7		1							
5	Duck Slough @ Gurr Rd	3	1	2[2]	2[3]	1		4						1			1
2	Hatch Drain @ Tuolumne Rd	7		7													2
3	Highline Canal @ Hwy 99		4					1	1							1	
3	Highline Canal @ Lombardy Rd								1								
2	Hilmar Drain @ Central Ave			5													
4	Howard Lateral @ Hwy 140								1								
2	Lateral 2 ½ near Keyes Rd		2														
2	Levee Drain @ Carpenter Rd	6		9	9	2	7	10						2	1	1	
4	Livingston Drain @ Robin Ave		6														
4	McCoy Lateral @ Hwy 140		3						2								
4	Merced River @ Santa Fe	4[2]			1[4]			1									
5	Miles Creek @ Reilly Rd	1	1		1[4]			5			1		1			1	
1	Mootz Drain downstream of Langworth Pond	6	1					6									
3	Mustang Creek @ East Ave								1								
2	Prairie Flower Drain @ Crows Landing Rd	4		10	10	2	6	5						1		1	
4	Unnamed Drain @ Hwy 140	2	2					3	1								
	Grand Total	**48**	**25**	**33**	**23**	**5**	**13**	**47**	**13**	**1**	**1**	**1**	**1**	**4**	**1**	**5**	**4**

[1] Exceedances of the hardness based WQTL for dissolved and total copper are evaluated under the same management plan.
[2]Management plans were reinstated for sites/constituents due to exceedances during January through September 2013 monitoring.
[3]TDS was approved for removal from Duck Slough @ Gurr Rd management plan on May 30, 2012; however, following exceedances in March and July 2013 TDS will be addressed under the SC management plan.
[4]Sites will not be placed in new management plans for TDS; the Coalition no longer analyzes for TDS. TDS will be addressed under the SC management plans.

2013 New Site/Constituents Requiring Management Plans

New sites requiring a focused management plan approach are added to the priority list (Table 75). Source identification, outreach, and evaluation of management practices will be addressed at all new site subwatersheds that have been added to the focused management plan list during their years of high priority status as specified in Table 75.

As a result of January through September 2013 monitoring, several new site/constituent specific management plans are required (Table 75). Sites will not be placed in new management plans for TDS since the Coalition no longer analyzes for the constituent. TDS will be addressed in the SC management plans. Listed below are constituents that triggered a new or reinstated site/constituent specific management plan following January through September 2013 monitoring.

- DO
  - Merced River @ Santa Fe (reinstated management plan)
  - Unnamed Drain @ Hwy 140
- pH
  - Unnamed Drain @ Hwy 140
- SC
  - Duck Slough @ Gurr Rd (reinstated management plan)
- *E. coli*
  - Unnamed Drain @ Hwy 140
- Diazinon
  - Miles Creek @ Reilly Rd
- Water column toxicity to *C. dubia*
  - Levee Drain @ Carpenter Rd

TMDL CONSTITUENTS

Monitoring to evaluate compliance with approved TMDLs occurred in the Coalition region during 2013. For further information on TMDL monitoring in the ESJWQC region, refer to the Monitoring Objectives and Design section of this report and the San Joaquin River Chlorpyrifos and Diazinon 2014 TMDL AMR (submitted May 1, 2014).

The Basin Plan includes TMDL monitoring and reporting requirements; dischargers must comply with the monitoring and management criteria specified per each TMDL. A narrative concerning each approved TMDL constituent is provided below to document the Coalition's strategy and actions to meet the TMDL requirements for Coalition members from January through September 2013.

If an exceedance of the WQTL occurs for a TMDL constituent, a management plan is required for that constituent in that site subwatershed. A management plan for a TMDL constituent results in additional focused monitoring, source identification, and outreach within the site subwatershed. Coalition efforts include but are not limited to: 1) MPM, 2) conducting site subwatershed grower meetings, 3) encouraging the implementation of and evaluating the efficacy of management practices, and 4) addressing the seven surveillance and monitoring objectives described in the Basin Plan. Intensive outreach and documentation of implemented management practices occur throughout the Coalition every year; however, greater efforts to acquire this information are made in locations the Coalition has designated as high priority site subwatersheds (Table 5). Furthermore, the Coalition conducts annual meetings to provide growers with information on management practices designed to improve water quality. These actions enable growers within the Coalition region to address the agricultural sources of TMDL constituents.

Chlorpyrifos and Diazinon TMDL

The San Joaquin River chlorpyrifos and diazinon TMDL was adopted by the Regional Board in October 21, 2005 and documented in an amendment to the Basin Plan (*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*). The TMDL was approved by the US EPA on December 20, 2006. Dischargers had until December 31, 2010 to be in compliance with the water quality objectives (WQOs) and loading capacity in the San Joaquin River and load allocations to the river for diazinon and chlorpyrifos.

Based on the chlorpyrifos and diazinon TMDL, the Lower San Joaquin River is divided into seven subareas, which include agricultural drainages monitored by the ESJWQC and the Westside San Joaquin River Watershed Coalition (Westside Coalition) under the Irrigated Lands Regulatory Program (ILRP). A surveillance and monitoring program was developed in 2010 to collect information necessary to assess compliance with the seven monitoring objectives established in the Basin Plan Amendment. The monitoring objectives are 1) determine load capacity compliance, 2) determine load allocation compliance, 3) determine degree of implemented management practices, 4) determine effectiveness of implemented management practices, 5) determine if alternative pesticides are impairing water quality, 6) determine if additive or synergistic effects of multiple pollutants are causing toxicity, and 7) demonstrate management practices achieve the lowest pesticide levels technically and economically achievable. The ESJWQC and the Westside Coalition collaborated to develop a monitoring plan for assessing compliance of the Lower San Joaquin River concentration based loads at the six compliance points identified in the Basin Plan Amendment (Monitoring Objective 1). Sampling occurs on a monthly basis at three of the six compliance points (at Sack Dam, at Highway 165 near Stevinson, and at Las Palmas Avenue near Patterson). During the 2013 WY (October 2012 through September 2013), sampling occurred at the other three compliance points (at Hills Ferry Rd, at the Maze Boulevard (Hwy 132) Bridge, and at the Airport Way Bridge near Vernalis) in February and from May through September 2013 (Table 76). Both Coalitions independently assess compliance with the monitoring objectives by reviewing the results of the San Joaquin River monitoring relative to the monitoring conducted in the upstream tributaries within each of the Coalition regions.

The TMDL Monitoring subsection of the Monitoring Objectives and Design section of this report outlines the ESJWQC and the Westside Coalition's collaborative monitoring plan for assessing compliance with the Lower San Joaquin River concentration based loads at the six compliance points identified in the Basin Plan Amendment. Monitoring results from the 2013 WY (October 2012 through September 2013) as well as an assessment of each Coalition's compliance with Monitoring Objectives 1- 7 will be reported in the San Joaquin River Chlorpyrifos and Diazinon TMDL 2014 AMR (submitted May 1, 2014).

Table 76. Monitoring frequency of San Joaquin River compliance points for the chlorpyrifos and diazinon TMDL.

RESPONSIBLE COALITION	STATION NAME	MONITORING FREQUENCY IN 2013 WY (OCT 2012-SEPT 2013)
Westside	San Joaquin River at Sack Dam	Monthly
Westside	San Joaquin River at Highway 165 near Stevinson	Monthly
Westside	San Joaquin River at Las Palmas Avenue near Patterson	Monthly
ESJWQC	San Joaquin River at Hills Ferry Road	Feb, and May through Sept
ESJWQC	San Joaquin River at the Maze Boulevard (Highway 132) Bridge	Feb, and May through Sept
ESJWQC	San Joaquin River at the Airport Way Bridge near Vernalis	Feb, and May through Sept

Monitoring to assess TMDL compliance occurred at the San Joaquin River at Fremont Ford site from November 2011 through February 2012 in place of the San Joaquin River at Highway 165 near Stevinson site.

During the 2013 WY one exceedance of the WQO for chlorpyrifos occurred in March samples collected from the San Joaquin River at Las Palmas Avenue near Patterson sample location. There were no detections of chlorpyrifos or diazinon at any of the ESJWQC San Joaquin River compliance points during the 2013 WY. One exceedance each for chlorpyrifos and diazinon occurred during tributary monitoring within the ESJWQC region from October 2012 through September 2013 at Dry Creek @ Wellsford Rd (0.14 µg/L; September 10, 2013) and Miles Creek @ Reilly Rd (0.18 µg/L; February 20, 2013). A complete review of results from monitoring during the 2013 WY as well as an assessment of each Coalition's compliance with Monitoring Objectives 1- 7 will be reported in the San Joaquin River Chlorpyrifos and Diazinon 2014 TMDL AMR (submitted May 1, 2014).

SUMMARY OF REQUIRED GROWER SUBMITTALS

The ESJWQC serves as the third-party group for growers within the Eastern San Joaquin River Watershed who are members of the ESJWQC. The WDR applies to growers within the Watershed who are members of ESJWQC. Table 77 includes a list of all ESJWQC submittals and approvals related to the WDR. Following the adoption of the WDR on December 7, 2012, the Coalition's Notice of Applicability (NOA) was approved on January 11, 2013. The approval date associated with the NOA starts the timeline for several other submittal requirements, including the submittal of templates designed to provide information about management practices of each Coalition member's farming operation (Farm Evaluations, Nitrogen Management Plan, Sediment and Erosion Control Plan), Groundwater Quality Assessment Report (GAR), and MPU. Accordingly, the templates and GAR outline were submitted on April 11, 2013 and the official GAR was submitted on January 13, 2014 (approval pending). Furthermore, on January 16, 2013, the Regional Board mailed a letter to non-members within the Coalition region encouraging growers who were not members to enroll in the ESJWQC by May 2013, 2013. On December 9, 2013, the Coalition received approval of the Farm Evaluation Template which was resubmitted on December 6, 2013. The Coalition resubmitted the Sediment and Erosion Plan Template on January 13, 2014; both the Sediment and Erosion Plan Template and the Nitrogen Management Plan Template approvals are pending Regional Board review. The State Water Resources Control Board has convened an expert panel tasked with developing the conceptual basis for a nitrogen use reporting system within the state. The approval of the Nitrogen Management Plan Template will most likely await the outcome of that process. The Coalition's MPU for the 2014 WY was submitted on August 1, 2013 (addendum was submitted on December 10, 2013) and was approved on February 13, 2014.

Table 77. ESJWQC WDR related submittals and approvals.

The ESJWQC WDR (R5-2012-0116-R1) was approved December 7, 2012 and revised October 3, 2013.

Item Number	Document Description	Submittal Date	Approval Date
1	Notice of Applicability-third party application	December 14, 2012	January 11, 2013
2	Regional Board letter to non-members	January 16, 2013	NA
3	Farm Evaluation Template	April 11, 2013 December 6, 2013	December 9, 2013
4	Nitrogen Management Plan Template	April 11, 2013	Approval Pending
5	Sediment and Erosion Control Plan Template	April 11, 2013	Approval Pending
6	Sediment and Erosion Control Assessment Report	January 13, 2014	Approval Pending
7	Groundwater Quality Assessment Report Outline	April 11, 2013	May 6, 2013 (memo)
8	Groundwater Quality Assessment Report	January 13, 2014	January 24, 2014 (memo) Approval Pending
9	Monitoring Plan Update (MPU)	August 1, 2013	October 9, 2013 (memo)
10	MPU Addendum	December 10, 2013	February 13, 2014

NA-Not applicable

FARM EVALUATIONS

The ESJWQC WDR requires that all Coalition members complete a Farm Evaluation. The Farm Evaluation is intended to gather information on general site conditions and management practices that members currently have in place to protect surface and groundwater quality (approved December 9, 2013).

The Farm Evaluations are designed to collect the following information:

1. identification of crops grown and acreage of each crop,
2. geographical location of the member's farm,
3. identification of on-farm management practices implemented to achieve the WDR farm management performance standards,
4. identification of whether or not there is movement of soil during storm events and/or during irrigation (sediment and erosion risk areas) and a description of where this occurs,
5. identification of whether or not water leaves the property and is conveyed downstream and a description of where this occurs,
6. location of active wells and abandoned wells, and
7. identification of whether wellhead protection and backflow prevention devices have been implemented.

Members are also required to provide information on any outreach events they have attended in the last year. Farm Evaluations are designed to describe how each member is implementing management practices to protect water quality while trend data are collected through monitoring. Management practices that are designed to protect the quality of groundwater should be implemented, where applicable, by members in high or low vulnerability areas. Data from the Farm Evaluations can be used to evaluate changes in surface water quality relative to changes in management practices.

The Farm Evaluations contain four different sections with questions specific to both surface and groundwater management practices, 1) whole farm evaluation, 2) specific field evaluation, 3) irrigation well information, and 4) sediment and erosion control practices.

Members complete their Farm Evaluation as prioritized by farm size and whether they are in a high or low vulnerability area. Table 78 includes the Farm Evaluation submittal deadlines for high and low vulnerability areas. The focus on high vulnerability areas is to determine where surface and/or groundwater quality are most impacted. All ESJWQC members within high vulnerability (all sizes of farming operations) areas must submit a Farm Evaluation annually by March 1. Low vulnerability farming operation areas have a reporting frequency of every five years (small farming operations in low vulnerability areas due 2017; Table 78). Members are required to complete their Farm Evaluations by March 1, 2014 (extended to May 1, 2014 by Regional Board action March 27, 2014) and the Coalition will report data attained from the Farm Evaluations in an addendum to the 2014 Annual Report on July 1, 2014 (approved March 27, 2014).

Table 78. Farm Evaluation deadlines for high and low vulnerability areas in the ESJWQC.

Farming Operations[1]	Document Required	Due Date[1]	Updates Required	Report to RB
High Vulnerability Areas (greater than 60 irrigated acres)	Farm Evaluation	March 1, 2014[2]	March 1 annually	May 1, 2014[2]
Small Farming High Vulnerability Area (less than 60 irrigated acres)				
Low Vulnerability Areas (greater than 60 acres)	Farm Evaluation	March 1, 2015	every 5 years	May 1, 2015
Small Farming High Vulnerability Area (less than 60 irrigated acres)		March 1, 2017	every 5 years	May 1, 2017

[1]-Relevant for surface or groundwater
[2]-On January 27, 2014 the Coalition requested to extend the deadline for high vulnerability areas to return their Farm Evaluation from March 1, 2014 to May 1, 2014 and to extend the Annual Report component (18) to be extended from May 1, 2014 to July 1, 2014 (Approved March 27, 2014).

NITROGEN MANAGEMENT PLAN

Coalition members are required to prepare and implement a Nitrogen Management Plan and submit a Nitrogen Management Plan Summary Report for the previous crop year (template submitted on April 11, 2013; approval pending). Areas in the ESJWQC region are classified into two categories for surface water and groundwater quality where nitrogen is concerned, high and low vulnerability areas. The ESJWQC is responsible for identifying members with high vulnerability parcels (for either surface water or groundwater).

Groundwater high vulnerability areas are identified as:

1. areas where groundwater quality impairments exist and irrigated agriculture is a potential contributor,
2. areas where conditions make groundwater more vulnerable to impacts from irrigated agricultural activities, or
3. areas that meet any of the following requirements:
    a) An exceedance of the WQTL for nitrogen occurs in groundwater and irrigated agriculture may have contributed to the exceedance,
    b) Basin Plan requires development of groundwater quality management plan for constituents discharged by agriculture, or
    c) The Executive Officer determines irrigated agriculture may be causing groundwater impairments that may threaten beneficial uses.

Surface water high vulnerability areas are identified as:

1. areas where exceedances occur twice in a three year period for the same constituent at a monitoring location where irrigated agriculture may be the cause,
2. areas where the Basin Plan requires development of a surface water management plan for irrigated agricultural constituents, or
3. areas where the Executive Officer determines irrigated agriculture to be the cause of surface water impairments that threaten beneficial uses.

Low vulnerability areas are regions not designated as high vulnerability for either surface or groundwater; deadlines for submission of required plans by growers in low vulnerability groundwater areas are listed in Table 79. Members within a high vulnerability groundwater area (where nitrate is a constituent of concern) must prepare and implement a certified Nitrogen Management Plan and Nitrogen Management Plan Summary Report by the deadlines listed below and outlined in Table 79.

1. High vulnerability farming operations (greater than 60 irrigated acres) - Nitrogen Management Plan due March 1, 2015 and updated annually thereafter; Nitrogen Management Plan Summary Report due March 1, 2016 and update annually for the previous year.
2. High vulnerability small farming operations (less than 60 total irrigated acres) - Nitrogen Management Plan due March 1, 2017 and updated annually thereafter; Nitrogen Management Plan Summary Report due March 1, 2018 and updated annually for the previous year.
3. Areas re-designated from low to high vulnerability - Nitrogen Management Plan must be prepared in compliance with the specifications for a small or 'other' farming operation as outlined above.
4. Low vulnerability groundwater area - Nitrogen Management Plan due March 1, 2017 and updated annually. Certification of the Nitrogen Management Plan and Nitrogen Management Plan Summary Report are not required.

Table 79. Groundwater Nitrogen Management Plan deadlines for high and low vulnerability areas in the ESJWQC.

Farming Operations	Document Required	Due Date[1]	Updates Required	Certification Required?[2]
High Vulnerability Areas (greater than 60 irrigated acres)	Nitrogen Management Plan	March 1, 2015	Annually	Yes
	Nitrogen Management Plan Summary Report	March 1, 2016	Annually for previous year	No
Small Farming High Vulnerability Area (less than 60 irrigated acres)	Nitrogen Management Plan	March 1, 2017	Annually	Yes
	Nitrogen Management Plan Summary Report	March 1, 2018	Annually for previous year	No
Low Vulnerability Areas	Nitrogen Management Plan	March 1, 2017	Annually	No
	Nitrogen Management Plan Summary Report	March 1, 2018		No

[1]-Members re-designated from low to high vulnerability groundwater areas must prepare a Nitrogen Management Plan according to the schedule for farming operations either greater or less than 60 acres.
[2]-Certification is required for Nitrogen Management Plans for all members located within a high vulnerability groundwater area where nitrate is a constituent of concern.

Mitigation Monitoring Report

Members required to implement mitigation measures as outlined in Attachment C of the WDR must submit a Mitigation Monitoring Report on March 1 annually. The Coalition will report on the California Environmental Quality Act (CEQA) mitigation measures implemented and reported by ESJWQC members including the impact measures addressed, location (TRS), and monitoring scheduled to measure the success of mitigation.

SEDIMENT AND EROSION CONTROL PLAN

All Coalition members are required to implement effective sediment discharge and erosion prevention practices. The Coalition was required to provide an assessment report within one year of receiving an

NOA (approved on January 11, 2013) to identify areas susceptible to erosion and discharge of sediment that could impact receiving water and submitted a Sediment and Erosion Assessment Report on January 13, 2014 (approval pending).

The Sediment and Erosion Assessment Report identifies the areas within the ESJWQC region where growers will be required to complete Sediment and Erosion Control Plans (SECPs). In addition, the Farm Evaluations include questions which address erosion potential and allow members to self-identify as potential dischargers of sediment to surface waters. Members identified as having high potential to discharge sediment are required to prepare a SECP in one of the ways identified in the WDR (Page 25). Therefore, with the approval of the Sediment and Erosion Assessment Report, the Coalition will contact members located in areas identified as having a high potential for erosion and request that those members complete the SECP. A qualified Sediment and Erosion Control Plan developer must certify the member's SECP (WDR, Attachment A, Page 23). Those plans will be maintained at the member's farming operation and updated as conditions change. The document must be onsite and accessible by the Regional Board staff if requested during inspections. Members located in areas with high potential for erosion are required to complete and implement a SECP within 180 days (farm operations greater than 60 irrigated acres) and within one year (small farm operations less than 60 irrigated acres) of the approval of the Sediment and Erosion Assessment Report (submitted January 13, 2014; approval pending; Table 78). The Coalition is in the process of revising the SECP and will submit the SECP template in 2014.

Table 80. Sediment and Erosion Control Plan deadlines for high erosion potential areas.

Farming Operations	Document Required	Due Date[1]	Updates Required	Certification Required?
High Erosion Potential Areas (farms greater than 60 irrigated acres)	Sediment Erosion Control Plan	180 days after approval of Sediment and Erosion Assessment Report	as needed	Yes
Small Farming High Erosion Potential Area (farms less than 60 irrigated acres)	Sediment Erosion Control Plan	1 year after approval of Sediment and Erosion Assessment Report	as needed	Yes

[1]-Due dates pending approval of the Sediment and Erosion Assessment Report submitted January 13, 2014.

GROUNDWATER QUALITY ASSESSMENT REPORT AND EVALUATION/MONITORING WORKPLANS

For groundwater protection, the WDR requires 1) a Groundwater Quality Assessment Report (GAR), 2) a Management Practices Evaluation Program, and 3) a Groundwater Quality Trend Monitoring Program. Table 81 includes all deadlines associated with the Groundwater Quality Assessment Report and Evaluation/Monitoring Workplans.

Table 81. Groundwater Quality Assessment Report and Evaluation/Monitoring Workplan deadlines.

Document	Due Date	Approval Date
Notice of Applicability-third party application	December 14, 2012	January 11, 2013
Groundwater Quality Assessment Report Outline	April 11, 2013	May 6, 2013
Groundwater Quality Assessment Report	January 13, 2014	Approval Pending
Management Practice Evaluation Program Workplan-third party only option	one year of GAR approval	NA

Document	Due Date	Approval Date
Management Practice Evaluation Program Workplan-group option	two years of GAR approval	NA
Groundwater Quality Trend Monitoring Workplan	one year of GAR approval	NA

NA-Not applicable, not submitted yet

Groundwater Quality Assessment Report

Upon receipt of the January 11, 2013 approval of the NOA, the timeline for several requirements began, including the requirement that three months after, "the third-party will provide a proposed outline of the GAR to the Executive Officer that describes the data sources and references that will be considered in developing the GAR." The Coalition submitted the GAR outline on April 11, 2013 and the GAR was submitted on January 13, 2014 (approval pending; Table 81). The GAR was prepared in accordance with the outline submitted to the Regional Board on April 11, 2013 and contains details on the approach and methods applied to determine high and low vulnerability areas in the ESJWQC region. The GAR is designed to provide information necessary for the design of the Management Practices Evaluation Program, the Groundwater Quality Trend Monitoring Program, and the Groundwater Quality Management Plan. Therefore, the GAR includes the following:

1. assessment of available, applicable, relevant data, and information to determine high/low vulnerability areas where irrigated land discharge may affect groundwater quality,
2. priorities for implementation of monitoring and studies within high vulnerability areas,
3. basis for establishing workplans to assess groundwater quality trends,
4. basis for establishing workplans and priorities to evaluate the effectiveness of agricultural management practices to protect groundwater quality, and
5. provide a basis for establishing groundwater quality management plans in high vulnerability areas and priorities for implementation of those plans.

The GAR compares the designated East San Joaquin High Vulnerability Area (ESJHVA) to each area designated by the State Water Board Resources Control Board's (SWRCB) Hydrogeologically Vulnerable Areas and California Department of Pesticide Regulation's (DPR) Groundwater Protection Area, and to these areas combined. The GAR content addresses the scientific quantification of vulnerable areas as related to the delineation between areas of higher and lower groundwater vulnerability. A model for assessing groundwater vulnerability for the ESJWQC area was developed through statistical approaches based on observed groundwater quality and hydrogeologic characteristics. High vulnerability areas are identified and prioritized in the GAR. Six areas identified as Tentative High Vulnerability Areas have been identified and further examination of these areas is required to determine whether they should remain in the high groundwater vulnerability category.

Management Practices Evaluation Program

The Coalition will develop as a coordinated effort with the Westside Water Quality Coalition and the San Joaquin County and Delta Water Quality Coalition, a Management Practices Evaluation Program Workplan. The overall goal of the Management Practices Evaluation Program (MPEP) is to determine whether various management practices used by irrigated agriculture are protective of groundwater. The MPEP must address the conditions relevant to high vulnerability groundwater areas.

The Coalition has the option of fulfilling its requirements for the MPEP as part of a group or as an individual entity. The due date for the MPEP workplan is two years from the GAR approval for the group option, or one year from the GAR approval for the individual option (Table 81).

Groundwater Quality Trend Monitoring Workplan

Within one year of the approval of the GAR, the Coalition is required to develop a Groundwater Quality Trend Monitoring Workplan (Table 81). The overall objectives of groundwater trend monitoring are to 1) determine the current water quality conditions of groundwater relevant to irrigated agriculture, and 2) develop long-term groundwater quality information for evaluation of the regional effects of irrigated agricultural practices. During the development of the GAR, numerous existing wells were identified to satisfy future requirements to develop a Groundwater Quality Trend Monitoring network to track groundwater quality and its response to agricultural practices.

PROGRAMMATIC QUESTIONS

The following sections provide responses to the six key programmatic questions outlined in the WDR using water quality information obtained during January through September 2013 monitoring. The Coalition utilizes monitoring data as well as management practice information to make the following conclusions. Water quality within the Coalition region has been determined using monitoring data from January through September 2013 collected from Assessment, Core, and MPM sites as outlined in the Coalition's MRPP and Management Plan. These data indicate water quality improvements are continuing across the Coalition region.

QUESTION 1: ARE RECEIVING WATERS TO WHICH IRRIGATED LANDS DISCHARGE MEETING APPLICABLE WATER QUALITY OBJECTIVES AND BASIN PLAN PROVISIONS?

The CVRWQB has determined that waters of the State receiving discharge from irrigated lands must support beneficial uses (BUs) for Agricultural Supply (AG), Aquatic Life (AQ; including cold freshwater habitat spawning, warm freshwater habitat and freshwater habitat), Water Contact Recreation (REC 1), and Municipal and Domestic Supply (MUN or Municipal). In 2008, the Regional Board developed a list of WQTLs based on numeric water quality objective and standards from the Basin Plan including interpretive narrative water quality objectives (Table 35). The Coalition uses this list of WQTLs to determine exceedances and impairments of BUs. In the WDR, a table of Water Quality Objectives (WQOs) is included in Attachment B. The Order states that additional trigger limits may be developed by the Executive Officer utilizing water quality criteria to interpret narrative water quality objectives. In lieu of receiving this finalized list, the Coalition continues to utilize the previous WQTLs included in Table 35.

Beneficial uses are listed in the Basin Plan for waterbodies; however, not all of the waterbodies upstream of the Coalition's monitoring sites are listed. Therefore, BUs for Coalition monitoring sites are applied to the most immediate downstream waterbody listed in the Basin Plan. Nonetheless, exceedances of constituent specific WQTLs that cause impairments to Agriculture, Aquatic Life, and Municipal Supply BUs can have multiple sources that may or may not be from agricultural irrigated lands. Until all sources that impair BUs of waterbodies are addressed, meeting all water quality objectives and Basin Plan provisions for the Waters of the State may be difficult to achieve.

Waters of the State are protected if no exceedances of WQTLs occur during monitoring events. Not all constituents have a WQTL associated with a BU including pH, orthophosphate (soluble), phosphorus (total), TKN, TOC, TSS, carbofuran, demeton-s, dicofol, malathion, molinate, parathion, methyl, and Thiobencarb. These constituents are not included in the assessment of BU protection (Tables 82–83, Figure 34) and are addressed separately.

Table 82 lists constituents that were detected above their respective WQTLs during 2013 monitoring and the BUs impaired by the exceedances. Figure 34 includes percentages of exceedances of constituent specific WQTLs that impaired BUs based on January through September 2013 monitoring results in the Coalition region. Table 83 lists sites in the Coalition region monitored from 2008 through September 2013 and summarizes when water quality was protective of BUs.

The most common exceedances of the WQTLs involved field (DO, SC) and physical (TDS) parameters resulting in impaired Agricultural and Aquatic Life BUs (Figure 34). Other constituents with exceedances of their respective WQTLs that impaired Aquatic Life BUs were ammonia and dissolved copper (Figure 34). Impairment of the Municipal BU resulted from elevated concentrations of diuron, nitrate/nitrite, and ammonia. There were numerous exceedances of the WQTL for *E. coli* which resulted in impaired Recreational BU. *E. coli* is the only constituent monitored by the Coalition that can cause impairment to Recreational beneficial use (Table 82). Even though improvements are evident from January through September 2013 monitoring results, water quality is still not entirely protective of all BUs across the Coalition region.

Table 82. Number of times beneficial uses were impaired from January through September 2013.

Beneficial Use	DO	SC	TDS	Ammonia	*E. coli*	Nitrate	Dissolved Metals (Copper)	Herbicides (Diuron)	Pesticides[1, 2] (Diazinon and Chlorpyrifos)
AQ Life	48			5			13		2
AG		33	23						
MUN				5		13		1	
REC 1					47				

[1] Different WQTLs apply to different beneficial uses; different pesticides affect different beneficial uses; see Table 35.

[2] Exceedance of malathion at Miles Creek @ Reilly Rd is not included because there is no WQTL associated with a beneficial use for the constituent.

AQ Life-Aquatic Life (includes cold freshwater habitat spawning, warm freshwater habitat and freshwater habitat)

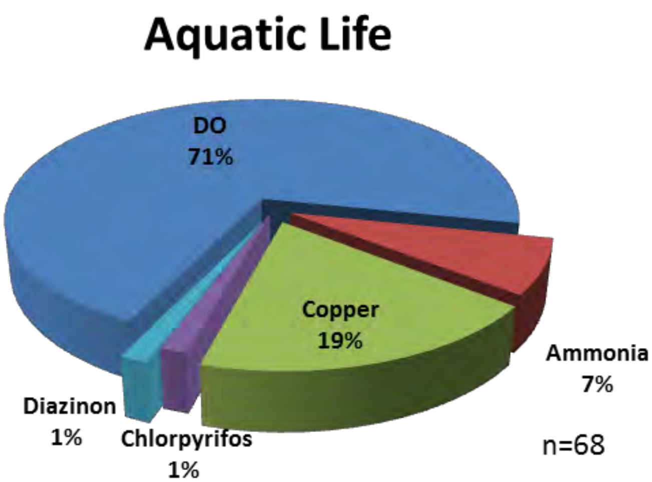
AG-Agricultural

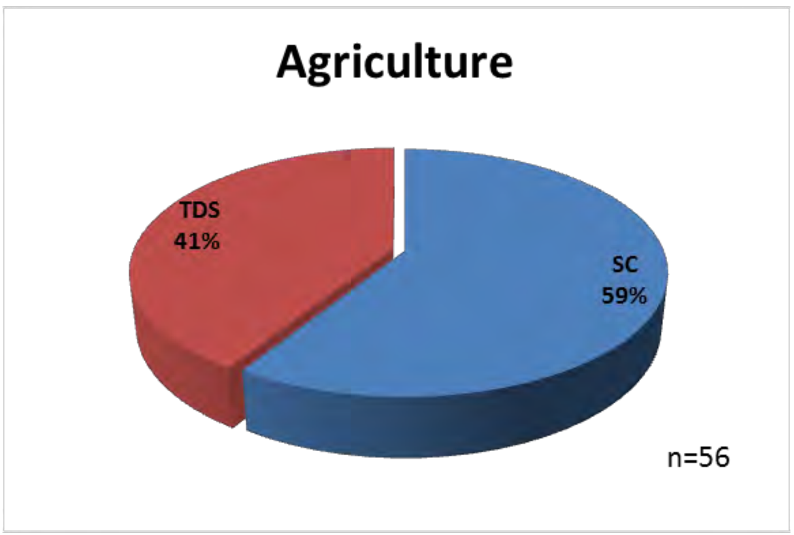
MUN-Municipal and Domestic Supply

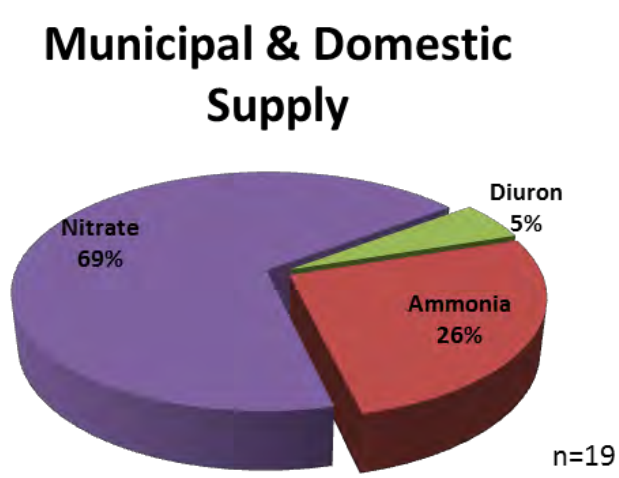
REC 1-Water Contact Recreation

Figure 34. Percentages of impairments of beneficial uses due to exceedances of constituent specific WQTLs from January through September 2013.

Aquatic Life includes all categories (cold freshwater habitat spawning, warm freshwater habitat and freshwater habitat); 'n' represents the total number of exceedances per BU.







Agricultural BU

The Agricultural BU has been impaired due to salts (measured as SC and TDS) in agricultural drains monitored in the ESJWQC region, specifically within Zone 2 (Figure 34). Zone 2 includes the western portion of the Coalition region where there is shallow salty groundwater (Table 83). This area of the Coalition region has inadequate subsurface drainage resulting in low crop productivity if the water is not drained from the root zone. Tile drains were installed to intercept rising groundwater and infiltrating surface water. This water is then drained off the fields so the land can be used for agriculture.

Thirty one of the 33 exceedances of the WQTL for SC occurred in sites located in Zone 2 (all except for two at Duck Slough @ Gurr Rd). Furthermore, all of the detections of TDS above the WQTL coincided with exceedances of the WQTL for SC in Zone 2. Managing the concentration of salts is beyond the scope of what the Coalition can control through agricultural management practices and is the focus of the Central Valley-wide CV-SALTS process.

Aquatic Life BU

Monitoring results indicate that exceedances of the WQTLs for DO (71%), dissolved copper (19%), diazinon (1%), chlorpyrifos (1%), and ammonia (7%) resulted in impairments to the Aquatic Life BU (Figure 34).

Dissolved oxygen is a non-conserved constituent, meaning it can increase or decrease in concentration as water moves downstream. Processes affecting DO in waterways include stream flow, fluctuations in temperature, loss of vegetation around streams, geography (region, morphology of stream channels and land surface, and patterns of flow) as well as excessive nutrients resulting in algal growth and decomposition. During education and outreach, growers in the Coalition region receive recommendations to implement management practices designed to prevent the offsite movement of constituents (including high priority constituents and sediment) into the waterway by reducing irrigation tailwater and storm runoff. As growers implement management practices to reduce discharge of high priority constituents, the amount of water flowing into tributaries is also reduced. When growers reduce the amount of water entering tributaries, water flows and potentially DO concentrations can be lowered. Of the DO exceedances, 2 occurred in in non-contiguous waterbodies.

Copper is one of the three pesticides applied by agriculture and found in concentrations above WQTLs that impaired the Aquatic Life BU; the other two pesticides were chlorpyrifos and diazinon (Table 82, Figure 34). A total of 13 exceedances of the hardness based dissolved copper WQTL occurred in the environmental samples collected at sites in the ESJWQC. Exceedances of the copper WQTL occurred in samples collected from locations in Zones 3, 4 and 6. Of the 13 exceedances, 12 were from sites in a management plan for copper. Only one of the exceedances occurred at a site not previously in a management plan (Unnamed Drain @ Hwy 140) this was the first copper exceedance at the site and a new management plan is not required. It is common for a site subwatershed to consistently have exceedances of the copper WQTL; often laterals that may have had copper applied for algae/weed control have elevated levels of copper.

Chlorpyrifos and diazinon are the other two pesticides applied by agriculture and detected in samples at concentrations above the WQTL resulting in Aquatic Life BU impairments (Table 82, Figure 34). The ESJWQC monitors for chlorpyrifos and diazinon across the Coalition region, in addition to three locations in the San Joaquin River to assess compliance with the San Joaquin River Chlorpyrifos and Diazinon TMDL. During September MPM at Dry Creek @ Wellsford Rd, an exceedance of the WQTL for chlorpyrifos occurred. It is likely that the exceedance was the result of chlorpyrifos applications that occurred in close proximity to the creek by a non-member (Figure 10). Dry Creek @ Wellsford has been in a management plan for chlorpyrifos since 2006 and there were no detections of chlorpyrifos during 2011 and 2012.

During February high TSS monitoring, an exceedance of the diazinon WQTL occurred in the field duplicate sample collected from Miles Creek @ Reilly Rd; there was no detection in the environmental sample collected at the same time. The PUR data indicate there were no applications reported that could be associated with the exceedance (Appendix V). There have been four exceedances of the WQTL for diazinon in the Coalition region since monitoring began; the last exceedance to occur in samples collected in the ESJWQC region was February 2008.

Municipal and Domestic Supply BU

Exceedances of the WQTL for nitrate (69%), ammonia (26%), and diuron (5%) caused impairments to Municipal BU (Figure 34). During the January through September 2013, a total of 13 exceedances of the WQTL for nitrates occurred in samples collected from two sites in Zone 2: Levee Drain @ Carpenter Rd and Prairie Flower Drain @ Crows Landing Rd. Both of these sites are in a management plan as a result of past nitrate exceedances. Nitrate concentrations above the California Maximum Contaminant Limit (MCL) have occurred in samples collected from waterbodies in Zones 2, 4, and 5 in the past.

One sample collected from Duck Slough @ Gurr Rd and two samples each collected from Levee Drain @ Carpenter Rd and Prairie Flower Drain @ Crows Landing Rd contained concentrations of ammonia above the WQTL of 1.5 mg/L. Previous exceedances of the WQTL for ammonia and associated water column toxicities in Zone 2 were attributed to discharge from dairies; four of the five samples with ammonia concentrations above the WQTL also coincided with water column toxicity (three times to *C. dubia*, once to *P. promelas*, and twice to *S. capricornutum*).

A single exceedance of the diuron WQTL occurred at Dry Creek @ Rd 18 during January MPM. There have been a total of three exceedances of the diuron WQTL since 2008 (January and February 2008, and January 2013) in samples collected from Dry Creek @ Rd 18. Diuron use associated with the 2013 exceedance was associated with applications to citrus in the Dry Creek @ Rd 18 site subwatershed which is similar to previous use associated with diuron exceedances in the Coalition region. Previous exceedances of diuron within the Coalition region have occurred mainly during storm events in the winter months.

Overall Frequency of Exceedances

Trends of improving water quality in the Coalition region are evident from 2008 through September 2013, where monitoring results indicate declines in the frequency of exceedances of WQTLs of applied pesticides (Figure 34). During 2008, the Coalition began focused outreach at first priority site subwatersheds and recommended management practices to targeted growers. The Coalition believes management practices implemented as a result of focused outreach are improving the water quality in the Coalition region. Table 83 lists the sites where the Coalition has conducted monitoring and lists, by year, whether or not each of the BU categories has been protected or not. There are currently 27 site subwatersheds in a management plan in the Coalition region. Seventeen of the 27 site subwatersheds have had at least one constituent removed from a management plan due to improved water quality. Improvements in water quality are noticeable in high priority subwatersheds where focused outreach and education are complete including Bear Creek @ Kibby Rd, Berenda Slough along Ave 18 ½, Cottonwood Creek @ Rd 20, Deadman Creek @ Hwy 59, Dry Creek @ Rd 18, Dry Creek @ Wellsford Rd, Duck Slough @ Hwy 99, Highline Canal @ Hwy 99, Highline Canal @ Lombardy Rd, Hilmar Drain @ Central Ave, Howard Lateral @ Hwy 140, Lateral 2 ½ near Keyes Rd, and McCoy Lateral @ Hwy 140 (Table 83).

Of the 25 waterbodies sampled in 2013, 20 waterbodies had one or more BUs category protected; of these 20, 15 were impaired for that BU one or more previous years (blue highlights, Table 83). Monitoring results at sites where high priority focused outreach is complete indicate a higher frequency of meeting Municipal and Agricultural BUs compared to before focused outreach. Even though the site was removed due to highway road construction, Duck Slough @ Hwy 99 consistently met BUs in every category from the time outreach occurred up to when the site was removed from the monitoring program (Table 83). With the exception of 2011, monitoring results from samples collected from Dry Creek @ Wellsford Rd consistently met Agricultural BU. Focused outreach began in 2010 at the second set of high priority subwatersheds; Bear Creek @ Kibby Rd is not impaired for Municipal, Agricultural, and Aquatic life BUs. Water quality improved in the third set of high priority subwatersheds at Berenda Slough @ Ave 18 ½, Dry Creek @ Rd 18, Lateral 2 ½ near Keyes Rd and Livingston Drain @ Robin Ave monitoring results indicate Municipal and Agricultural BUs have been protected since outreach began in 2011 (Table 83). Focused outreach began in the fourth priority subwatersheds in 2012; Hilmar Drain @ Central Ave is a site in the fourth set of high priority site subwatersheds and water quality has been protective of the Aquatic Life BU every year it has been monitored since 2009 (Table 83).

Waste discharged from irrigated lands is but one of many possible sources of impairments to BUs. In many instances, natural conditions or other sources could potentially be the cause of impairment in waterways monitored by the Coalition. Water quality protective of BUs within Coalition boundaries may not depend exclusively on the Coalition efforts alone; other dischargers may need to improve the quality of their discharge. The difference in geology and geography between Coalition zones influences monitoring results for constituents such as SC, TDS and dissolved copper. Monitoring sites in Zones 2 are geographically located in an area where high salinity is common, resulting in exceedances of the WQTLs for SC and TDS. Due to high salinity, sites in Zone 2 rarely meet Agricultural beneficial uses, although agriculture clearly exists in Zone 2 (Table 83). Growers in Zone 2 farm commodities such as forage crops, which have a relatively high tolerance to salinity. Exceedances of the dissolved copper WQTL are common at monitoring sites located in Zones 3, 4 and 6. It is possible that certain geologic conditions could be contributing to the elevated copper levels found in water column samples in these zones. As a result, sites in these zones commonly do not meet Aquatic Life BU (Table 83). The number of exceedances of other constituents applied by agriculture has declined significantly while the number of exceedances of the WQTL for copper remain elevated. Growers have implemented management practices that reduce the discharge of pesticides such as chlorpyrifos. It is expected that these practices would eliminate the discharge of copper but copper remains a problem in Zones 3, 4, and 6. Geological and geographical factors influencing salts and copper in the waterways are outside the scope of what the Coalition is capable of improving through modified agricultural practices.

Exceedances of WQTLs of Constituents Not Associated with Beneficial Use

pH

There were 25 exceedances of the WQTL for pH during 2013. Two of the 25 exceedances were of the lower WQTL (6.5) and the other 23 were exceedances of the upper WQTL (8.5). The pH exceedances occurred in every zone in the Coalition region with the exception of Zone 2.

Malathion

In addition, samples collected from Miles Creek @ Reilly Rd during April storm monitoring resulted in an exceedance level detection of the organophosphate malathion. There is a prohibition of discharge for the pesticide malathion except under the Rice Coalition Management Plan; therefore any detection of the constituent is considered an exceedance. The field duplicate malathion concentration reported by the laboratory was below the reporting limit and therefore was an estimated value. Since there is a prohibition of discharge of this constituent, it is not assigned a most restrictive BU; however, malathion is known to be toxic to aquatic life. For this reason, addressing malathion during education and outreach as well as recommending management practices for growers to implement is still relevant to maintain the integrity of Waters of the State. The Coalition discusses all constituents with growers during high priority focused outreach.

Table 83. Evaluation of beneficial uses applied to 2008-2013 monitoring locations (alphabetical by Zone).

'X' indicates no sampling occurred during the years specified. Blue highlights indicate a protected BU in 2013 when the same BU and monitoring site was impaired in one or more previous years.

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

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

Zone	Monitoring Site	Immediate Downstream Waterbody	Beneficial Use Immediate Downstream Waterbody	Status 2008 Meets BUs?	Status 2009 Meets BUs?	Status 2010 Meets BUs?	Status 2011 Meets BUs?	Status 2012 Meets BUs?	Status 2013 Meets BUs?
			REC 1	Yes	No	No	No	No	No
			AQ Life	No*	No	No*	No	Yes	No
5	Duck Slough @ Hwy 99 (2008-2010)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	Yes	Yes	Yes	Yes	X
			AG	No	Yes	Yes	Yes	Yes	X
			REC 1	No	X	X	X	X	X
			AQ Life	No	No	Yes	Yes	Yes	X
5	Miles Creek @ Reilly Rd	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	X	X	X	X	X	Yes
			AG	X	X	X	X	X	No
			REC 1	X	X	X	X	X	No
			AQ Life	X	X	X	X	X	No
6	Ash Slough @ Ave 21 (2015-2017)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	Yes	Yes	Yes	X	X	X
			AG	Yes	Yes	Yes	X	X	X
			REC 1	Yes	Yes	Yes	X	X	X
			AQ Life	Yes	No	No	X	X	X
6	Berenda Slough along Ave 18 ½ (2011-2013)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	X	X	X	Yes	Yes	Yes
			AG	X	X	X	Yes	Yes	Yes
			REC 1	X	X	X	No	Yes	X
			AQ Life	No	X	X	No	No	No
6	Cottonwood Creek @ Rd 20 (2010-2012)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	Yes	Yes	Yes	Yes	Yes+	Yes
			AG	Yes	Yes	Yes	Yes	Yes+	Yes
			REC 1	Yes	No	No	No	Yes+	No
			AQ Life	No	Yes	No	No	Yes+	No
6	Dry Creek @ Rd 18 (2011-2013)	San Joaquin River (Sack Dam to mouth of Merced River)	MUN	No	X	X	Yes	Yes	Yes
			AG	Yes	X	X	Yes	Yes	Yes
			REC 1	No	X	X	X	X	No
			AQ Life	No	X	X	No	Yes	No

AG- Agriculture
AQ Life- Aquatic Life Aquatic Life (cold freshwater habitat spawning, warm freshwater habitat and freshwater habitat).
MUN- Municipal and Domestic Supply
REC 1- Water Contact Recreation
X-Site was not scheduled for sampling during the year.
*Does not meet BUs requirements due to sediment toxicity to *H. azteca* in one or more occurrences.
Yes+-Site was dry during all monitoring events that occurred in 2013.
[1]-The evaluation of BUs for Mootz Drain considers results from both the upstream (@ Langworth Pond) and downstream (downstream of Langworth Pond) locations.

QUESTION 2: ARE IRRIGATED AGRICULTURAL OPERATIONS CAUSING OR CONTRIBUTING TO IDENTIFIED WATER QUALITY PROBLEMS? IF SO, WHAT ARE THE SPECIFIC FACTORS OR PRACTICES CAUSING OR CONTRIBUTING TO THE IDENTIFIED PROBLEMS?

For many parameters, it is not clear to what extent exceedances of WQTLs are from agricultural activities resulting in offsite movement of farm inputs and sediment into waterways. Most exceedances are for parameters not applied by irrigated agriculture or which may originate with numerous sources in addition to irrigated agriculture. Source identification is difficult, especially for non-conserved constituents and constituents with numerous potential sources. There are numerous non-conserved constituents that cannot be traced upstream, e.g. DO and pH. Even in pristine watersheds, exceedances of WQTLs for these constituents may occur as a result of normal diurnal stream processes. During sampling from January through September 2013, locations in the western portion of the Coalition region (Zone 2) had numerous exceedances of the WQTLs for SC and TDS. The construction of drains such as Prairie Flower Drain and Levee Drain occurred in the late 1800s as a means of lowering the shallow groundwater table to a level where crops can be grown. Groundwater in the region is very salty and the water in Prairie Flower Drain for a large portion of the year is not discharged by agriculture. Because of the elevated salt content, the water used for irrigation is not recirculated for irrigation and must be discharged leading to the potential for exceedance level detections of SC and pesticides. Retention basins would fill from shallow groundwater almost as soon as construction was completed.

Exceedances of nutrient (e.g. ammonia and nitrates) WQTLs are a major cause of impairment of the Municipal BU and may or may not be a result of fertilizer runoff into waterways. Elevated concentrations of nitrates tend to occur in subwatersheds such as Prairie Flower Drain and Levee Drain where surface drains intercept shallow groundwater with high concentrations of nitrates from decades of discharge from dairy operations. During January through September 2013, all water samples resulting in exceedances of the WQTL for nitrates were collected from Levee Drain @ Carpenter Rd and Prairie Flower Drain @ Crows Landing Rd. Unless sophisticated isotopic analytical analyses are performed, it is not possible to distinguish nitrates originating from inorganic fertilizers applied to crops from cows in dairy and feedlot operations.

Agricultural pesticide applications may result in pesticides entering surface waters as a result of spray drift or runoff in either storm water or irrigation return flows. From January through September 2013, there was one exceedance each of chlorpyrifos, diazinon, diuron, and malathion WQTLs in the Coalition region. The Coalition identifies potential sources of toxicity through PUR data analysis, assessment of water quality data, and evaluation of current management practices. The Coalition's strategy for identifying sources of pesticides that can cause toxicity is further described in the ESJWQC Management Plan. Management of spray drift, irrigation practices, and sediment runoff by Coalition members has resulted in overall improved water quality. However, the Coalition does not conduct outreach with growers that are not members and it is difficult to determine if non-member practices contributed to the pesticide exceedances that occurred from January through September 2013.

During January through September 2013, exceedances of the hardness-based WQTL for dissolved copper occurred 13 times across eight subwatersheds. The Coalition monitors for both dissolved and total copper; only dissolved copper concentrations have resulted in exceedances of the hardness based WQTL. Copper is applied by agriculture in a variety of forms mostly as a fungicide. Of the 13 exceedances two were associated with aerial and ground copper applications (Appendix V). A majority of the applications were to almonds, apricots, grapes, peaches, pistachios, and walnuts. All site subwatersheds with exceedances are currently in management plans for copper (except for Unnamed Drain @ Hwy 140) and additional practices have been implemented by members in those subwatersheds to reduce the offsite movement of copper into downstream waterbodies. It is possible that the copper concentrations measured in samples collected from these sites are the result of other sources including dairies and irrigation district applications to control weeds/algae.

QUESTION 3: ARE WATER QUALITY CONDITIONS CHANGING OVER TIME (E.G., DEGRADING OR IMPROVING AS NEW MANAGEMENT PRACTICES ARE IMPLEMENTED)?

Monitoring from January through September 2013 resulted in several exceedances of pesticide WQTLs. One exceedance each of the chlorpyrifos, diazinon, diuron, and malathion WQTLs occurred from January through September 2013. This is still a significant decline in exceedances of applied pesticide WQTLs compared to results from 2008. In 2009, the Coalition's Management Plan strategy was implemented including focused outreach regarding water quality impairments and management practices that could be implemented to reduce off site movement of pesticides and other constituents impairing water quality. The Coalition believes that the decline in pesticide exceedances is a direct result of general and focused education and outreach with growers in high priority site subwatersheds. Management practices implemented by members of the ESJWQC since 2009 have resulted in improved water quality reducing the percent of applied pesticide exceedances from 1.3% in 2008 to less than 0.01% for samples collected from 2009 through September 2013 (25 exceedances out of 6,368 samples, Table 84).

Figure 35 includes 1) a figure of the percentages of all exceedances that occurred from 2008 through September 2013 by constituent category, and 2) bar graphs of the percent of exceedances of applied metals and applied pesticides from 2008 through September 2013. Toxicity resampling events and exceedances from 2008 upstream MPM conducted as part of source evaluation are not included. From 2008 through September 2013, the majority of exceedances of WQTLs occurred for nutrients, physical parameters, and *E. coli* (39%), and field parameters (36%). The percentages of exceedances of metals (9%), toxicity (8%), and pesticides (7%) were relatively small in comparison (Figure 35).

Applied Metals: 2008 - 2013

Figure 35 (bar graph) includes the percent of applied metals exceedances from 2008 through September 2013. Metals applied by agriculture are copper and zinc. However, Figure 35 only includes copper exceedances because copper was the only applied metal to be detected above the hardness based WQTL at sites in the Coalition region between January 1, 2008 and September 30, 2013. The most notable decline in metals exceedances occurred from 2008 through 2009. Before October 2008, the concentration of dissolved metals was determined by performing a calculation based on total metals concentrations. In October 2008, the Coalition initiated focused grower outreach and education, management practice implementation, and began analyzing for both the total and hardness based dissolved fractions of metals to better characterize contamination in the water column. Dissolved metals more adequately reflect the bioavailable, and therefore the toxic fraction in the water column. Since the Coalition adopted this method for analyzing dissolved metals, exceedances of the hardness based WQTLs of metals have declined.

The source of the copper causing the exceedances is not known but the relatively restricted geographic areas of exceedances, and the broader distribution of applications to the same commodities argues for a natural source or an anthropogenic source that is restricted geographically. However, Coalition representatives continue to discuss management practices with growers that should result in reductions of dissolved copper if the exceedances of the hardness based WQTL for copper are the result of applications of pesticides containing copper. Similar discussions with growers have been successful in reducing the exceedances of various pesticide WQTLs including exceedances occurring within the same watersheds as those where exceedances of the copper WQTL occur. During 2013 monitoring, there were 13 exceedances of the hardness based WQTL for dissolved copper across the Coalition region (5.9% of the samples, Table 84). Copper exceedances are typical at sites located in Madera County.

Of the site subwatersheds within a management plan for copper, four have undergone focused outreach and management practices have been recorded for targeted members. Since 2008, growers in site subwatersheds with copper management plans have implemented management practices to address spray drift, irrigation water management, and storm runoff. Due to improved water quality and additional management practices implemented by Coalition members, three site subwatersheds have had copper removed from management plans.

Applied Pesticides: 2008 - 2013

The most significant decline in exceedances of applied pesticides occurred directly after focused education and outreach began between 2008 and 2009 (Figure 35 and Table 84). The percent of samples with applied pesticides has remained less than 1% since 2009. In 2008 where 1.3% of samples collected resulted in exceedances of pesticide WQTLs compared to January through September 2013 with 0.6%. From 2009 through September 2013, the percent of applied pesticides exceedances is <0.1% (25 out of 6,369 samples, Table 84).

Assessment Monitoring within the Coalition region was conducted to assess changes in overall water quality (all constituents are monitored) regardless of past water quality impairments. Assessment sites are rotated every two years to ensure that all waterbodies in the Coalition region are assessed over time. Exceedances occurred during Assessment Monitoring in February at Miles Creek @ Reilly Rd for malathion and in September for diazinon. Samples collected from Dry Creek @ Rd 18 in January were in exceedance of the diuron WQTL. Miles Creek @ Reilly Rd is a fifth priority site subwatersheds and therefore outreach and management practice documentation began in 2013 (Appendix I and II). Dry Creek @ Rd 18 is a third priority subwatershed and management practices have been documented for this watershed (Appendix I and II).

The malathion exceedance appears to be isolated with no prior history of malathion detections in samples collected from Miles Creek @ Reilly Rd (18 samples analyzed for malathion for 2008 through September 2013).

The exceedance of the diazinon WQTL in samples collected from Miles Creek @ Reilly Rd occurred during February storm sampling. As described in the Discussion of Results section of this report, the exceedance occurred in the field duplicate sample and the associated environmental sample had no detection of diazinon. There was no significant toxicity to any of the three water column species tested and to date, there has been no reported use of diazinon to associate with this sample. The Coalition will continue to review PUR data to assess potential sources. At this time it is unknown if management practices by members or nonmembers resulted in the diazinon detection in the Miles Creek field duplicate sample. Since diazinon is a TMDL constituent, a management plan for diazinon will be implemented within the Miles Creek @ Reilly Rd site subwatershed which is already in a management plan for DO, *E. coli*, TDS, lead, chlorpyrifos, copper, *C. dubia* toxicity, *S. capricornutum* toxicity, and *H. azteca* sediment toxicity. Management practices implemented by members within the Miles Creek @ Reilly Rd site subwatershed will be reported in the 2015 management plan progress report as part of the Annual Report.

The exceedance of the diuron WQTL occurred in samples collected from Dry Creek @ Rd 18 in January 2013 and this was the first time that an exceedance of the diuron WQTL occurred in samples collected from the site subwatershed since 2008. Therefore, the site is in a management plan for diuron. The diuron exceedance is associated with applications to citrus crops. Management practices implemented by targeted members in the Dry Creek @ Rd 18 for chlorpyrifos exceedances are anticipated to also reduce the runoff of other applied pesticides including diuron. These practices include: installing a device that controls the timing of discharge, installing and/or improving berms between fields and waterways, reduced the amount of water used during surface irrigation, and spraying areas close to waterbodies when the wind is blowing away.

Management Plan Monitoring was conducted within the Coalition region in subwatersheds that receive focused outreach and management practice documentation (Table 5). The schedule for MPM is based on months of previous exceedances and is focused on evaluating improvements in water quality as a result of newly implemented practices by Coalition members. Management Plan Monitoring has been occurring since 2007, prior to the overall ESJWQC Management Plan submission in October 2008. In 2012, MPM only occurred through March at which time the Coalition received approval to cease MPM until January 2013. The only applied pesticide exceedance to occur during MPM was of the chlorpyrifos WQTL at Dry Creek @ Wellsford Rd. The last exceedance of the chlorpyrifos WQTL within this subwatershed was in July 2010 and was associated with applications to almonds, corn and walnuts. Since 2009, management practices have been documented for Coalition members with the potential for direct drainage into the creek including many members with almonds, corn, and walnuts located near the creek. Members of the Coalition have implemented additional practices including additional spray and irrigation management practices that have resulted in fewer detections of chlorpyrifos since outreach began. The Coalition reviewed chlorpyrifos applications that occurred near the time of the sample collection at Dry Creek @ Wellsford Rd in September and found that the applications that occurred closest to the sample date (less than a mile from the sampling location) were made by a nonmember (Figure 10). The Coalition does not conduct outreach nor assess management practices of non-members.

Of the applied pesticides, chlorpyrifos has been one the pesticides for which the Coalition has focused its outreach to encourage members to implement additional management practices. As of 2013, the Coalition demonstrated that implemented practices have reduced the off-site movement of chlorpyrifos into downstream waterbodies and nine site subwatersheds removed from chlorpyrifos management plans. In 2013, there was a single chlorpyrifos exceedance (likely due to non-member applications) compared to 2011during which time there were three exceedances of the WQTL for chlorpyrifos; two at Deadman Creek @ Hwy 59 and one at Berenda Slough @ Ave 18 ½. In 2013, MPM conducted at Deadman Creek @ Hwy 59 and Berenda Slough @ Ave 18 ½ resulted in no exceedances of the chlorpyrifos WQTL which can be attributed to additional practices implemented by members in these two subwatersheds in 2012 and 2013.

One factor influencing water quality results could be that some growers have changed products without changing management practices. Coalition representatives emphasize that regardless of the product applied, appropriate management practices must be used to protect water quality. Overall, monitoring results from 2008 through September 2013 indicate that individual visits and the implementation of management practices (not just switching products) are resulting in improved water quality; hence fewer exceedances of pesticides occurred from January through September 2013 compared to previous years.

Figure 35. Percentages of exceedances of WQTLs from 2008 through September 2013 in the ESJWQC.
Pie chart includes percentages of all exceedances from 2008 through September 2013 by constituent group. Samples collected during toxicity resampling and 2008 upstream MPM are excluded. The bar graphs includes percentages of exceedances of 'applied pesticides' or 'applied metals' which are ag applied constituents only.

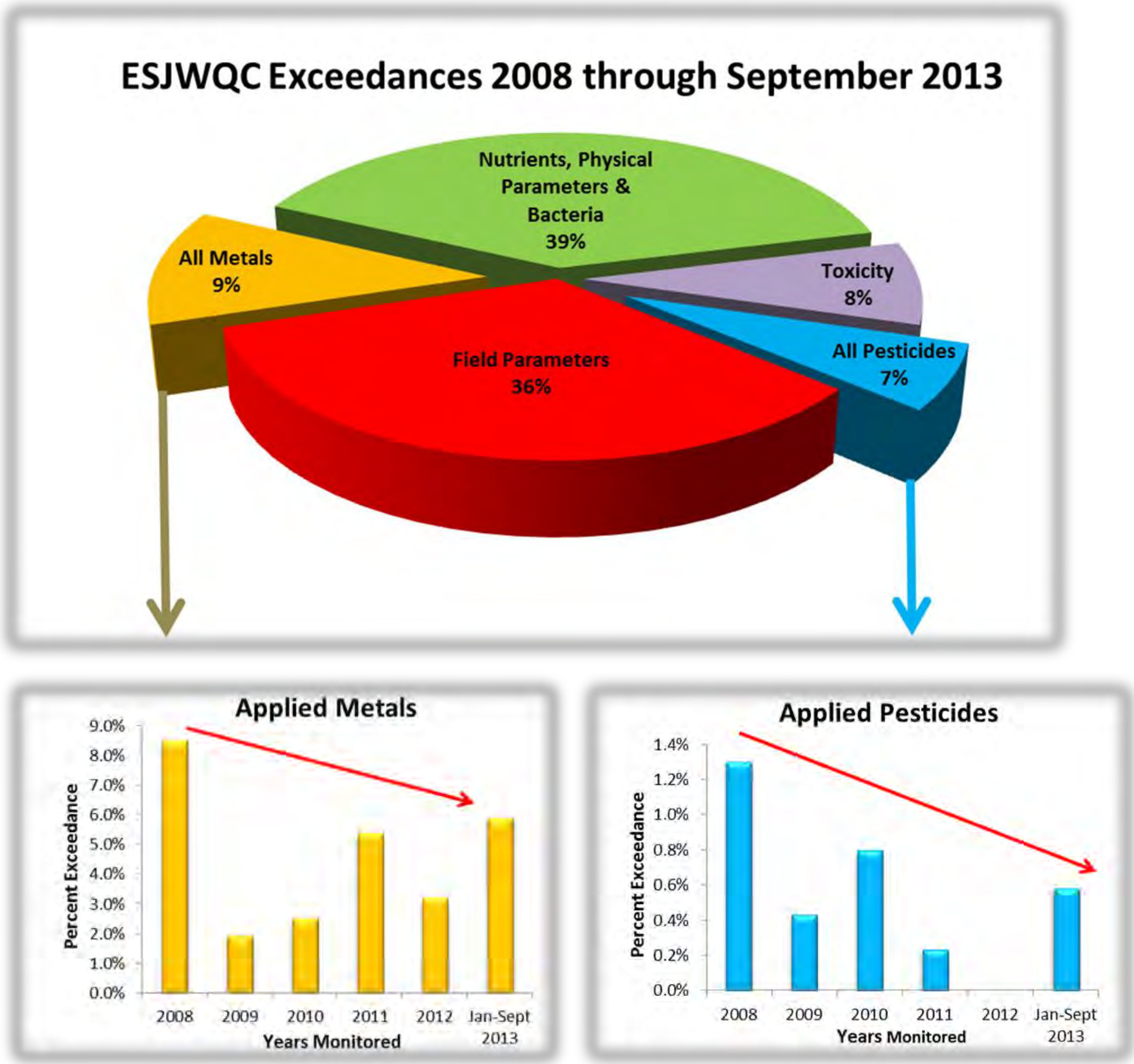


Table 84. Percentages of exceedances of WQTLs for applied metals and applied pesticides from 2008-September 2013.
Table excludes toxicity resampling events and 2008 upstream MPM that was conducted as part of source evaluation.

Years	Applied Metals			Applied Pesticides		
	Exceedances	Sampled	% of Exceedances	Exceedances	Sampled	% of Exceedances
2008	39	459	8.5%	45	3460	1.3%
2009	6	310	1.9%	6	1380	0.4%
2010	8	318	2.5%	10	1249	0.8%
2011	30	556	5.4%	5	2101	0.2%
2012	9	278	3.2%	0	951	0.0%
Jan-Sept 2013	13	222	5.9%	4	687	0.6%

Spatial Trends

The Coalition evaluated monitoring data in order to identify potential trends and patterns in surface water quality that could be associated with discharge(s) from irrigated lands. The Coalition reviewed trends for chlorpyrifos, diuron, and copper (top applied constituents with exceedances of WQTLs), ammonia and nitrate (constituents applied by agriculture but for which there are no application records), and DO, SC, and *E. coli* (constituents not applied by agriculture). To determine if there has been an improvement or degradation of water quality, the Coalition compared water quality results from 2009 to results from 2013.

Results from 2009 represent water quality in the Coalition region at the beginning of focused outreach. The 2009 year was when growers began implementing management practices designed to improve water quality. Water quality results from 2013 (5 years since focused outreach) indicate marked water quality improvements as a direct result of outreach and growers implementing management practices in high priority site subwatersheds for constituents such as chlorpyrifos, copper, diazinon, dimethoate, diuron, malathion, simazine.

Constituents Applied by Agriculture

Pesticides may be found in the water column or sediment as a result of applications to fields that are subsequently irrigated, have runoff after rainfall events, or from spray drift to surface waters. Irrigation return flows from fields or storm water runoff can move sediment and chemicals to surface waters.

A spatial trends analysis for the three top applied constituents in the Coalition region (detected in samples above the WQTL more than once) was performed to gain an understanding of the magnitude and frequency of exceedances in 2009 compared to those in 2013. Constituents with the greatest pounds applied between 2009 through September 2013 as well as the largest number of past exceedances were chosen for the analysis (Table 85, in red; Figures 36-50).

For chlorpyrifos, diuron, and copper the Coalition calculated magnitude to demonstrate the concentration of the constituents compared to their respective WQTLs. The Coalition divided the concentration of the detections by the WQTL of the constituent (Table 86; exceedances in bold). To calculate frequency of exceedances of the top applied constituents, the Coalition divided the number of exceedances per constituent by total samples of that constituent collected from all sites during that year (Table 87).

Table 85. Top agriculturally applied constituents from 2009 through September 2013 in the ESJWQC region.

Three constituents with greatest amount of pesticide use and greatest number of exceedances in red.

CONSTITUENTS	TOTAL AMOUNT APPLIED (LBS AI)	TOTAL EXCEEDANCE COUNT
COPPER	**2,377,087**	**66**
PARAQUAT DICHLORIDE	879,201	0
CHLORPYRIFOS	**548,850**	**18**
ZINC	473,073	0
GLYPHOSATE	349,316	0
SIMAZINE	260,63	0
DIURON	**131,778**	**4**
MALATHION	112,982	1
DIMETHOATE	52,352	2
PHOSMET	44,113	0
CARBARYL	26,447	1
DIAZINON	23,556	1
METHOMYL	18,460	0
ALDICARB	11,931	0
METHIDATHION	10,748	0
METHYL PARATHION	5806	0
LINURON	5261	0
OXAMYL	4444	0
METHAMIDOPHOS	1117	0
AZINPHOS-METHYL	1079	0
PHORATE	289	0
METHIOCARB	212	0
CARBOFURAN	27	0
CYANAZINE	1	0

Table 86. Magnitude of detections of top applied constituents (chlorpyrifos, diuron, and copper) in 2009 and January through September 2013.

Organized by constituent, date, and zone. Only dissolved copper results are included in this analysis. Exceedances are in bold.

ZONE	SITE SUBWATERSHED[1]	SAMPLE DATE	YEAR	ANALYTE	RESULT	WQTL[2] (µG/L)	MAGNITUDE	EXCEEDANCE?
1	Dry Creek @ Wellsford Rd	7/21/2009	2009	Chlorpyrifos	0.013	0.015	0.87	No
1	**Dry Creek @ Wellsford Rd**	**8/18/2009**	**2009**	**Chlorpyrifos**	**0.027**	**0.015**	**1.8**	**Yes**
1	Mootz Drain	**6/16/2009**	**2009**	**Chlorpyrifos**	**0.033**	**0.015**	**2.2**	**Yes**
2	**Lateral 2 1/2 near Keyes Rd**	**7/21/2009**	**2009**	**Chlorpyrifos**	**0.049**	**0.015**	**3.27**	**Yes**
3	**Highline Canal @ Hwy 99**	**7/21/2009**	**2009**	**Chlorpyrifos**	**0.093**	**0.015**	**6.2**	**Yes**
5	Duck Slough @ Gurr Rd	1/20/2009	2009	Chlorpyrifos	0.012	0.015	0.8	No
5	**Miles Creek @ Reilly Rd**	**7/21/2009**	**2009**	**Chlorpyrifos**	**0.028**	**0.015**	**1.87**	**Yes**
1	**Dry Creek @ Wellsford Rd**	**9/10/2013**	**2013**	**Chlorpyrifos**	**0.14**	**0.015**	**9.33**	**Yes**
1	Mootz Drain	**2/7/2009**	**2009**	**Diuron**	**2.1**	**2**	**1.05**	**Yes**
1	Mootz Drain	3/17/2009	2009	Diuron	0.86	2	0.43	No
2	Levee Drain @ Carpenter Rd	4/2/2013	2013	Diuron	0.28	2	0.14	No
2	Levee Drain @ Carpenter Rd	5/14/2013	2013	Diuron	1.7	2	0.85	No
2	Levee Drain @ Carpenter Rd	6/11/2013	2013	Diuron	0.27	2	0.14	No
4	Unnamed Drain @ Hwy 140	4/2/2013	2013	Diuron	0.2	2	0.1	No
5	Miles Creek @ Reilly Rd	2/12/2013	2013	Diuron	0.57	2	0.29	No
5	Miles Creek @ Reilly Rd	2/20/2013	2013	Diuron	0.42	2	0.21	No
5	Miles Creek @ Reilly Rd	3/12/2013	2013	Diuron	0.4	2	0.2	No
6	**Dry Creek @ Rd 18**	**1/8/2013**	**2013**	**Diuron**	**5.2**	**2**	**2.6**	**Yes**
1	Mootz Drain	2/7/2009	2009	Copper	3	12.664	0.24	No
1	Mootz Drain	3/17/2009	2009	Copper	3.5	15.499	0.23	No
1	Mootz Drain	4/21/2009	2009	Copper	3.4	6.279	0.54	No
1	Mootz Drain	5/19/2009	2009	Copper	2.8	8.029	0.35	No

Zone	Site Subwatershed[1]	Sample Date	Year	Analyte	Result	WQTL[2] (µG/L)	Magnitude	Exceedance?
1	Mootz Drain	6/16/2009	2009	Copper	3	6.441	0.47	No
1	Mootz Drain	7/21/2009	2009	Copper	2.5	5.29	0.47	No
1	Mootz Drain	8/18/2009	2009	Copper	2.3	6.279	0.37	No
1	Mootz Drain	9/22/2009	2009	Copper	1.8	6.279	0.29	No
1	Mootz Drain	10/20/2009	2009	Copper	3.1	5.122	0.61	No
1	Mootz Drain	11/17/2009	2009	Copper	1.9	8.956	0.21	No
1	Mootz Drain	12/15/2009	2009	Copper	1.6	11.939	0.13	No
2	Lateral 2 1/2 near Keyes Rd	4/21/2009	2009	Copper	0.69	3.918	0.18	No
2	Lateral 2 1/2 near Keyes Rd	5/19/2009	2009	Copper	0.57	10.466	0.05	No
2	Lateral 2 1/2 near Keyes Rd	6/16/2009	2009	Copper	0.57	11.939	0.05	No
2	Lateral 2 1/2 near Keyes Rd	7/21/2009	2009	Copper	0.36	11.939	0.03	No
2	Lateral 2 1/2 near Keyes Rd	8/18/2009	2009	Copper	0.49	16.883	0.03	No
2	Lateral 2 1/2 near Keyes Rd	9/22/2009	2009	Copper	0.1	5.87	0.02	No
2	Lateral 2 1/2 near Keyes Rd	10/20/2009	2009	Copper	0.7	1.669	0.42	No
3	Highline Canal @ Lombardy Rd	8/18/2009	2009	Copper	0.58	1.871	0.31	No
3	**Mustang Creek @ East Ave**	**2/7/2009**	**2009**	**Copper**	**25**	**20.927**	**1.19**	**Yes**
3	Mustang Creek @ East Ave	3/17/2009	2009	Copper	21	29.279	0.72	No
3	**Mustang Creek @ East Ave**	**10/20/2009**	**2009**	**Copper**	**44**	**24.197**	**1.82**	**Yes**
3	**Mustang Creek @ East Ave**	**12/15/2009**	**2009**	**Copper**	**25**	**22.898**	**1.09**	**Yes**
4	Howard Lateral @ Hwy 140	4/21/2009	2009	Copper	4	7.322	0.55	No
4	Howard Lateral @ Hwy 140	5/19/2009	2009	Copper	2.3	18.247	0.13	No
4	Howard Lateral @ Hwy 140	6/16/2009	2009	Copper	2	5.953	0.34	No
4	Howard Lateral @ Hwy 140	7/21/2009	2009	Copper	3.2	6.684	0.48	No
4	Howard Lateral @ Hwy 140	8/18/2009	2009	Copper	2	2.739	0.73	No
4	Howard Lateral @ Hwy 140	9/22/2009	2009	Copper	2.2	2.645	0.83	No
4	**Howard Lateral @ Hwy 140**	**10/20/2009**	**2009**	**Copper**	**3.3**	**1.567**	**2.11**	**Yes**
4	Merced River @ Santa Fe	1/20/2009	2009	Copper	0.4	2.645	0.15	No
4	Merced River @ Santa Fe	2/7/2009	2009	Copper	0.49	2.456	0.2	No
4	Merced River @ Santa Fe	3/17/2009	2009	Copper	0.73	3.018	0.24	No
4	Merced River @ Santa Fe	4/21/2009	2009	Copper	0.79	2.739	0.29	No
4	Merced River @ Santa Fe	5/19/2009	2009	Copper	0.7	2.456	0.29	No
4	Merced River @ Santa Fe	6/16/2009	2009	Copper	0.58	2.167	0.27	No
4	Merced River @ Santa Fe	7/21/2009	2009	Copper	0.8	2.264	0.35	No
4	Merced River @ Santa Fe	8/18/2009	2009	Copper	0.76	2.167	0.35	No
4	Merced River @ Santa Fe	9/22/2009	2009	Copper	0.28	1.97	0.14	No
4	Merced River @ Santa Fe	10/20/2009	2009	Copper	0.61	1.97	0.31	No
4	Merced River @ Santa Fe	11/17/2009	2009	Copper	0.35	1.669	0.21	No
4	Merced River @ Santa Fe	12/15/2009	2009	Copper	0.54	5.122	0.11	No
5	Deadman Creek @ Gurr Rd	1/20/2009	2009	Copper	4.3	22.244	0.19	No
5	Deadman Creek @ Gurr Rd	2/7/2009	2009	Copper	4.9	37.239	0.13	No
5	Deadman Creek @ Gurr Rd	3/17/2009	2009	Copper	0.5	16.193	0.03	No
5	Deadman Creek @ Gurr Rd	4/21/2009	2009	Copper	1.3	8.726	0.15	No
5	Deadman Creek @ Gurr Rd	5/19/2009	2009	Copper	1.6	7.48	0.21	No
5	Deadman Creek @ Gurr Rd	6/16/2009	2009	Copper	1.2	6.441	0.19	No
5	Deadman Creek @ Gurr Rd	7/21/2009	2009	Copper	2.1	4.953	0.42	No
5	Deadman Creek @ Gurr Rd	8/18/2009	2009	Copper	1	2.167	0.46	No
5	Deadman Creek @ Gurr Rd	9/22/2009	2009	Copper	0.62	3.741	0.17	No
5	Deadman Creek @ Gurr Rd	10/20/2009	2009	Copper	1.6	3.383	0.47	No
5	Deadman Creek @ Gurr Rd	11/17/2009	2009	Copper	4	9.716	0.41	No
5	Deadman Creek @ Gurr Rd	12/15/2009	2009	Copper	2.5	24.841	0.1	No
5	Duck Slough @ Gurr Rd	1/20/2009	2009	Copper	0.2	14.094	0.01	No
5	Duck Slough @ Gurr Rd	2/7/2009	2009	Copper	7.6	13.382	0.57	No
5	Duck Slough @ Gurr Rd	3/17/2009	2009	Copper	4.6	8.879	0.52	No
5	Duck Slough @ Gurr Rd	4/21/2009	2009	Copper	2.6	8.262	0.31	No
5	**Duck Slough @ Gurr Rd**	**5/19/2009**	**2009**	**Copper**	**7.3**	**6.116**	**1.19**	**Yes**
5	Duck Slough @ Hwy 99	6/16/2009	2009	Copper	0.61	2.456	0.25	No
5	Duck Slough @ Hwy 99	7/21/2009	2009	Copper	0.7	1.871	0.37	No
5	Duck Slough @ Hwy 99	8/18/2009	2009	Copper	0.61	1.567	0.39	No

Zone	Site Subwatershed[1]	Sample Date	Year	Analyte	Result	WQTL[2] (µg/L)	Magnitude	Exceedance?
5	Duck Slough @ Hwy 99	9/22/2009	2009	Copper	0.25	1.252	0.2	No
5	Miles Creek @ Reilly Rd	7/21/2009	2009	Copper	1.5	3.018	0.5	No
5	Miles Creek @ Reilly Rd	8/18/2009	2009	Copper	1.6	4.268	0.37	No
6	**Ash Slough @ Ave 21**	**5/19/2009**	**2009**	**Copper**	**3**	**2.167**	**1.38**	**Yes**
1	Burnett Lateral @ 28 Mile Rd	1/8/2013	2013	Copper	2.9	6.844	0.42	No
1	Burnett Lateral @ 28 Mile Rd	2/12/2013	2013	Copper	1.4	6.924	0.2	No
1	Burnett Lateral @ 28 Mile Rd	2/20/2013	2013	Copper	1.3	6.924	0.19	No
1	Mootz Drain	4/2/2013	2013	Copper	4.8	5.788	0.83	No
1	Mootz Drain	5/14/2013	2013	Copper	2.8	4.527	0.62	No
1	Mootz Drain	6/11/2013	2013	Copper	3	4.093	0.73	No
1	Mootz Drain	7/9/2013	2013	Copper	2.3	7.4	0.31	No
1	Mootz Drain	8/13/2013	2013	Copper	2.3	4.27	0.54	No
1	Mootz Drain	9/10/2013	2013	Copper	3.6	5.46	0.66	No
2	Hilmar Drain @ Central Ave	2/12/2013	2013	Copper	5.4	27.392	0.2	No
2	Hilmar Drain @ Central Ave	7/9/2013	2013	Copper	3.4	28.7	0.12	No
2	Levee Drain @ Carpenter Rd	1/8/2013	2013	Copper	4.6	28.653	0.16	No
2	Levee Drain @ Carpenter Rd	2/12/2013	2013	Copper	6.5	32.38	0.2	No
2	Levee Drain @ Carpenter Rd	2/20/2013	2013	Copper	3.9	32.38	0.12	No
2	Levee Drain @ Carpenter Rd	3/12/2013	2013	Copper	3.4	31.764	0.11	No
2	Levee Drain @ Carpenter Rd	4/2/2013	2013	Copper	2.8	13.382	0.21	No
2	Levee Drain @ Carpenter Rd	5/14/2013	2013	Copper	4	21.587	0.19	No
2	Levee Drain @ Carpenter Rd	6/11/2013	2013	Copper	3.3	21.587	0.15	No
2	Levee Drain @ Carpenter Rd	7/9/2013	2013	Copper	5	17.6	0.28	No
2	Levee Drain @ Carpenter Rd	8/13/2013	2013	Copper	2.9	21.59	0.13	No
2	Levee Drain @ Carpenter Rd	9/10/2013	2013	Copper	2	30.53	0.07	No
3	**Highline Canal @ Hwy 99**	**1/8/2013**	**2013**	**Copper**	**11**	**8.417**	**1.31**	**Yes**
3	Highline Canal @ Hwy 99	2/12/2013	2013	Copper	6.7	7.873	0.85	no
3	Highline Canal @ Hwy 99	4/2/2013	2013	Copper	1.2	1.97	0.61	No
3	Highline Canal @ Hwy 99	6/11/2013	2013	Copper	0.54	1.77	0.31	No
3	Highline Canal @ Hwy 99	7/9/2013	2013	Copper	0.51	1.7	0.3	No
3	Highline Canal @ Hwy 99	8/13/2013	2013	Copper	0.46	1.67	0.28	No
3	**Highline Canal @ Lombardy Rd**	**1/8/2013**	**2013**	**Copper**	**11**	**9.716**	**1.13**	**Yes**
3	Highline Canal @ Lombardy Rd	2/12/2013	2013	Copper	11	11.206	0.98	No
3	Highline Canal @ Lombardy Rd	3/12/2013	2013	Copper	0.95	1.871	0.51	No
3	Highline Canal @ Lombardy Rd	5/14/2013	2013	Copper	0.65	1.97	0.33	No
3	Highline Canal @ Lombardy Rd	8/13/2013	2013	Copper	0.34	1.67	0.2	No
3	**Mustang Creek @ East Ave**	**1/8/2013**	**2013**	**Copper**	**11**	**8.956**	**1.23**	**Yes**
3	Mustang Creek @ East Ave	2/12/2013	2013	Copper	11	16.883	0.65	No
4	Bear Creek @ Kibby Rd	1/8/2013	2013	Copper	3.2	6.844	0.47	No
4	Bear Creek @ Kibby Rd	2/12/2013	2013	Copper	1.5	11.206	0.13	No
4	Bear Creek @ Kibby Rd	8/13/2013	2013	Copper	0.69	3.02	0.23	No
4	**Howard Lateral @ Hwy 140**	**4/9/2013**	**2013**	**Copper**	**7.2**	**4.953**	**1.45**	**Yes**
4	Howard Lateral @ Hwy 140	7/9/2013	2013	Copper	2	5.1	0.39	No
4	Livingston Drain @ Robin Ave	1/8/2013	2013	Copper	4.5	15.499	0.29	No
4	Livingston Drain @ Robin Ave	5/21/2013	2013	Copper	9.7	14.658	0.66	No
4	Livingston Drain @ Robin Ave	6/11/2013	2013	Copper	2.6	3.652	0.71	No
4	Livingston Drain @ Robin Ave	7/9/2013	2013	Copper	2.7	7.4	0.36	No
4	**McCoy Lateral @ Hwy 140**	**1/8/2013**	**2013**	**Copper**	**3.2**	**1.871**	**1.71**	**Yes**
4	McCoy Lateral @ Hwy 140	6/11/2013	2013	Copper	3.1	5.953	0.52	No
4	**McCoy Lateral @ Hwy 140**	**9/10/2013**	**2013**	**Copper**	**2.1**	**1.87**	**1.12**	**Yes**
4	**Unnamed Drain @ Hwy 140**	**1/8/2013**	**2013**	**Copper**	**4.7**	**4.267**	**1.1**	**Yes**
4	Unnamed Drain @ Hwy 140	3/12/2013	2013	Copper	1.6	4.612	0.35	No
4	Unnamed Drain @ Hwy 140	4/2/2013	2013	Copper	2.5	10.466	0.24	No
4	Unnamed Drain @ Hwy 140	5/14/2013	2013	Copper	1.3	4.441	0.29	No
4	Unnamed Drain @ Hwy 140	6/11/2013	2013	Copper	1.3	5.953	0.22	No
4	Unnamed Drain @ Hwy 140	7/9/2013	2013	Copper	0.98	6.3	0.16	No
4	Unnamed Drain @ Hwy 140	8/13/2013	2013	Copper	1.2	6.28	0.19	No
4	Unnamed Drain @ Hwy 140	9/10/2013	2013	Copper	1	4.44	0.23	No

Zone	Site Subwatershed[1]	Sample Date	Year	Analyte	Result	WQTL[2] (µg/L)	Magnitude	Exceedance?
5	Duck Slough @ Gurr Rd	1/8/2013	2013	Copper	3.1	6.844	0.45	No
5	Duck Slough @ Gurr Rd	4/2/2013	2013	Copper	1.6	5.706	0.28	No
5	Duck Slough @ Gurr Rd	5/14/2013	2013	Copper	1.3	4.18	0.31	No
5	Duck Slough @ Gurr Rd	6/11/2013	2013	Copper	1.3	4.093	0.32	No
5	Duck Slough @ Gurr Rd	7/9/2013	2013	Copper	0.88	23.5	0.04	No
5	Duck Slough @ Gurr Rd	8/13/2013	2013	Copper	2.2	4.61	0.48	No
5	Duck Slough @ Gurr Rd	9/10/2013	2013	Copper	4.2	5.79	0.73	No
5	Miles Creek @ Reilly Rd	1/8/2013	2013	Copper	4.3	4.354	0.99	No
5	Miles Creek @ Reilly Rd	2/12/2013	2013	Copper	2.5	12.664	0.2	No
5	Miles Creek @ Reilly Rd	2/20/2013	2013	Copper	1.9	12.664	0.15	No
5	Miles Creek @ Reilly Rd	3/12/2013	2013	Copper	1.9	11.939	0.16	No
5	Miles Creek @ Reilly Rd	4/2/2013	2013	Copper	1.1	5.54	0.2	No
5	Miles Creek @ Reilly Rd	5/14/2013	2013	Copper	1.3	5.206	0.25	No
5	Miles Creek @ Reilly Rd	6/11/2013	2013	Copper	2	4.267	0.47	No
5	Miles Creek @ Reilly Rd	7/9/2013	2013	Copper	1.4	3.8	0.37	No
5	Miles Creek @ Reilly Rd	8/13/2013	2013	Copper	0.76	3.02	0.25	No
5	Miles Creek @ Reilly Rd	9/10/2013	2013	Copper	1.4	3.92	0.36	No
6	Berenda Slough along Ave 18 1/2	7/9/2013	2013	Copper	2.6	4.8	0.54	No
6	**Cottonwood Creek @ Rd 20**	**1/8/2013**	**2013**	**Copper**	**13**	**6.844**	**1.9**	**Yes**
6	Cottonwood Creek @ Rd 20	7/9/2013	2013	Copper	3.3	5.3	0.62	No
6	Cottonwood Creek @ Rd 20	9/10/2013	2013	Copper	3.1	5.79	0.54	No
6	**Dry Creek @ Rd 18**	**1/8/2013**	**2013**	**Copper**	**11**	**5.788**	**1.9**	**Yes**
6	Dry Creek @ Rd 18	2/12/2013	2013	Copper	8.6	11.206	0.77	No
6	Dry Creek @ Rd 18	3/12/2013	2013	Copper	8.1	17.567	0.46	No
6	Dry Creek @ Rd 18	4/2/2013	2013	Copper	9.8	12.664	0.77	No
6	Dry Creek @ Rd 18	5/14/2013	2013	Copper	6.2	13.382	0.46	No
6	**Dry Creek @ Rd 18**	**6/11/2013**	**2013**	**Copper**	**6.8**	**1.77**	**3.84**	**Yes**
6	**Dry Creek @ Rd 18**	**7/9/2013**	**2013**	**Copper**	**3.7**	**1.6**	**2.31**	**Yes**
6	**Dry Creek @ Rd 18**	**8/13/2013**	**2013**	**Copper**	**3**	**1.67**	**1.8**	**Yes**
6	**Dry Creek @ Rd 18**	**9/10/2013**	**2013**	**Copper**	**2.3**	**1.67**	**1.38**	**Yes**

[1]-TheThe results for 'Mootz Drain' include both the upstream (Mootz Drain @ Langworth Pond) and the downstream (Mootz Drain downstream of Langworth Pond) data.

[2]-The WQTL for dissolved copper is variable based on hardness.

Table 87. Frequency of exceedances of top applied constituents in the ESJWQC region in 2009 and January through September 2013.

Organized by constituent, date, and zone. Only dissolved copper is included in this analysis.

Analyte	Total Exceedances Per Site	Total Samples Collected	Frequency (% Exceedance)
Frequency of Chlorpyrifos Exceedances (2009)	5	99	5.05%
Frequency of Chlorpyrifos Exceedances (2013)	5	99	1.12%
Frequency of Diuron Exceedances (2009)	1	71	1.41%
Frequency of Diuron Exceedances (2013)	1	60	1.67%
Frequency of Copper Exceedances (2009)	6	95	6.31%
Frequency of Copper Exceedances (2013)	13	112	11.59%

[1]-In 2009 samples were collected at Mootz Drain @ Langworth Rd and in 2013 samples were collected at the downstream site, Mootz Drain downstream of Langworth Pond.

Chlorpyrifos

Chlorpyrifos is an organophosphate pesticide applied for pest control on a wide variety of crops in California with the highest amount of applications in the irrigation season (May, June, and July). In a waterbody, chlorpyrifos can both bind to sediment and remain in the water column (K_{oc} of 6,070). The WQTL for chlorpyrifos is 0.015 µg/L.

During 2009, there were seven detections of chlorpyrifos; five were exceedances of the WQTL (Table 86). From January through September 2013 there was only one exceedance in September and no other samples had detections of chlorpyrifos. Five out of 99 samples collected in 2009 had exceedances of the WQTL for chlorpyrifos (5.10% of samples collected) compared to one out of 89 samples in 2013 (1.12% of samples, Table 87). The frequency of the exceedances of chlorpyrifos has decreased substantially since outreach began. Overall pounds chlorpyrifos applied in 2009 was 145,936 lbs AI compared to 111,960 lbs AI applied from January through September 2013 and in both years the monitoring locations where samples had detections of exceedances did not correspond to areas of highest use (Figures 37 and 38. The pounds of chemical applied and exceedances decreased (Figure 36).

Diuron

Diuron is a broad-spectrum herbicide used for weed control on agriculture, highway rights of way, and by homeowners. It inhibits photosynthesis and also affects seed germination. Diuron is applied mostly during December, January, and February and is very water soluble (K_{oc} of 480). The WQTL for diuron is 2 µg/L.

During 2009, there were two detections of diuron (both collected from Mootz Drain) one of which was an exceedance of the WQTL (February). From January through September 2013 there were eight detections of diuron, one was an exceedance (January). The number of detections of diuron increased from 2009 to 2013; however, the number of exceedances remained the same (Table 87). Although the PUR data indicate that applications of diuron have decreased since outreach began with 26,525 lbs AI applied in 2009 and 14,671 lbs AI applied in 2013 (Figures 41-45), the frequency of exceedances of diuron has remained relatively the same (Table 87). Diuron has been approved for removal from three site subwatershed management plans.

Copper

Copper is applied to agriculture mostly as a fungicide / algaecide to a variety of crops and is applied across the Coalition region. The greatest amount of copper is applied in January and April (Figure 46). Copper may be found within waterbodies within the ESJWQC region due to: 1) recent agricultural applications moving to surface waters either through storm/irrigation runoff or spray drift, 2) dairy uses of copper sulfate in footbaths discharged to surface waters, 3) transport of copper from upstream abandoned mining operations, brake pads and other anthropogenic uses, and 4) copper used for algae and aquatic weed control in irrigation supply channels.

In 2009 and 2013 there were detections of copper in every zone in the Coalition region. In 2009 there were exceedances of the hardness based WQTL for dissolved copper in Zones 3, 4, 5, and 6; in 2013 exceedances only occurred in Zones 3, 4, and 6. Figures 46 through 50 include the pesticide use of copper, frequency of exceedances, and magnitude of exceedances. Although copper exceedances have increased since 2009, the maps of use indicate that the exceedances do not correlate with areas of highest use (Figures 49 and 50). Pesticides use slightly increased between 2009 and 2013 with 363,019 lbs AI applied in 2009 and 481,623 lbs AI applied in 2013 (Figure 46).

Copper continues to be detected in samples collected in three of the six Coalition zones despite additional practices implemented by growers. Although the frequency of exceedances of the copper WQTL has increased in 2013 compared to 2009, the Coalition has been able to remove three site subwatersheds from a copper management plan due to improved water quality. In subwatersheds where copper concentrations continue to result in water quality impairments, geological and geographical factors may be influencing the amount of copper. These factors are outside the scope of what the Coalition is capable of improving through modified agricultural practices. It is also possible that there have been applications by irrigation districts for algae and weed control in supply canals that are resulting in exceedances.

Figure 36. Sum of pounds of chlorpyrifos applied in 2009 and January through September 2013.
The PUR data are only available through September 2013.

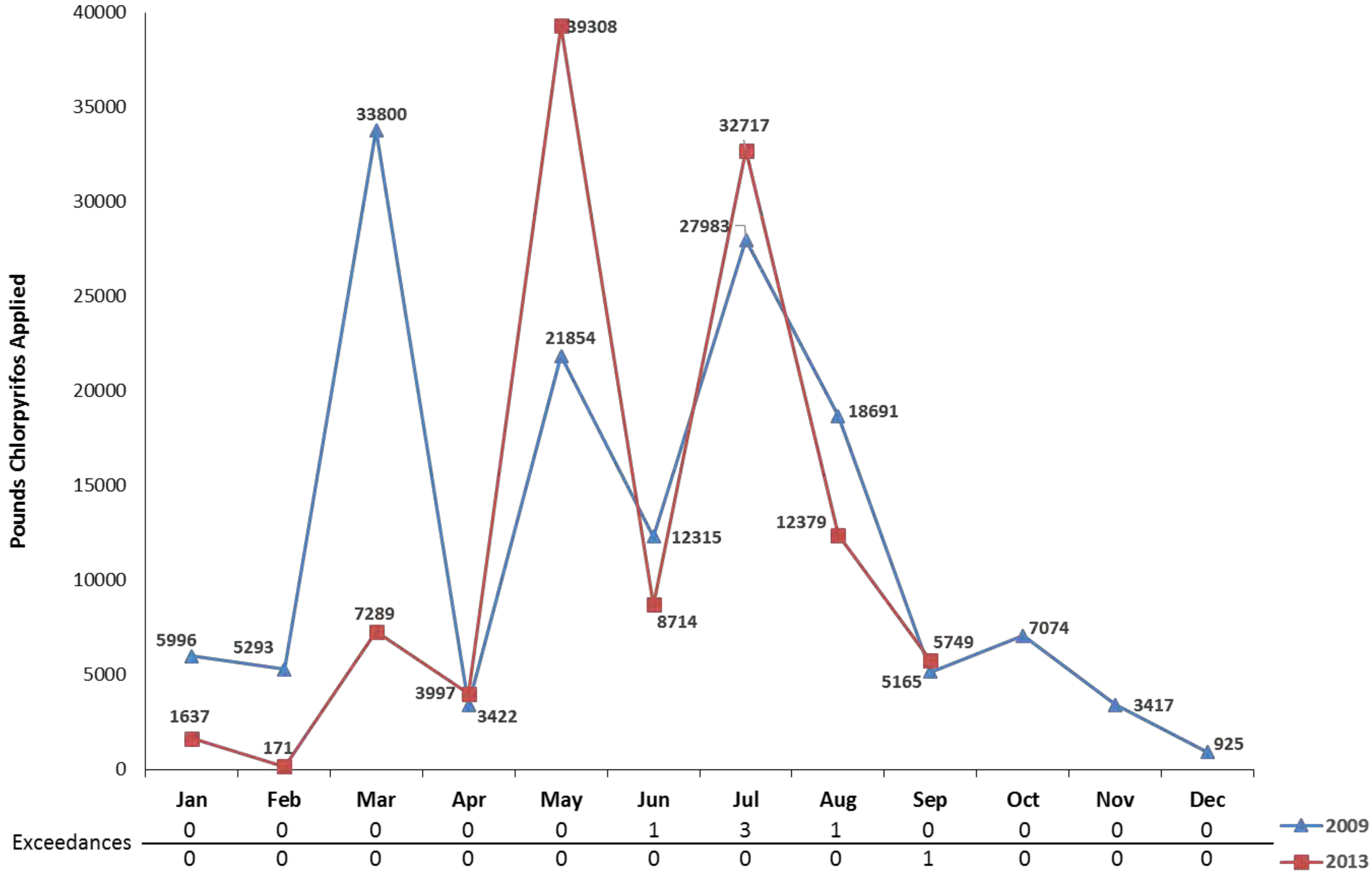


Figure 37. Magnitude of chlorpyrifos detections and total pounds of chlorpyrifos applied in 2009.

Magnitudes above 1 (red line) reflect an exceedance of the WQTL. Only monitoring locations with detections are shown on the map.

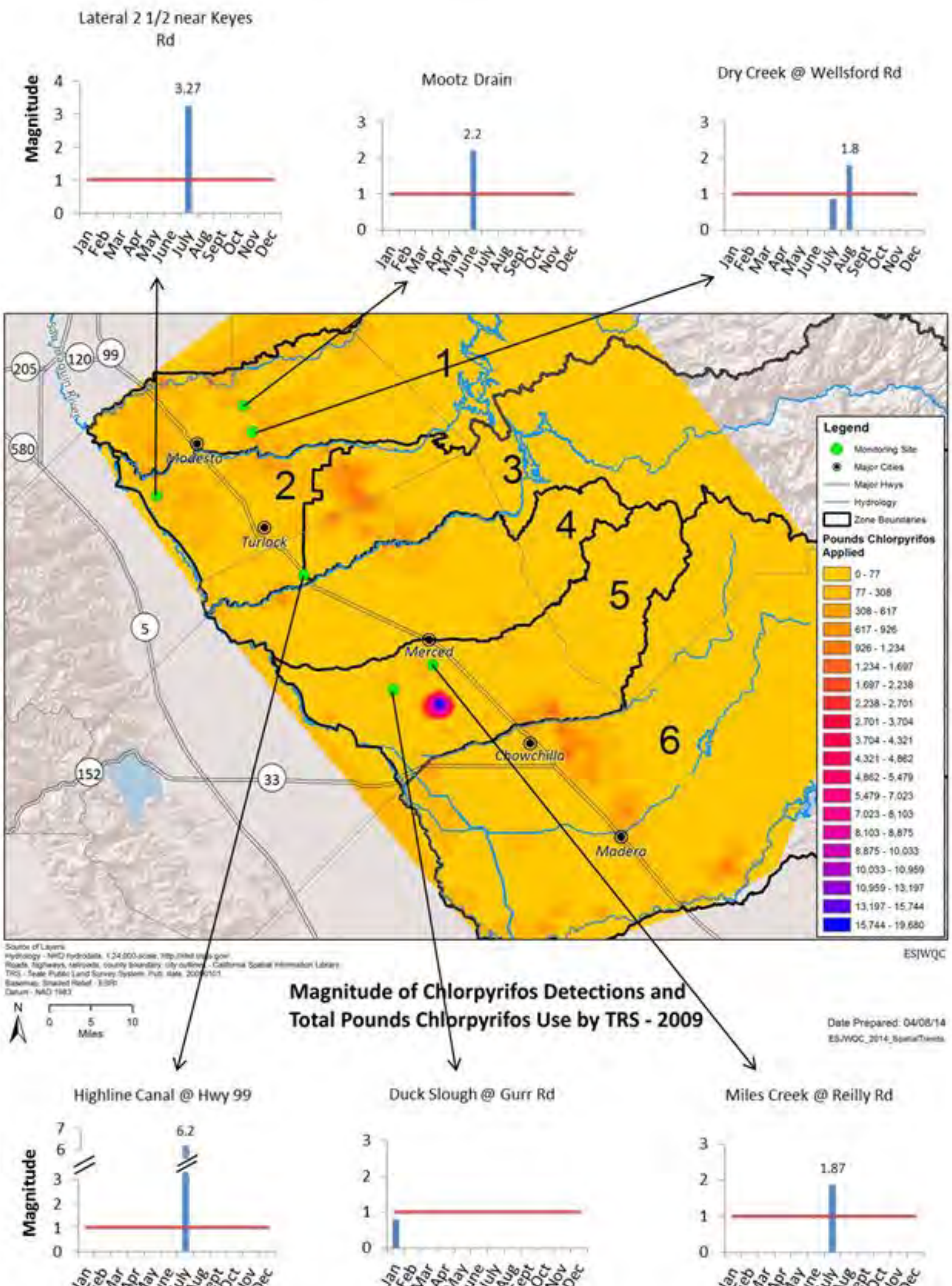


Figure 38. Magnitude of chlorpyrifos detections and total pounds of chlorpyrifos applied in January through September 2013.

Magnitudes above 1 (red line) reflect an exceedance of the WQTL. Only monitoring locations with detections are shown on the map.

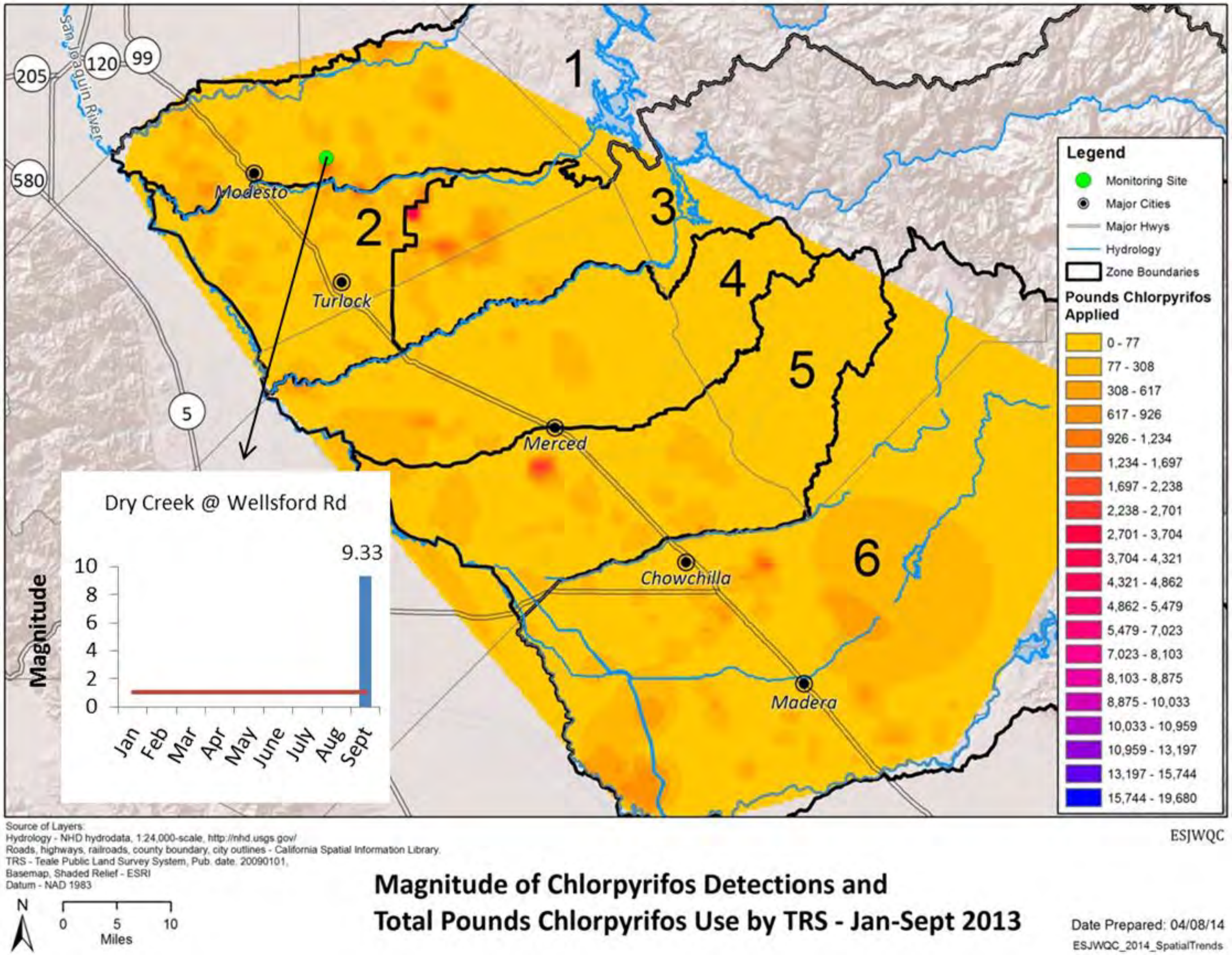


Figure 39. Frequency of exceedances for chlorpyrifos and total pounds of chlorpyrifos applied in for 2009.

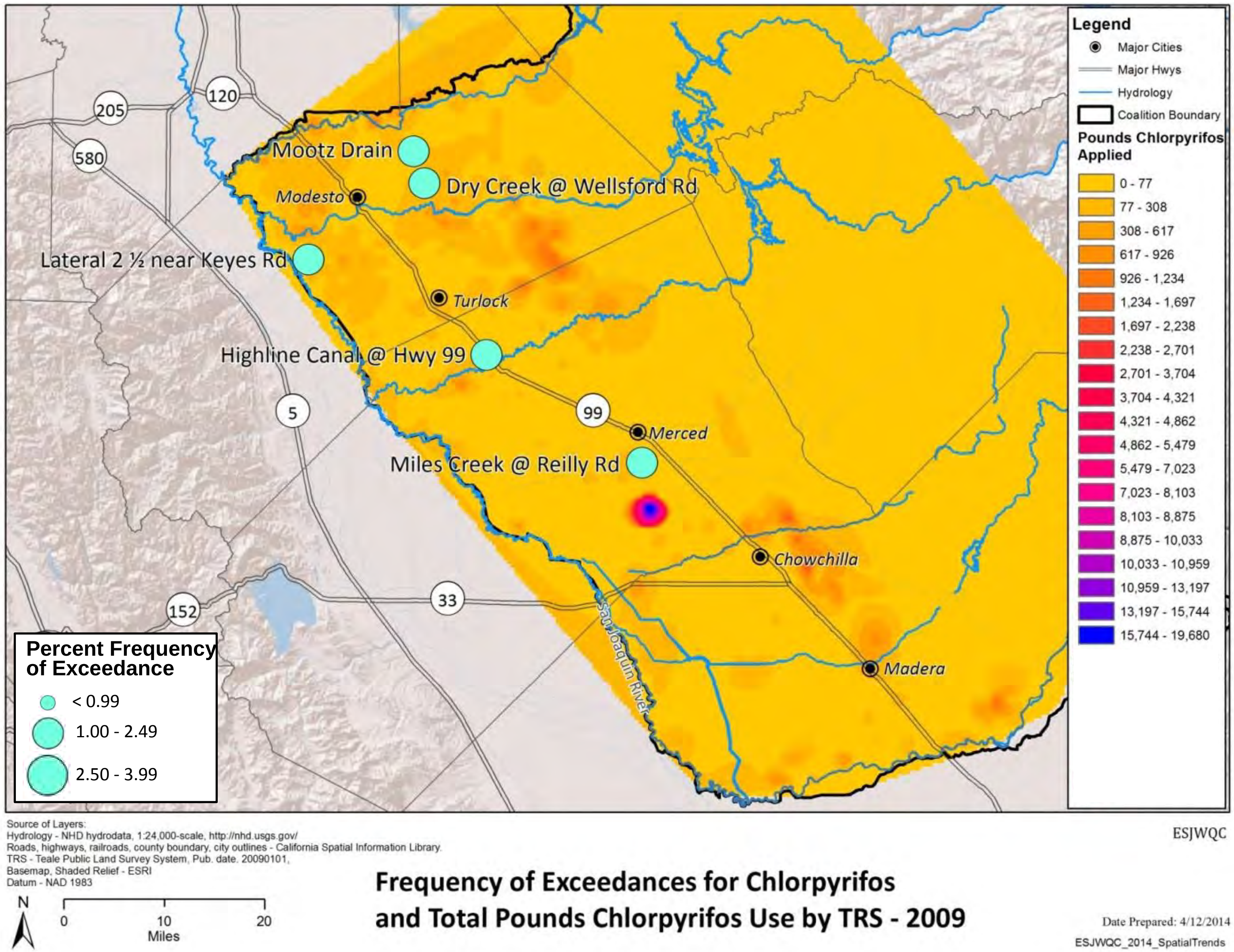


Figure 40. Frequency of exceedances for chlorpyrifos and total pounds of chlorpyrifos applied in January through September 2013.

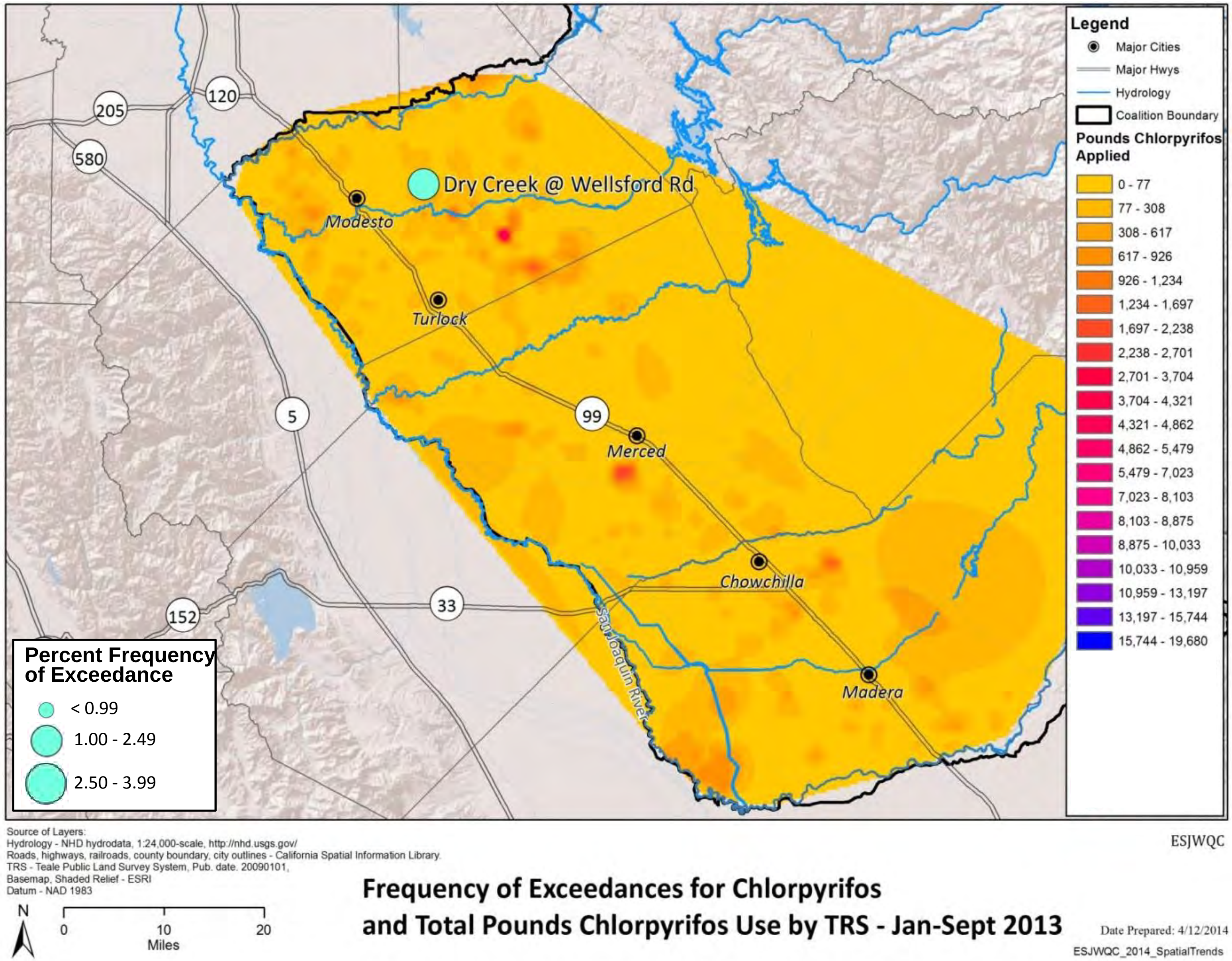
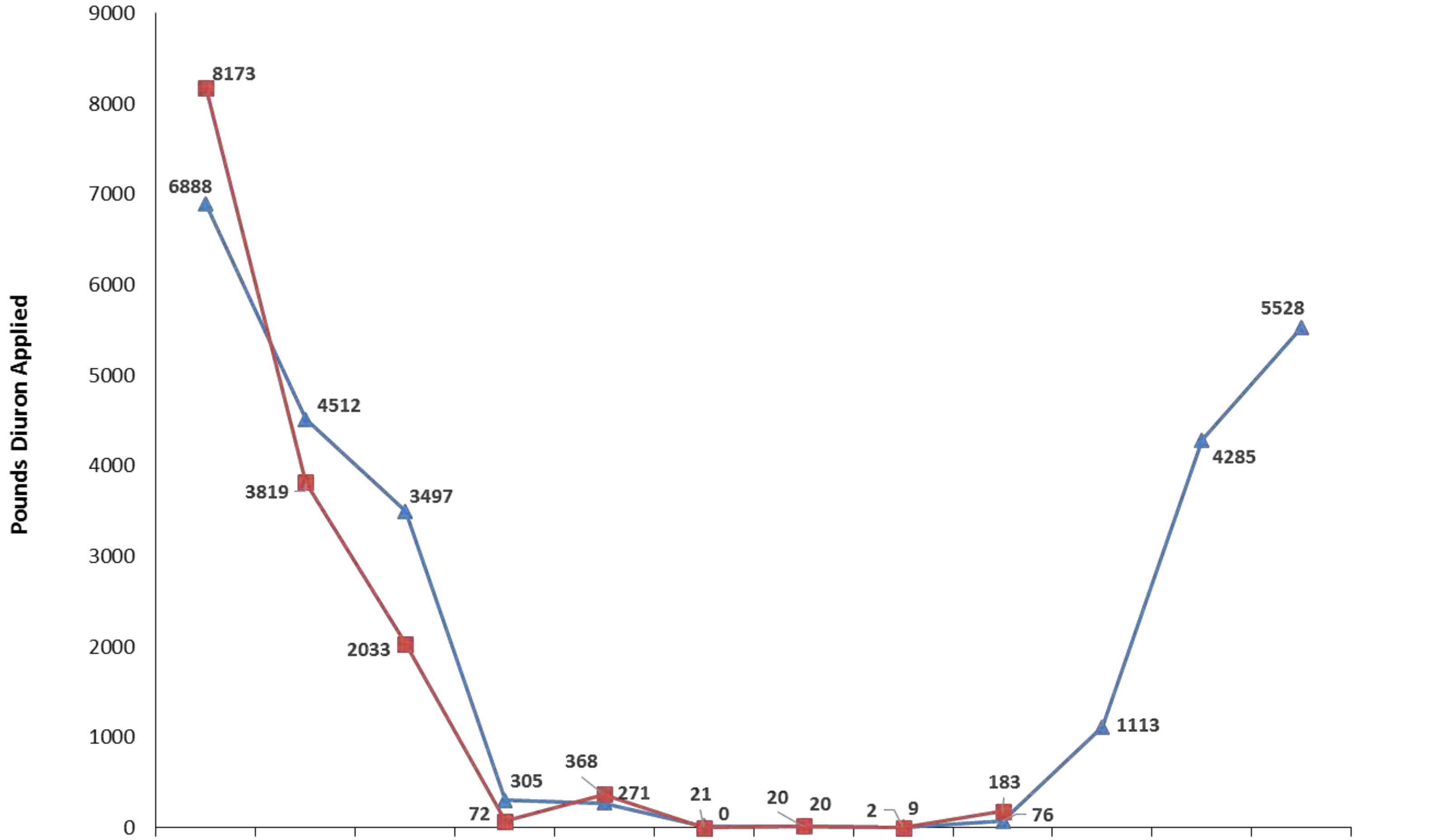


Figure 41. Sum of pounds of diuron applied in 2009 and January through September 2013.
The PUR data are only available through September 2013.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Exceedances 2009	0	1	0	0	0	0	0	0	0	0	0	0
Exceedances 2013	1	0	0	0	0	0	0	0	0	0	0	0

Figure 42. Magnitude of diuron detections and total pounds of diuron applied in 2009.

Magnitudes above 1 (red line) reflect an exceedance of the WQTL. Only monitoring locations with detections are shown on the map.

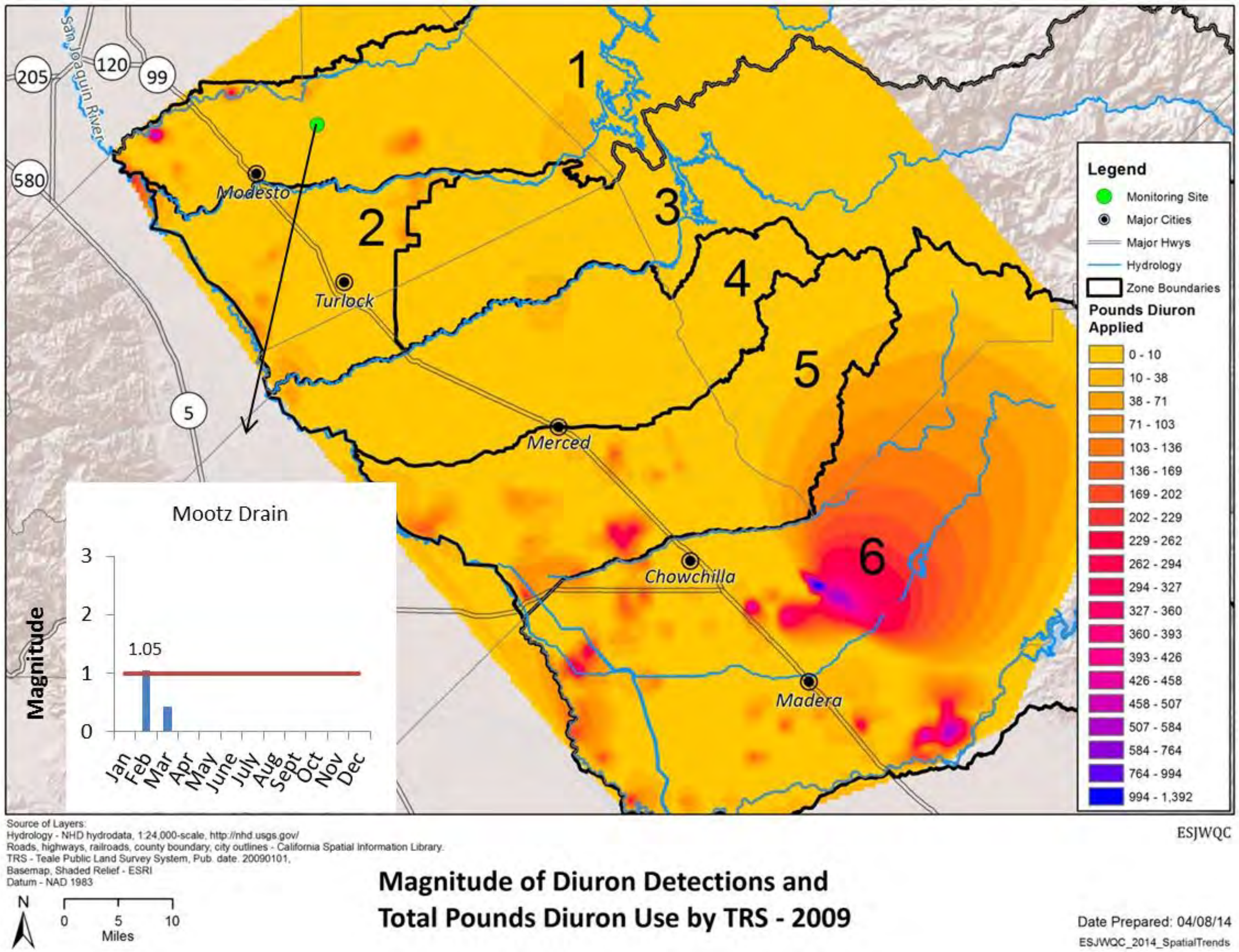


Figure 43. Magnitude of diuron detections and total pounds of diuron applied in January through September 2013.

Magnitudes above 1 (red line) reflect an exceedance of the WQTL. Only monitoring locations with detections are in the map.

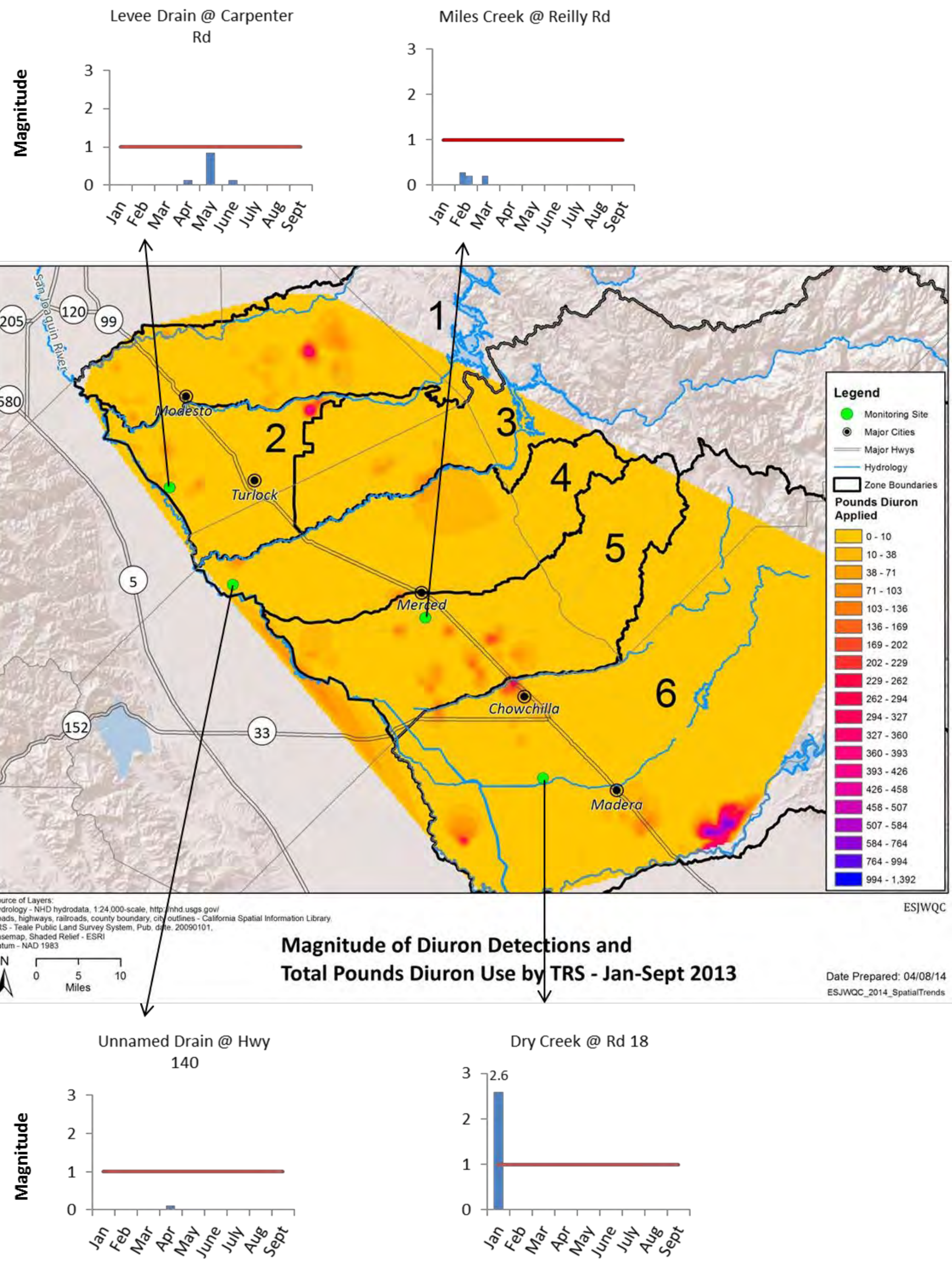


Figure 44. Frequency of exceedances for diuron and total pounds of diuron applied in 2009.

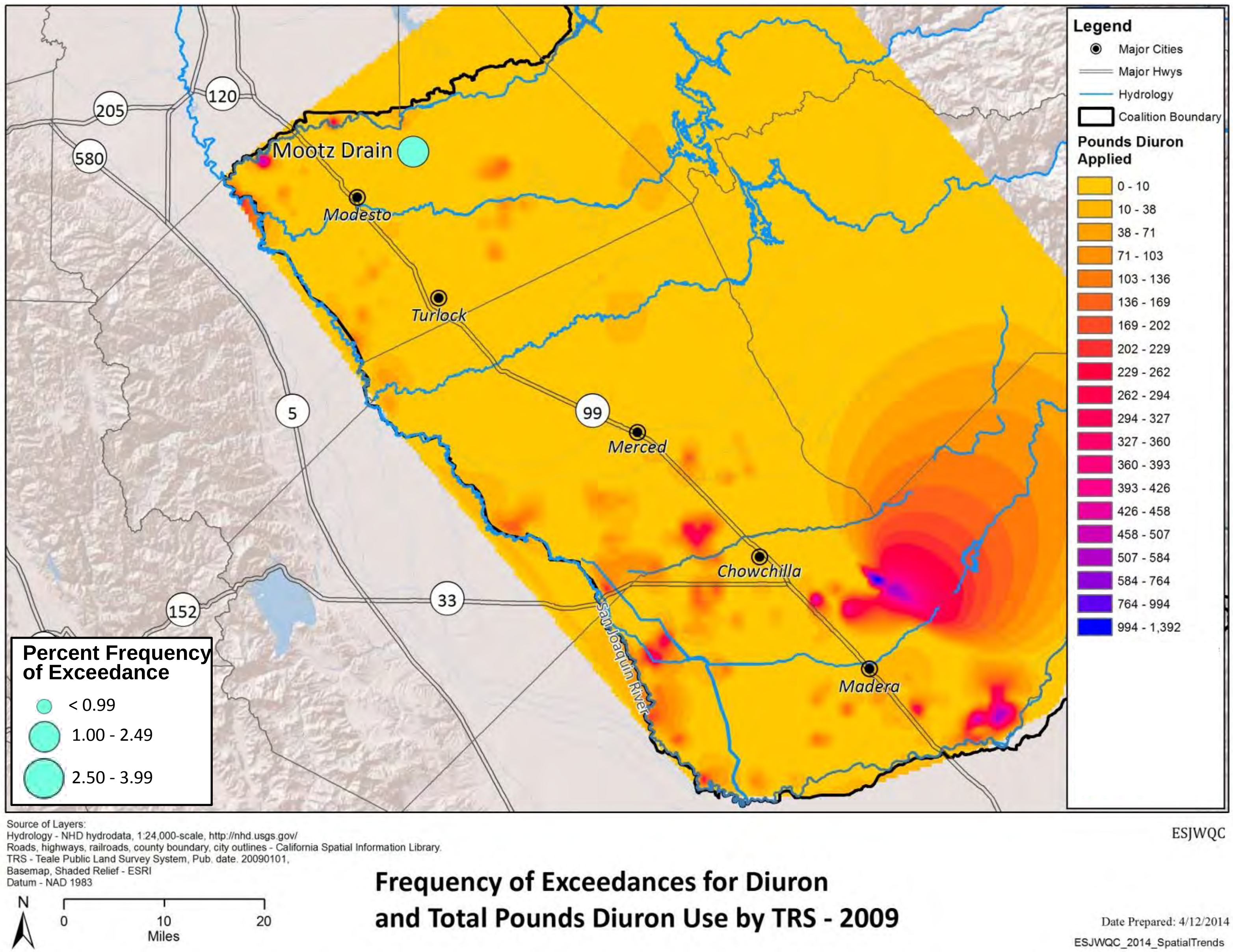


Figure 45. Frequency of exceedances for diuron and total pounds of diuron applied in January through September 2013.

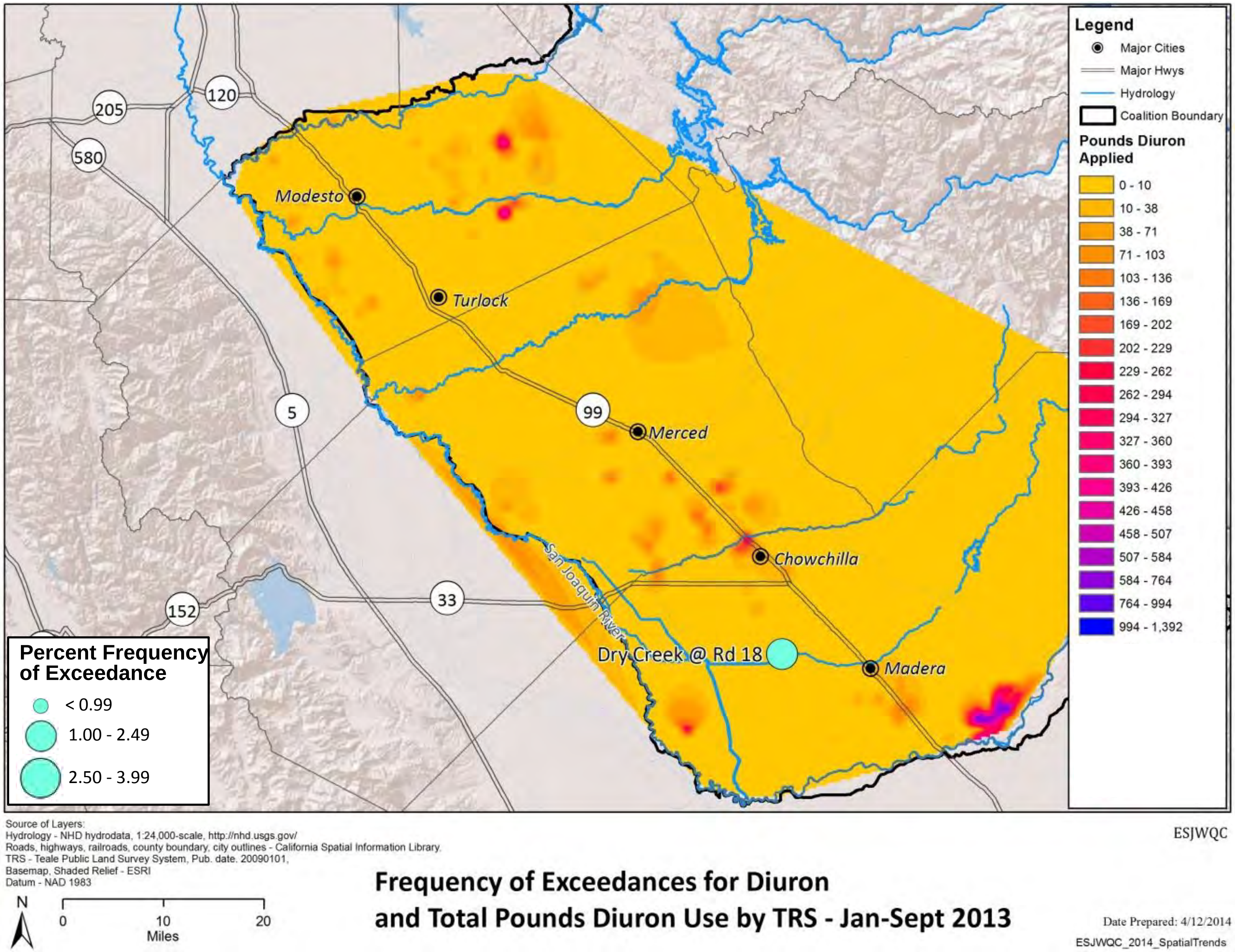


Figure 46. Sum of pounds of copper applied in 2009 and January through September 2013.
The PUR data are only available through September 2013.

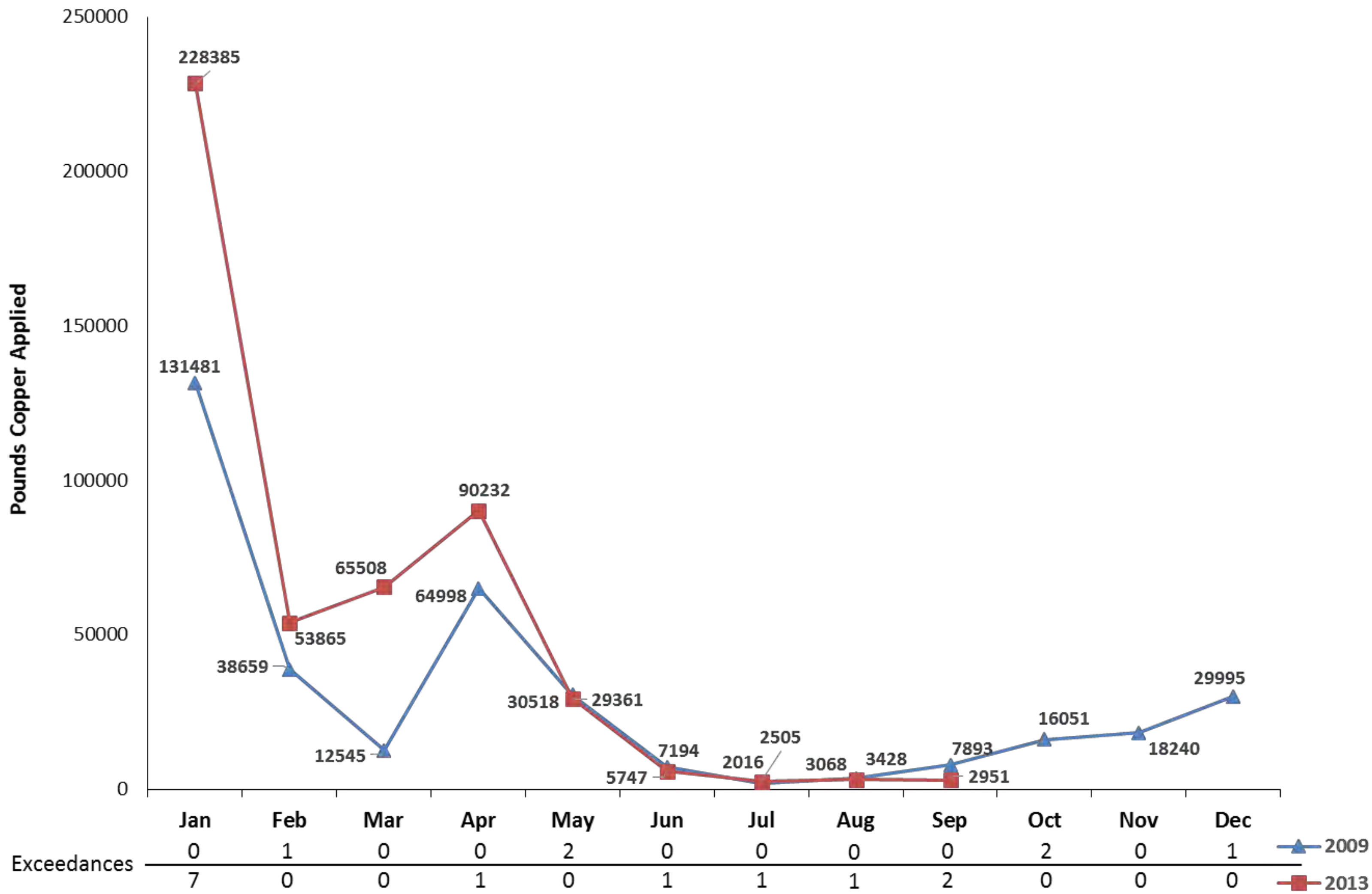


Figure 47. Magnitude of copper detections and total pounds of copper applied in 2009.

Magnitudes above 1 (red line) reflect an exceedance of the WQTL. Only monitoring locations with detections are shown on the map.

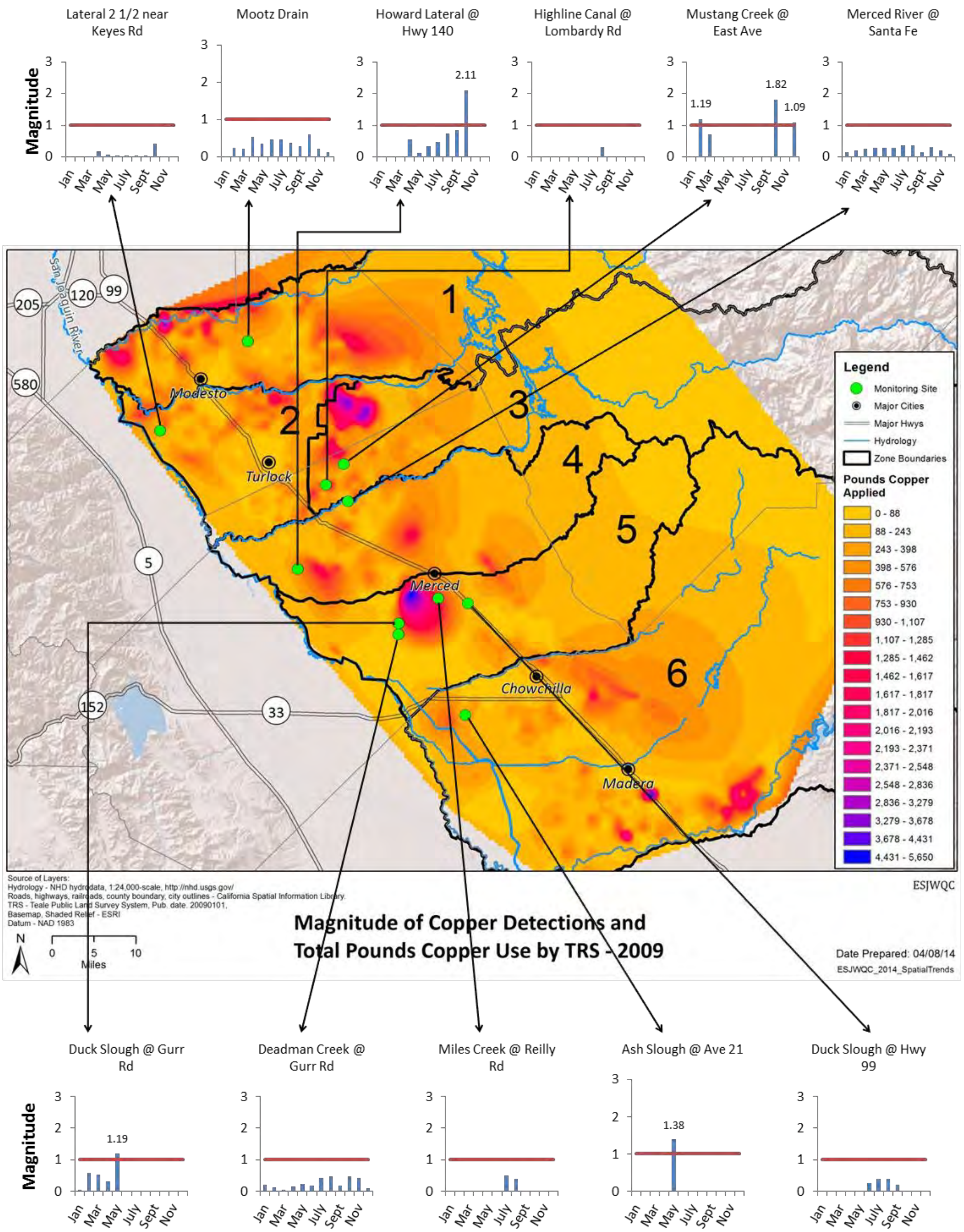


Figure 48. Magnitude of copper detections and total pounds of copper applied in January through September 2013.

Magnitudes above 1 (red line) reflect an exceedance of the WQTL. Only monitoring locations with detections are in the map.

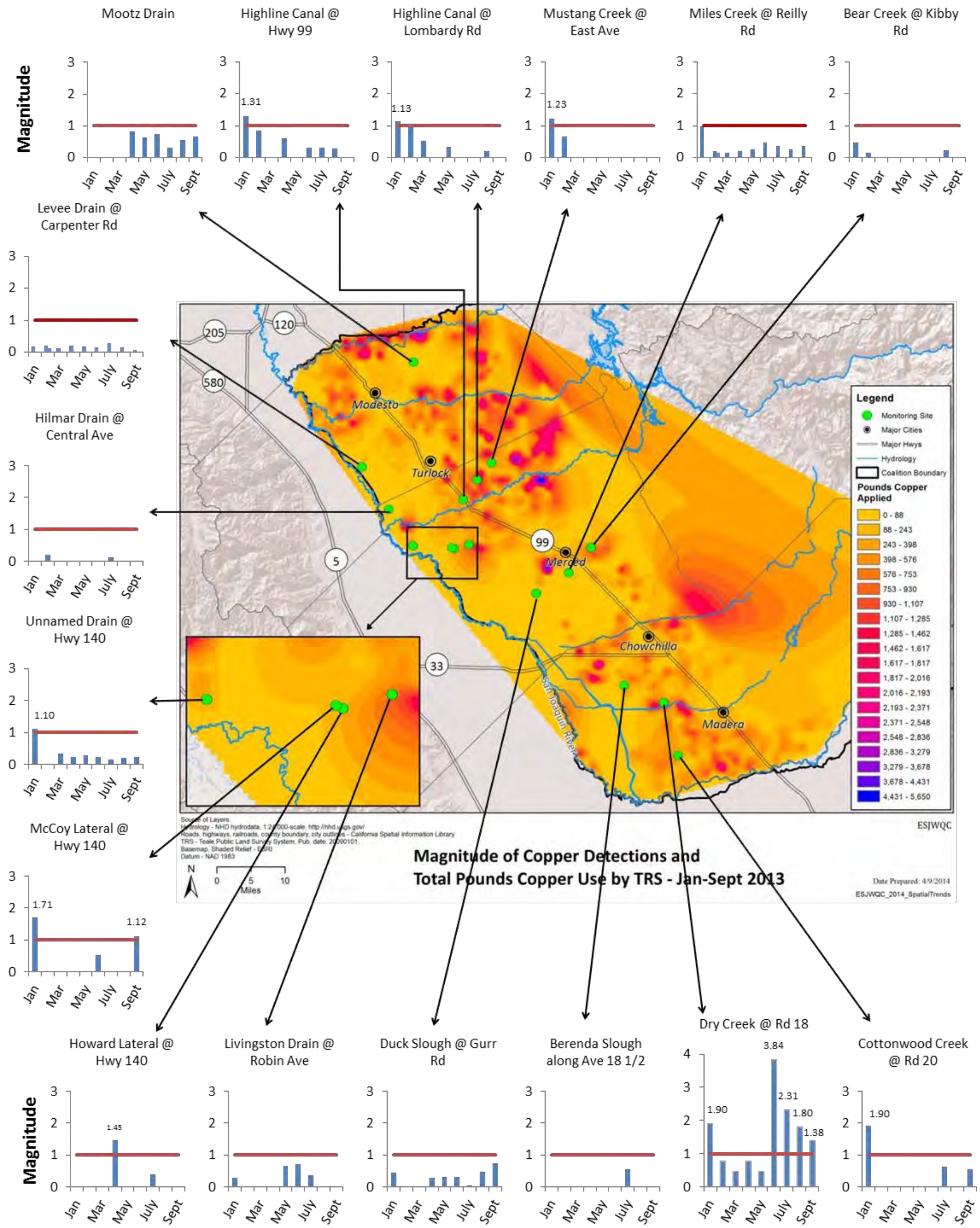


Figure 49. Frequency of exceedances for copper and total pounds of copper applied in 2009.

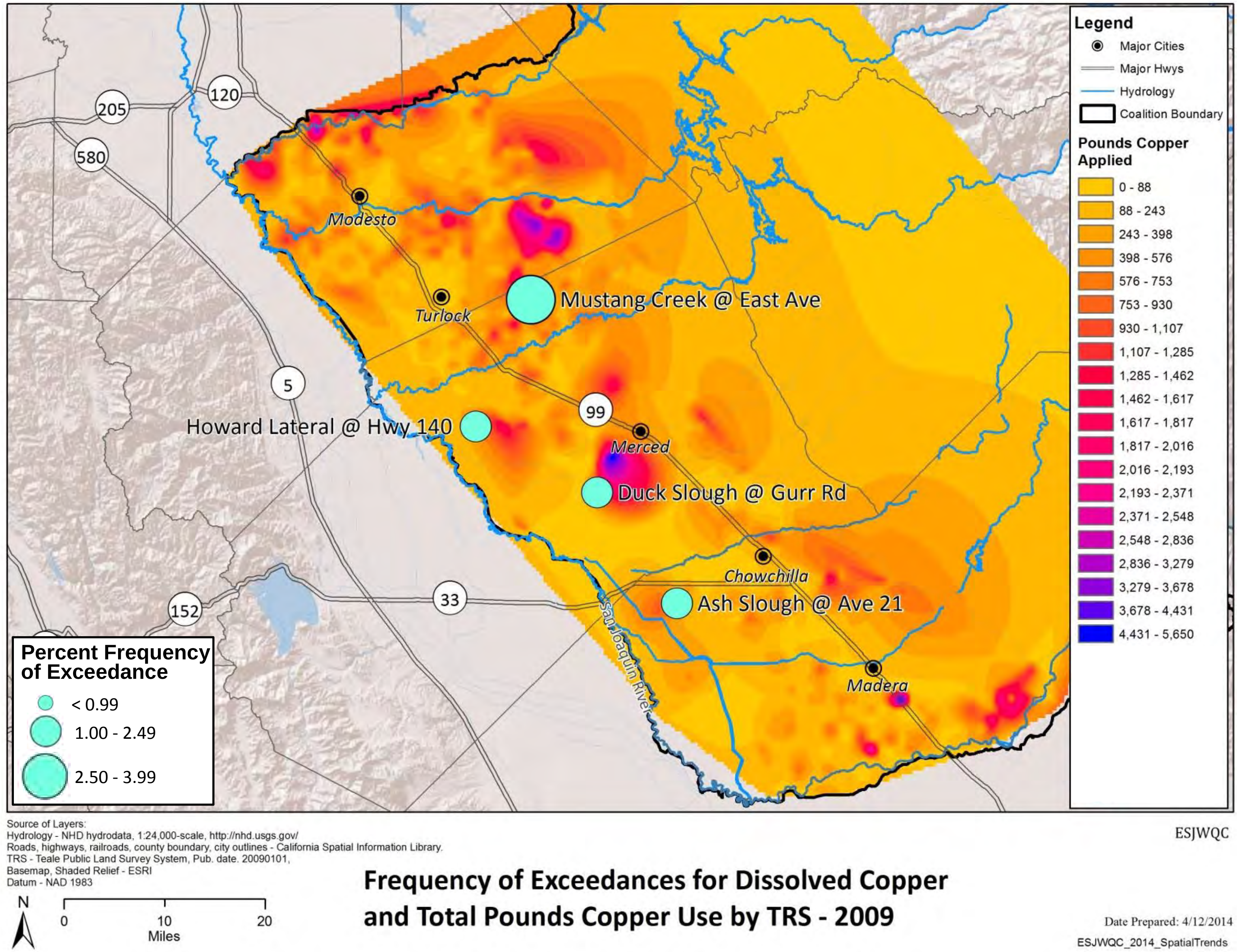
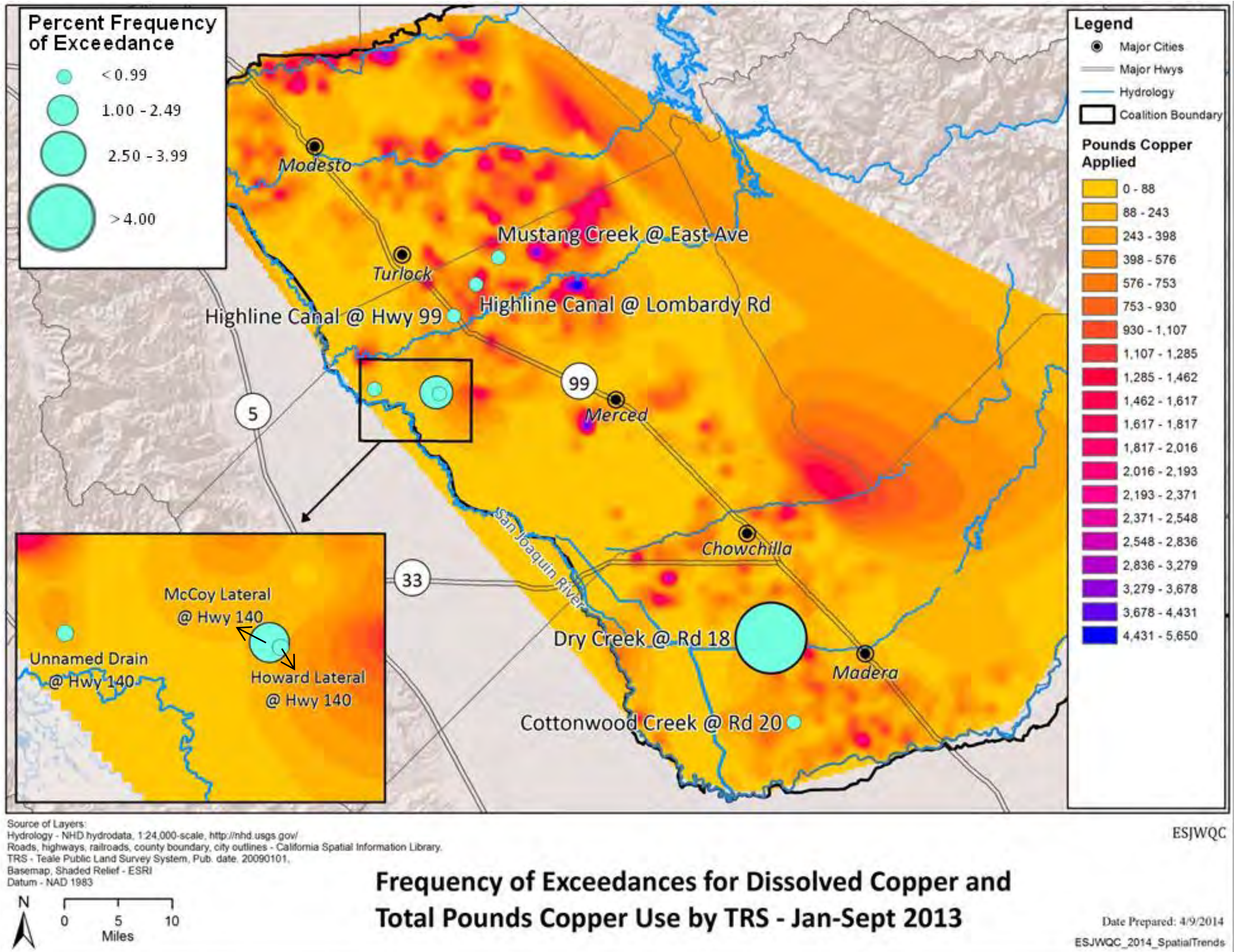


Figure 50. Frequency of exceedances for copper and total pounds of copper use by TRS for January through September 2013.



The Coalition conducted a spatial trends analysis for constituents not applied by agriculture: DO, pH, SC, *E. coli,* and ammonia/nitrate which are constituents applied by agriculture but not possible to track through any reporting system. These analyses include a comparison between the frequency of exceedances in samples collected during the storm and irrigation events in 2009 and 2013 (Table 88). For the purpose of demonstrating how dairies and depth of groundwater can influence water quality, contour layers for both cow density (in the *E. coli* and ammonia/nitrates maps) and depth to groundwater (in the SC maps) have been included (Figures 51-58).

Table 88. Frequency of exceedances of constituents not applied by agriculture during storm and irrigation events in 2009 and January through September 2013.

Organized by constituent, zone, date, and season.

Zone	Site Subwatershed	Sample Date	Year	Storm vs. Irrigation	Analyte[1]	Total Exceedances (Storm or Irrigation)	Total Samples Collected	Frequency % Exceedance
2	Prairie Flower Drain @ Crows Landing Rd	6/16/2009	2009	Irrigation	Ammonia	3	143	2.10%
5	Deadman Creek @ Gurr Rd	12/15/2009	2009	Storm	Ammonia	2	143	1.40%
2	Levee Drain @ Carpenter Rd	7/9/2013	2013	Irrigation	Ammonia	1	116	0.86%
2	Prairie Flower Drain @ Crows Landing Rd	2/20/2013	2013	Storm	Ammonia	1	116	0.86%
1	Dry Creek @ Wellsford Rd	5/19/2009	2009	Irrigation	DO	2	161	1.20%
1	Mootz Drain @ Langworth Rd	4/21/2009	2009	Irrigation	DO	6	161	3.59%
2	Prairie Flower Drain @ Crows Landing Rd	5/19/2009	2009	Irrigation	DO	1	161	0.60%
3	Mustang Creek @ East Ave	4/21/2009	2009	Irrigation	DO	1	161	0.60%
4	Howard Lateral @ Hwy 140	4/21/2009	2009	Irrigation	DO	1	161	0.60%
4	Merced River @ Santa Fe	7/21/2009	2009	Irrigation	DO	1	161	0.60%
5	Deadman Creek @ Gurr Rd	7/21/2009	2009	Irrigation	DO	2	161	1.20%
5	Duck Slough @ Hwy 99	6/16/2009	2009	Irrigation	DO	1	161	0.60%
5	Miles Creek @ Reilly Rd	4/21/2009	2009	Irrigation	DO	4	161	2.40%
6	Ash Slough @ Ave 21	5/19/2009	2009	Irrigation	DO	1	161	0.60%
6	Cottonwood Creek @ Rd 20	5/19/2009	2009	Irrigation	DO	1	161	0.60%
1	Dry Creek @ Wellsford Rd	12/15/2009	2009	Storm	DO	1	161	0.60%
1	Mootz Drain @ Langworth Rd	12/15/2009	2009	Storm	DO	1	161	0.60%
5	Deadman Creek @ Gurr Rd	2/7/2009	2009	Storm	DO	2	161	1.20%
1	Dry Creek @ Wellsford Rd	5/14/2013	2013	Irrigation	DO	4	203	2.17%
1	Mootz Drain downstream of Langworth Pond	5/14/2013	2013	Irrigation	DO	5	203	2.72%
2	Hatch Drain @ Tuolumne Rd	4/9/2013	2013	Irrigation	DO	5	203	2.72%
2	Levee Drain @ Carpenter Rd	5/14/2013	2013	Irrigation	DO	5	203	2.72%
2	Prairie Flower Drain @ Crows Landing Rd	5/14/2013	2013	Irrigation	DO	3	203	1.63%
4	Black Rascal Creek @ Yosemite Rd	4/9/2013	2013	Irrigation	DO	4	203	2.17%
4	Merced River @ Santa Fe	5/14/2013	2013	Irrigation	DO	4	203	2.17%
4	Unnamed Drain @ Hwy 140	5/14/2013	2013	Irrigation	DO	2	203	1.09%
5	Deadman Creek @ Gurr Rd	8/13/2013	2013	Irrigation	DO	1	203	0.54%
5	Duck Slough @ Gurr Rd	7/9/2013	2013	Irrigation	DO	3	203	1.63%
5	Miles Creek @ Reilly Rd	9/10/2013	2013	Irrigation	DO	1	203	0.54%
6	Berenda Slough along Ave 18 1/2	7/9/2013	2013	Irrigation	DO	1	203	0.54%
6	Cottonwood Creek @ Rd 20	7/9/2013	2013	Irrigation	DO	2	203	1.09%
6	Dry Creek @ Rd 18	8/13/2013	2013	Irrigation	DO	2	203	1.09%
1	Dry Creek @ Wellsford Rd	4/2/2013	2013	Storm	DO	1	203	0.54%
1	Mootz Drain downstream of Langworth Pond	4/2/2013	2013	Storm	DO	1	203	0.54%
1	Dry Creek @ Wellsford Rd	5/19/2009	2009	Irrigation	*E. coli*	4	143	2.80%
1	Mootz Drain @ Langworth Rd	6/16/2009	2009	Irrigation	*E. coli*	6	143	4.20%
2	Prairie Flower Drain @ Crows Landing Rd	4/21/2009	2009	Irrigation	*E. coli*	3	143	2.10%
3	Highline Canal @ Hwy 99	5/19/2009	2009	Irrigation	*E. coli*	1	143	0.70%
4	Howard Lateral @ Hwy 140	9/22/2009	2009	Irrigation	*E. coli*	1	143	0.70%
5	Deadman Creek @ Gurr Rd	7/21/2009	2009	Irrigation	*E. coli*	3	143	2.10%

Zone	Site Subwatershed	Sample Date	Year	Storm vs. Irrigation	Analyte[1]	Total Exceedances (Storm or Irrigation)	Total Samples Collected	Frequency % Exceedance
5	Duck Slough @ Gurr Rd	5/19/2009	2009	Irrigation	*E. coli*	1	143	0.70%
1	Dry Creek @ Wellsford Rd	12/15/2009	2009	Storm	*E. coli*	1	143	0.70%
1	Mootz Drain @ Langworth Rd	12/15/2009	2009	Storm	*E. coli*	1	143	0.70%
2	Prairie Flower Drain @ Crows Landing Rd	12/15/2009	2009	Storm	*E. coli*	1	143	0.70%
5	Deadman Creek @ Gurr Rd	12/15/2009	2009	Storm	*E. coli*	2	143	1.40%
5	Duck Slough @ Gurr Rd	12/15/2009	2009	Storm	*E. coli*	1	143	0.70%
6	Cottonwood Creek @ Rd 20	2/7/2009	2009	Storm	*E. coli*	1	143	0.70%
1	Dry Creek @ Wellsford Rd	5/14/2013	2013	Irrigation	*E. coli*	4	116	3.45%
1	Mootz Drain downstream of Langworth Pond	5/14/2013	2013	Irrigation	*E. coli*	5	116	4.31%
2	Levee Drain @ Carpenter Rd	5/14/2013	2013	Irrigation	*E. coli*	5	116	4.31%
2	Prairie Flower Drain @ Crows Landing Rd	8/13/2013	2013	Irrigation	*E. coli*	1	116	0.86%
4	Unnamed Drain @ Hwy 140	6/11/2013	2013	Irrigation	*E. coli*	1	116	0.86%
5	Duck Slough @ Gurr Rd	7/9/2013	2013	Irrigation	*E. coli*	3	116	2.59%
5	Miles Creek @ Reilly Rd	5/14/2013	2013	Irrigation	*E. coli*	2	116	1.72%
6	Cottonwood Creek @ Rd 20	7/9/2013	2013	Irrigation	*E. coli*	2	116	1.72%
6	Dry Creek @ Rd 18	6/11/2013	2013	Irrigation	*E. coli*	1	116	0.86%
1	Dry Creek @ Wellsford Rd	2/20/2013	2013	Storm	*E. coli*	1	116	0.86%
1	Mootz Drain downstream of Langworth Pond	4/2/2013	2013	Storm	*E. coli*	1	116	0.86%
2	Levee Drain @ Carpenter Rd	2/20/2013	2013	Storm	*E. coli*	2	116	1.72%
2	Prairie Flower Drain @ Crows Landing Rd	2/20/2013	2013	Storm	*E. coli*	2	116	1.72%
4	Unnamed Drain @ Hwy 140	4/2/2013	2013	Storm	*E. coli*	1	116	0.86%
5	Miles Creek @ Reilly Rd	2/20/2013	2013	Storm	*E. coli*	1	116	0.86%
2	Lateral 2 ½ near Keyes Rd	8/18/2009	2009	Irrigation	Nitrates	1	143	0.70%
2	Prairie Flower Drain @ Crows Landing Rd	7/21/2009	2009	Irrigation	Nitrates	6	143	4.20%
4	Howard Lateral @ Hwy 140	5/19/2009	2009	Irrigation	Nitrates	1	143	0.70%
2	Prairie Flower Drain @ Crows Landing Rd	2/7/2009	2009	Storm	Nitrates	2	143	1.40%
3	Mustang Creek @ East Ave	2/7/2009	2009	Storm	Nitrates	1	143	0.70%
5	Duck Slough @ Gurr Rd	2/7/2009	2009	Storm	Nitrates	1	143	0.70%
2	Levee Drain @ Carpenter Rd	5/14/2013	2013	Irrigation	Nitrates	3	116	2.59%
2	Prairie Flower Drain @ Crows Landing Rd	5/14/2013	2013	Irrigation	Nitrates	2	116	1.72%
2	Levee Drain @ Carpenter Rd	2/20/2013	2013	Storm	Nitrates	1	116	0.86%
2	Prairie Flower Drain @ Crows Landing Rd	2/20/2013	2013	Storm	Nitrates	2	116	1.72%
2	Hilmar Drain @ Central Ave	4/21/2009	2009	Irrigation	SC	2	161	1.20%
2	Prairie Flower Drain @ Crows Landing Rd	4/21/2009	2009	Irrigation	SC	6	161	3.59%
3	Mustang Creek @ East Ave	4/21/2009	2009	Irrigation	SC	1	161	0.60%
4	Howard Lateral @ Hwy 140	5/19/2009	2009	Irrigation	SC	1	161	0.60%
2	Prairie Flower Drain @ Crows Landing Rd	2/7/2009	2009	Storm	SC	2	161	1.20%
3	Mustang Creek @ East Ave	2/7/2009	2009	Storm	SC	2	161	1.20%
5	Deadman Creek @ Gurr Rd	2/7/2009	2009	Storm	SC	2	161	1.20%
2	Hatch Drain @ Tuolumne Rd	4/9/2013	2013	Irrigation	SC	4	203	2.17%
2	Hilmar Drain @ Central Ave	4/9/2013	2013	Irrigation	SC	4	203	2.17%
2	Levee Drain @ Carpenter Rd	5/14/2013	2013	Irrigation	SC	5	203	2.72%
2	Prairie Flower Drain @ Crows Landing Rd	5/14/2013	2013	Irrigation	SC	5	203	2.72%
5	Duck Slough @ Gurr Rd	7/9/2013	2013	Irrigation	SC	1	203	0.54%
2	Levee Drain @ Carpenter Rd	2/20/2013	2013	Storm	SC	1	203	0.54%
2	Prairie Flower Drain @ Crows Landing Rd	2/20/2013	2013	Storm	SC	2	203	1.09%
5	Duck Slough @ Gurr Rd	4/2/2013	2013	Storm	SC	1	203	0.54%

[1]-Nitrates include nitrate + nitrite as N. WQTLs are, ammonia (1.5 mg/L), DO (7 mg/L), *E. coli* (235 MPN/100 ml), nitrates (10 µg/L), and SC (700 µmhos/cm).

DO

Dissolved oxygen is a non-conserved constituent meaning that it can increase or decrease as water moves downstream. Source identification is not possible in the same way as it is for constituents such as pesticides. Instream processes generate or remove dissolved oxygen to/from the water column or sediment with no external inputs of agricultural constituents. Trying to assess the role of agricultural discharges on DO dynamics will be an involved and likely an expensive task. Even in pristine watersheds, exceedances of DO may occur during normal diurnal stream processes. Processes occurring on the land surface, in the water column, and in the sediment can reduce levels of DO. Processes affecting DO in waterways include stream flow, fluctuations in temperature, loss of vegetation around streams, as well as excessive nutrients. During education and outreach, growers in the Coalition region receive recommendations to implement management practices designed to prevent the offsite movement of constituents and sediment into the waterway by reducing irrigation tailwater and storm water runoff. As the volume of water moving to surface waters decreases, flows in the small waterbodies decrease which can result in lower DO in these waterbodies.

The frequency of DO exceedances during storm events decreased from four in 2009 to only two in 2013 (Table 86 and Figures 51 and 52). Exceedances of DO are more common during the irrigation season which is when growers are implementing management practices to reduce discharge and therefore the amount of water flowing in the waterways. There were more exceedances and more sites sampled for DO during 2013 (44 exceedances of 203 measurements collected) compared to 2009 where there were 25 exceedances of 161 DO measurements collected.

Because DO sources are difficult to determine with the resources currently available to the Coalition, DO has been classified as a Priority E constituent since the 2008 Management Plan became effective.

Figure 51. Frequency of 2009 storm and irrigation exceedances of the WQTL for DO.

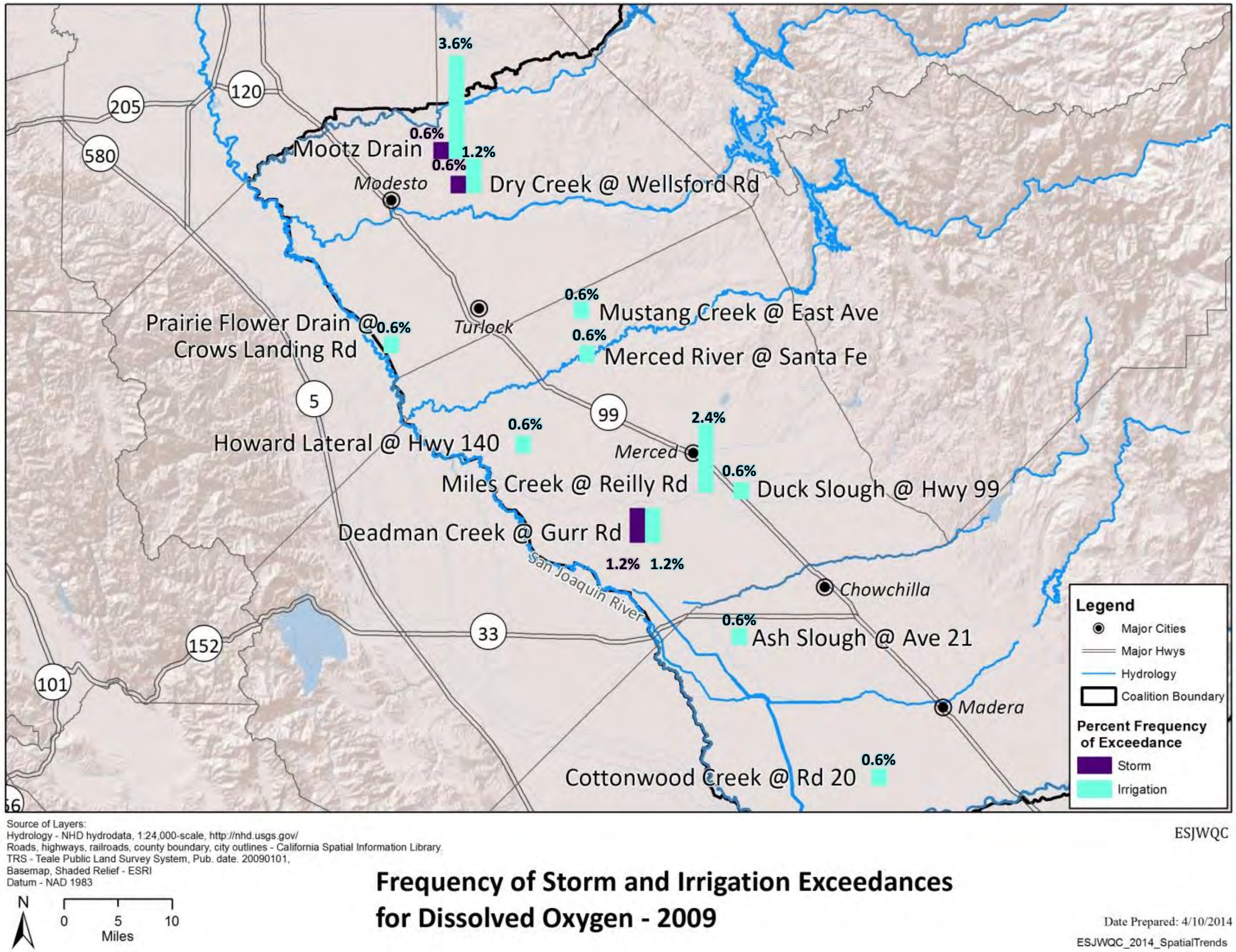
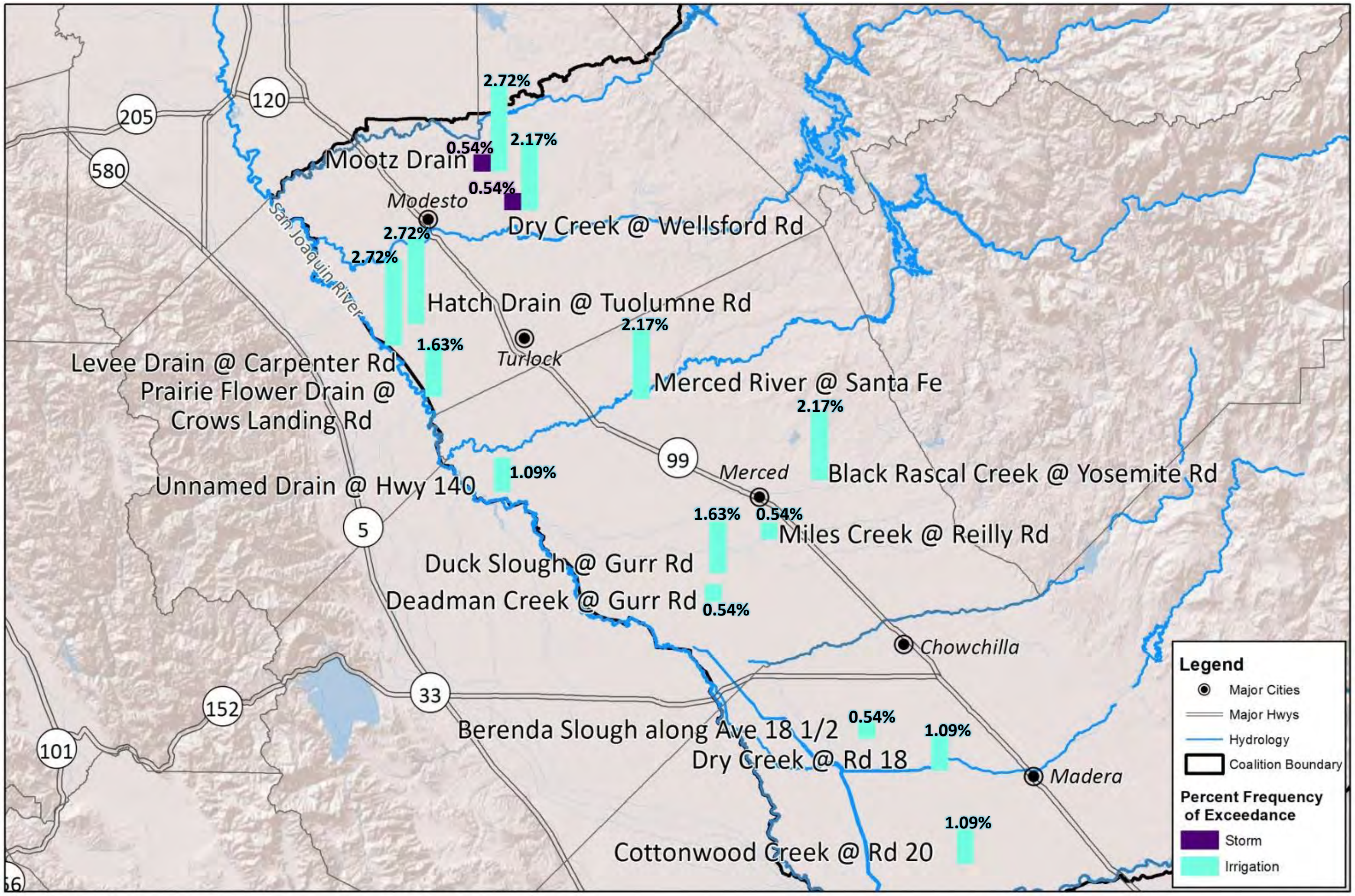


Figure 52. Frequency of January through September 2013 storm and irrigation exceedances for DO.



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

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ESJWQC

Frequency of Storm and Irrigation Exceedances for Dissolved Oxygen - Jan-Sept 2013

Date Prepared: 4/10/2014
ESJWQC_2014_SpatialTrends

SC

Exceedances of the WQTL for SC are common at locations on the west side of the Coalition region along the San Joaquin River (Zone 2). Groundwater is salty and near the river, groundwater levels are shallow and close to the surface. This section of the Valley has inadequate subsurface drainage conditions that result in a negative impact on crop productivity. In fact, management of subsurface drainage is necessary to cope with shallow groundwater conditions which result in the accumulation of salts in the root zones of agricultural crops (http://www.water.ca.gov/drainage/index.cfm). Tile drains have been installed to intercept groundwater and prevent it from reaching the root zone. The construction of drains such as Hatch Drain, Hilmar Drain, Levee Drain, and Prairie Flower Drain occurred in the late 1800s as a means of lowering the shallow groundwater table to a level that allowed crops to be grown. These drains receive discharge from tile drains as well as pull shallow groundwater from the area immediately surrounding the drain.

Figures 53 and 54 include the depth to groundwater to illustrate how the shallow groundwater near the river is where SC exceedances occurred most often in both 2009 and in 2013. The largest percentages of exceedances of SC occurred in Zone 2 during both 2009 (10 exceedances or 6%) and 2013 (21 exceedances or 10%; Table 86 and Figures 53 and 54).

Geological and geographical factors influencing salts in the waterways are outside the scope of what the Coalition is capable of improving through modified agricultural practices and are the focus of the Valley-wide CV-SALTS process. In 2006, the State Water Board, Regional Board and stakeholders initiated CV-SALTS, which is a collaborative effort to develop and implement a salinity and nitrate management program and Basin Plan Amendment. The Central Valley Salinity Coalition (CVSC) formed in July 2008 to organize, facilitate and fund efforts needed to fulfill the goals of CV-SALTS, including coordinating meetings of the CV-SALTS committees. The Lower San Joaquin River Committee of CV-SALTS is tasked with reviewing relevant studies and developing the science and policy needed to justify a Basin Plan amendment for salt and boron in the San Joaquin River upstream of Vernalis.

Coalition representatives and technical consultants (Michael L. Johnson, LLC (MLJ-LLC)) attend CV-SALTS meetings and participate in planning and reviewing studies relevant to the development of a Basin Plan amendment. In addition, the Coalition monitors for salt (SC), nitrates, and boron in every zone and includes these constituents in conversations with growers about water quality impairments and applicable management practices.

Figure 53. Frequency of 2009 storm and irrigation exceedances of the WQTL for SC with depth to groundwater.

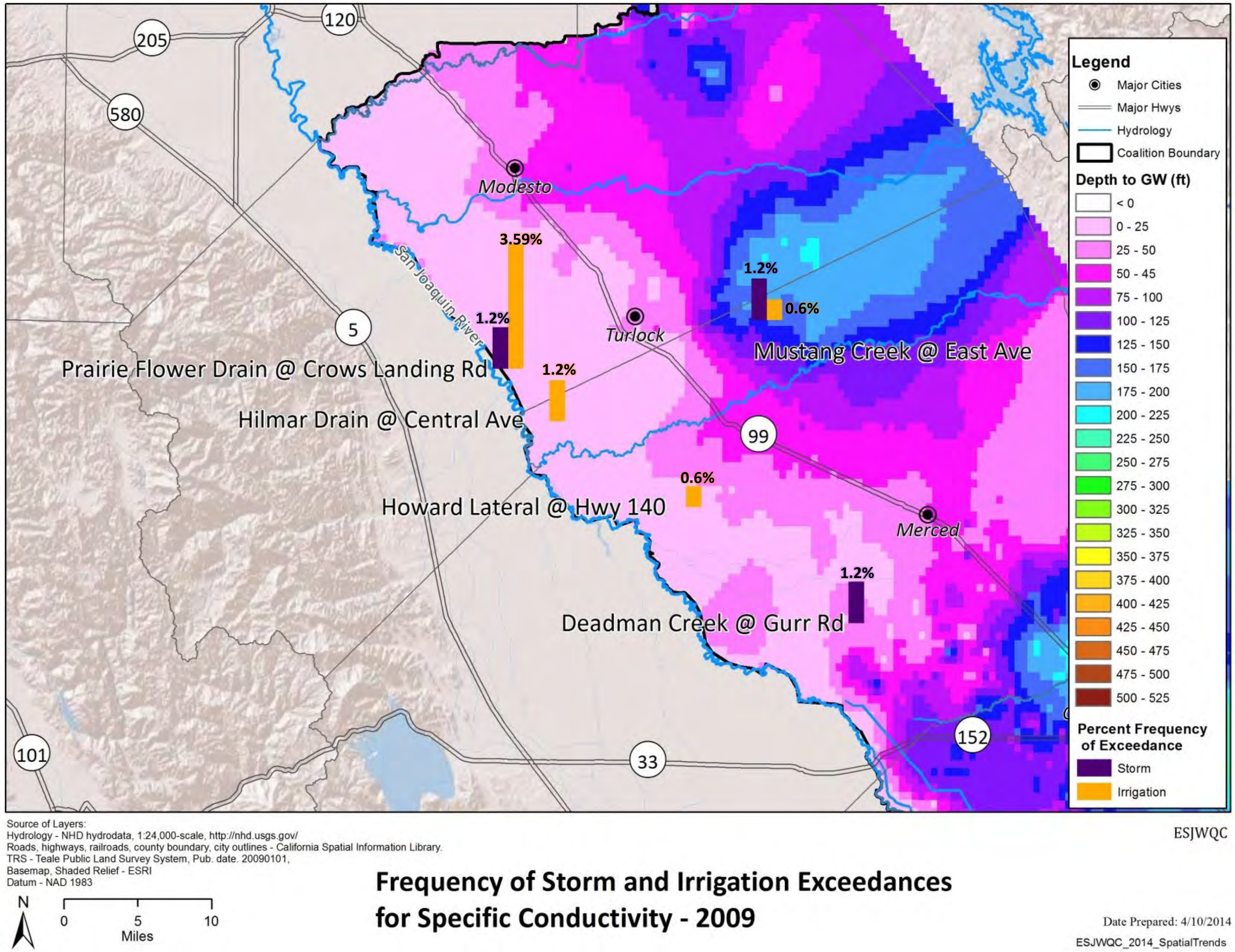
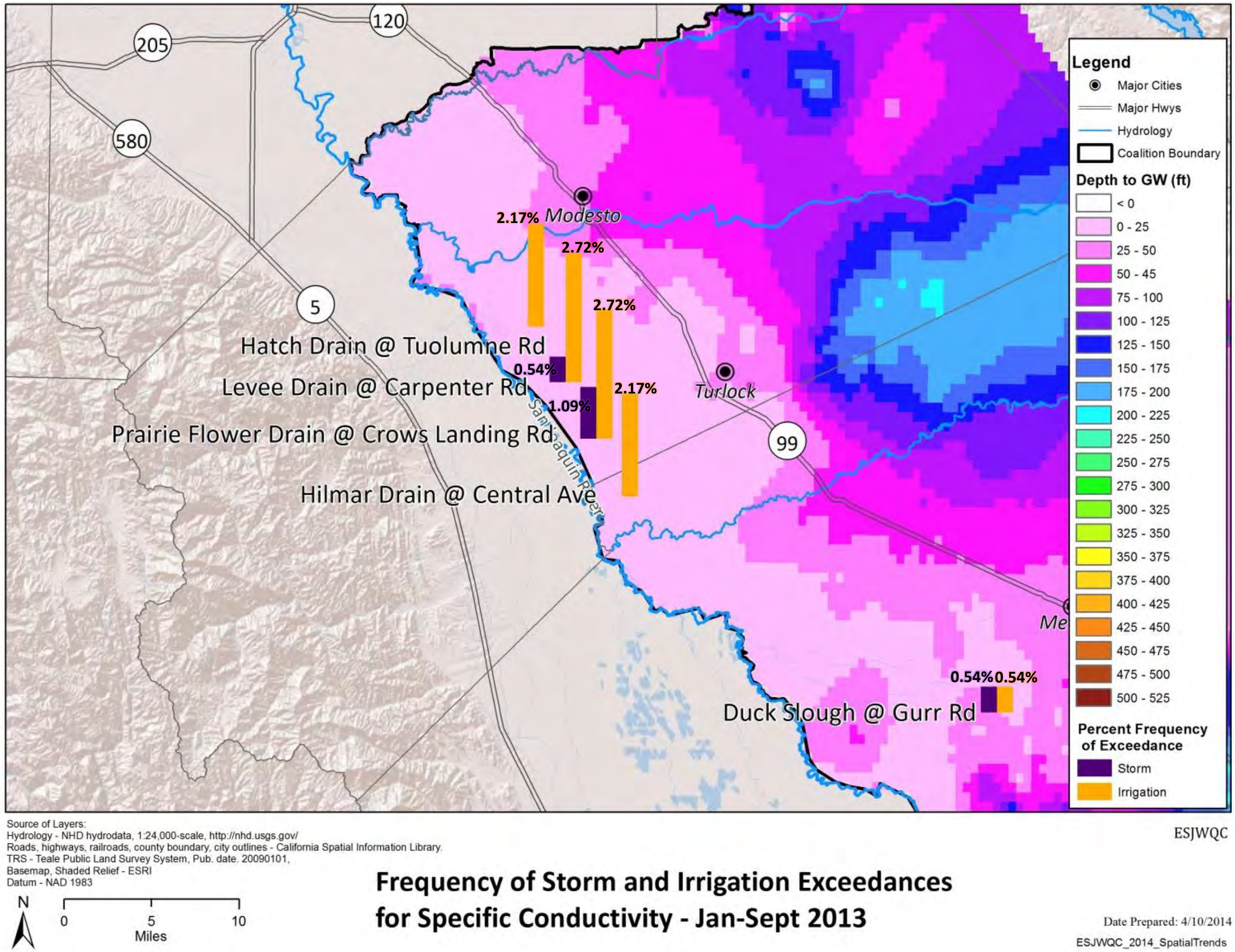


Figure 54. Frequency of January through September 2013 storm and irrigation exceedances of the WQTL for SC with depth to groundwater.



E. coli

E. coli are a natural component of ecosystems and also occur in the intestinal tracts of animals. Coliform bacteria are voided in fecal material which can enter surface waters. *E. coli* may persist in the presence of oxygen in the environment for periods of time after being voided, and are known to reproduce and proliferate in the environment. Any species of vertebrate that voids feces can contribute *E. coli* to surface waters, including humans, companion animals such as dogs and cats, cows, chickens, waterfowl (ducks and geese), raccoons, otters, ground squirrels, feral pigs, and in some locations deer.

Furthermore, manure is applied to crops as a fertilizer and can contribute to the presence of *E. coli* in surface waters if composting is not conducted appropriately. Manure application practices are intended to keep manure from reaching waterways and proliferating bacteria. Even though landowners and operators are required to follow crop specific manure application practices and guidelines, contamination may occur. Although dairies are not allowed to discharge into the waterways, there have been instances of discharge noted in the past in the Coalition area.

Therefore, elevated levels of *E. coli* in the waterways could be due to 1) storm water runoff carrying bacteria from dairy facilities in the subwatershed (past instances of direct dairy discharges have been noted in the Coalition region), 2) manure from dairies is sold to adjacent farms and if improperly composted and stored can contribute to elevated levels of bacteria in the waterway, and 3) naturally occurring *E. coli* bacteria in the waterways could be measured during sampling events.

The exceedances of the *E. coli* WQTL in both 2009 and 2013 most often occurred at sites downstream of areas containing a high density of cows (Figures 55 and 56). There were a total of 26 exceedances out of 143 samples (18%) collected during 2009 (7 during storms) and during 2013 a total of 32 exceedances out of 116 samples (28%) (8 during storms; Table 86, Figures 55 and 56).

Figure 55. Frequency of 2009 storm and irrigation exceedances of the WQTL for *E. coli* with cow density.

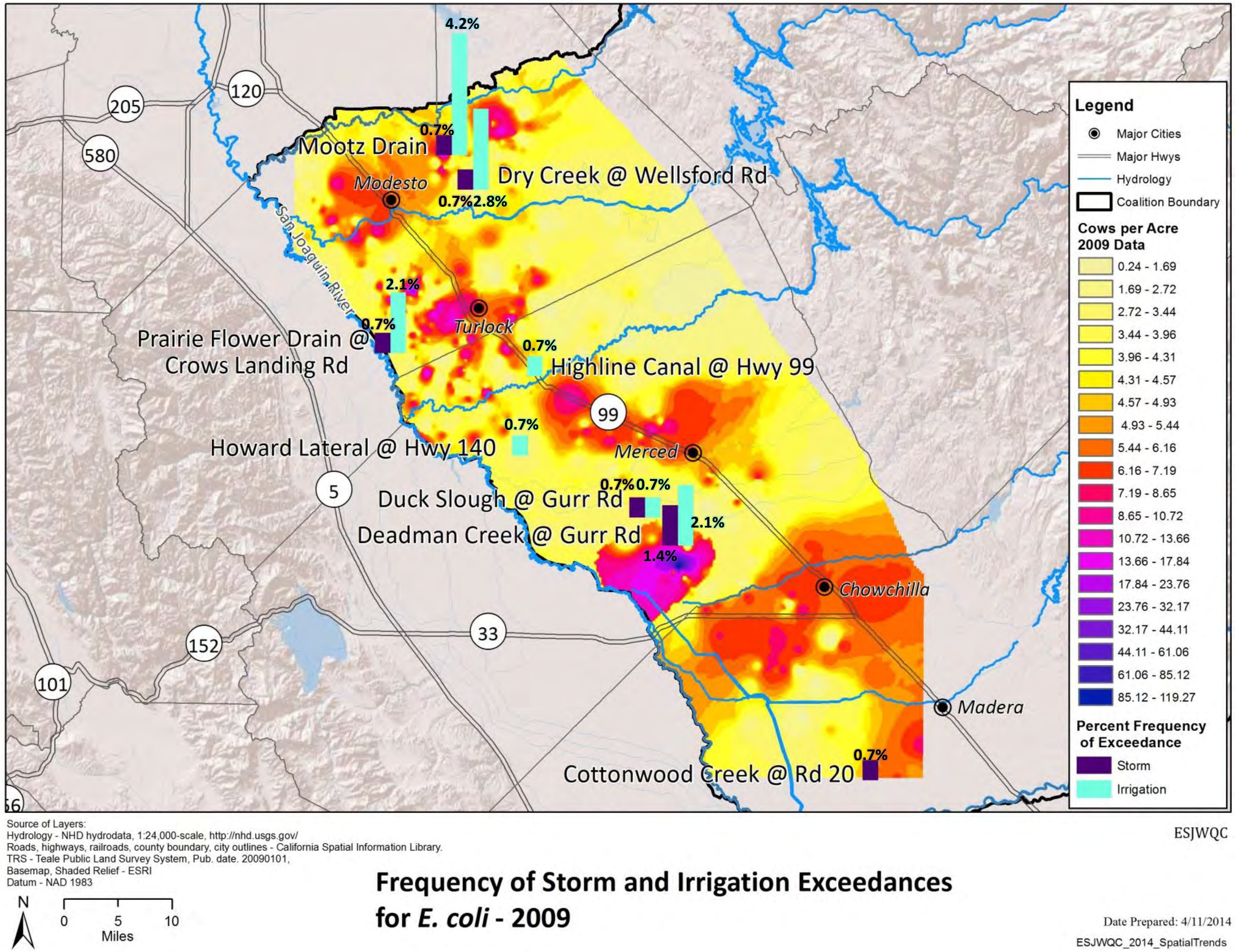
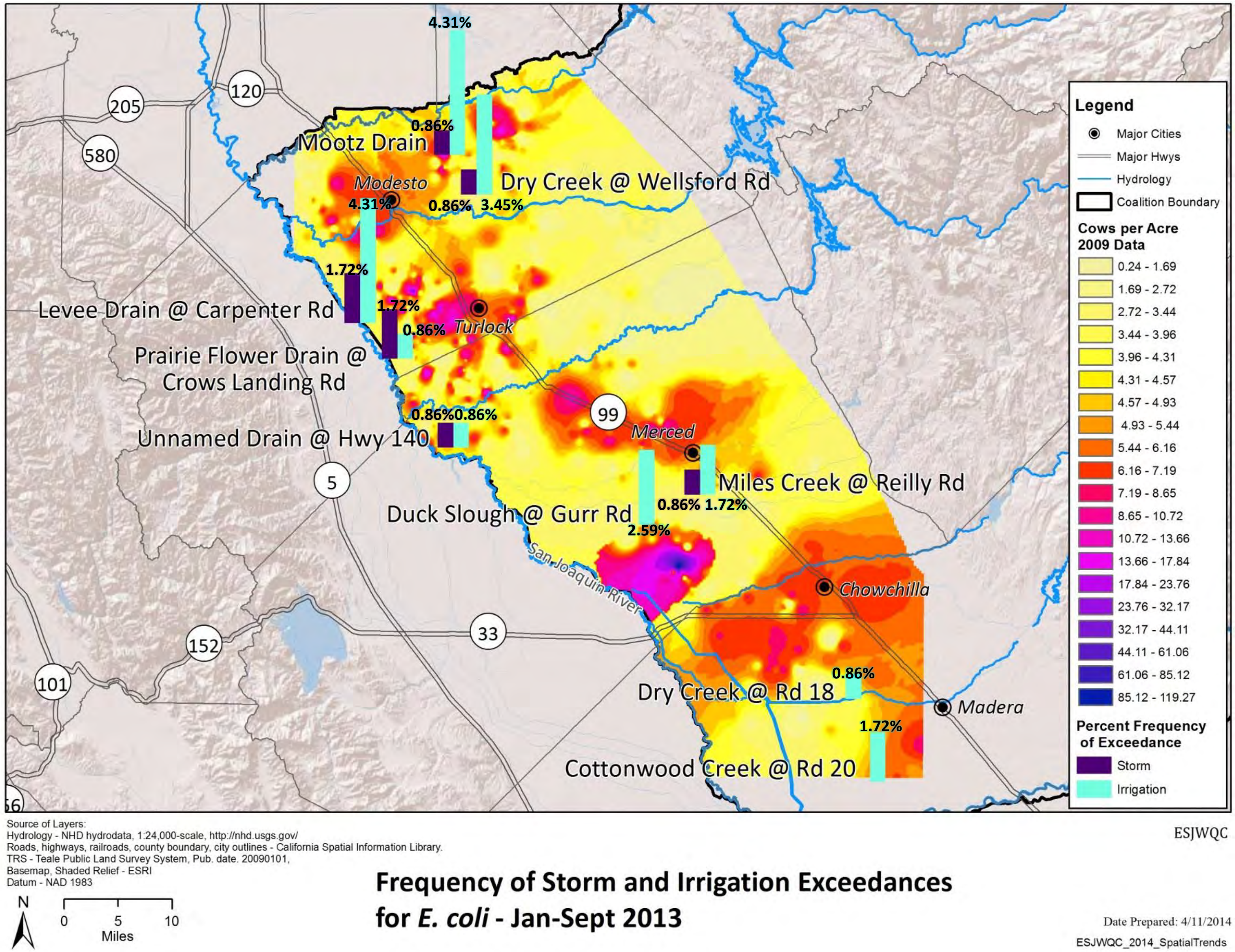


Figure 56. Frequency of January through September 2013 storm and irrigation exceedances of the WQTL for *E. coli* with cow density.



Ammonia and Nitrates

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

From years of movement of nitrate into groundwater, there is a significant amount of nitrate in the aquifers beneath the ESJWQC region. Nitrate in shallow groundwater originating from dairies and fertilizer applications may now be intercepted by the field and surface drains and transported to surface waters resulting in exceedances of the WQTL for nitrate. Deeper wells contaminated with nitrate can be a source of fertilizer in irrigation water. Excessive nutrients can cause eutrophication of surface waters resulting in low DO and an inability to support healthy aquatic communities. Sources of nutrients, organic carbon, and low DO are difficult to identify. Because of their extreme solubility, nitrates in fertilizer could move to surface waters immediately after application although it is unlikely that applications in the spring would result in exceedances of the WQTL throughout the irrigation season. Nitrates may move past the root zone to the shallow subsurface (vadose zone) and move laterally to surface waters although the extent of this potential pathway is not known.

In 2009 there were 12 exceedances of the nitrate WQTL and in 2013 there were eight exceedances of the WQTL (Table 86, Figures 57 and 58). Although the number of nitrate exceedances has decreased, elevated concentrations of nitrate remain in subwatersheds such as Prairie Flower Drain and Levee Drain where surface drains intercept shallow groundwater that has a high concentration of nitrate. 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.

Figure 57. Frequency of 2009 storm and irrigation exceedances of the WQTLs for ammonia and nitrates with cow density.

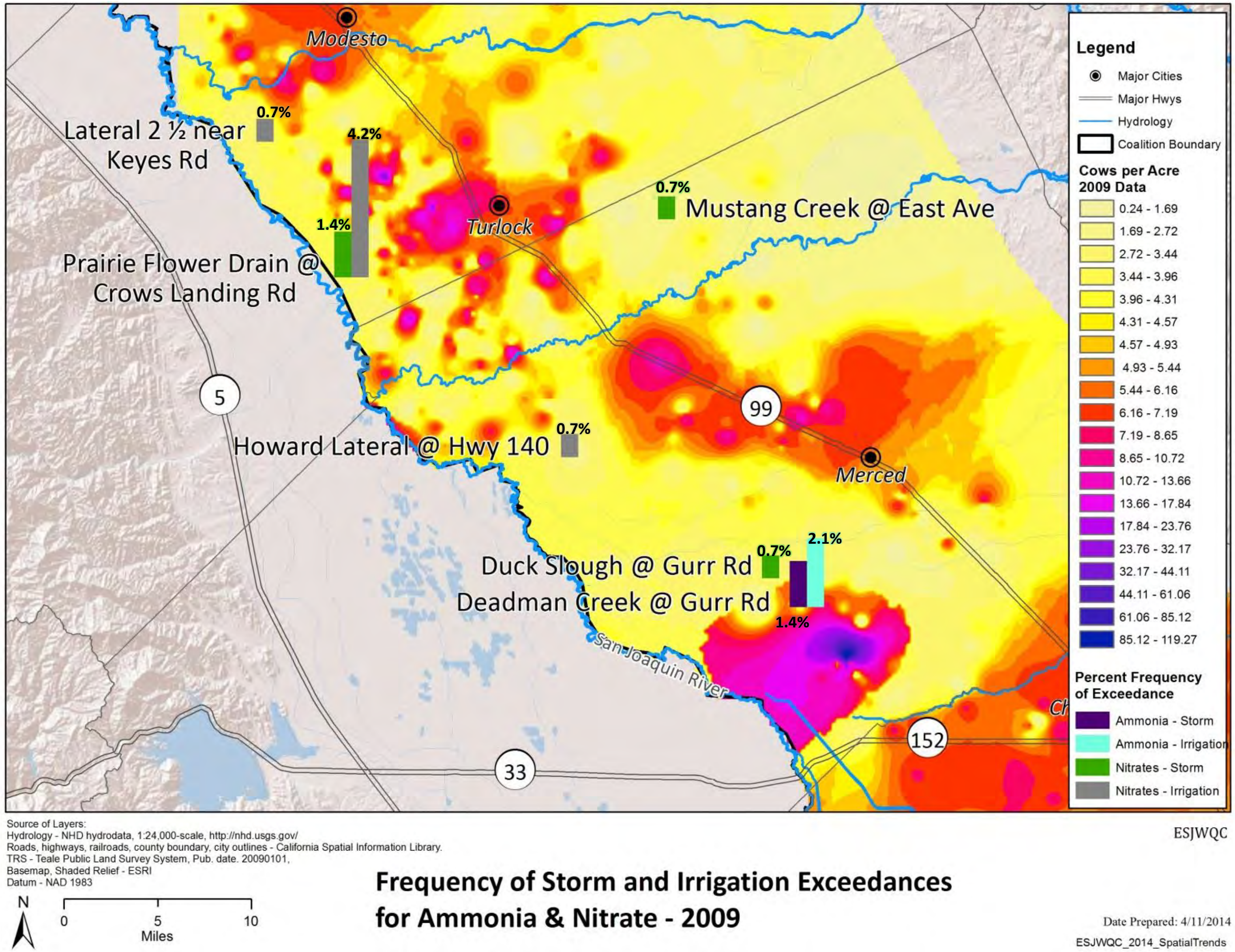
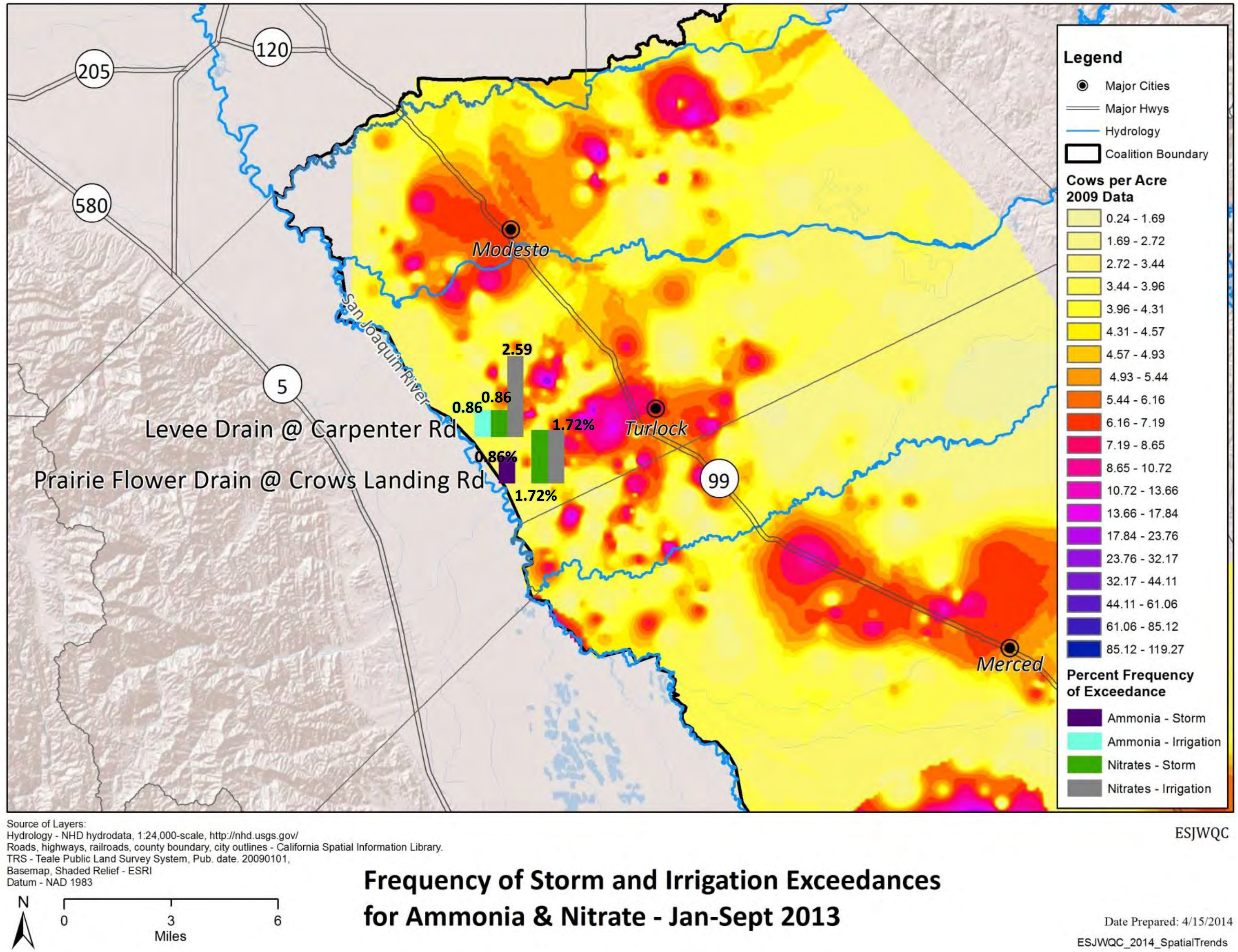


Figure 58. Frequency of January through September 2013 storm and irrigation exceedances of the WQTLs for ammonia and nitrate with cow density.



QUESTION 4: WHAT ARE THE MANAGEMENT PRACTICES THAT ARE BEING IMPLEMENTED TO REDUCE THE IMPACTS OF IRRIGATED AGRICULTURE ON WATERS OF THE STATE WITHIN THE COALITION GROUP BOUNDARIES AND WHERE ARE THEY BEING APPLIED?

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

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

The Coalition's MPURs submitted every April 1 (prior to this May 1 submittal) include details on the number of growers implementing practices and acres associated with these specific management practices. The Coalition conducted meetings with targeted growers to document current management practices in the first, second, third, fourth, and fifth priority subwatersheds. Follow-up contacts occurred with those targeted growers to document newly implemented management practices. Newly implemented practices include those recommended by the Coalition as well as additional practices growers implement without a specific recommendation to do so.

The 2011 MPUR included a summary of all currently implemented management practices in the first priority subwatersheds, the 2012 MPUR summarized currently implemented management practices in the second and third priority subwatersheds and newly implemented management practices in the first and second priority subwatersheds, and the 2013 MPUR included a summary of all currently implement management practices in the fourth priority site subwatersheds. The Coalition is in the process of sending out follow-up contacts in the fifth priority subwatersheds and is beginning to schedule individual meetings with targeted growers in the sixth priority subwatersheds; these results will be reported in the 2015 Annual Report.

The Coalition summarized the information about acres associated with newly implemented management practices designed to reduce the impacts of irrigated agriculture in the first, second, third, and fourth priority subwatersheds (Table 67). When evaluating management practices and the associated acreage, a parcel may be included under multiple management practices. Therefore, the acreages in Table 67 cannot be summed together across management practices for each subwatershed, but can be used to evaluate number of acres with a particular practice within the overall targeted direct drainage acreage of the subwatershed.

A majority of the practices listed in Table 67 affect the amount of irrigation and/or storm water runoff and include: installing microirrigation systems, reducing the amount of water used in surface irrigation, installing a device to control the amount and/or timing of discharge into a waterway, implementing sediment ponds and/or implementing a recirculation/tailwater return system (Table 67). Drainage basins and recirculation/tailwater return systems also have a double purpose of reducing sediment discharge in addition to reducing or eliminating pesticide discharge into a downstream waterbody. Grass row centers and filter strips are already commonly implemented practices and do not represent a high percentage of the targeted acreage (<1%); most growers are already implementing these practices when applicable. Both grass rows and filter strips can be effective in reducing the amount of pesticides and fine particulate matter in agricultural discharges to surface waters. Of the high priority subwatersheds in Table 66, only one subwatershed in the first priority set had acreage with polyacrylaminde (PAM; 150 acres in Prairie Flower Drain subwatershed). The use of PAM is to help fine particles settle out (as well as any pesticide or metal bound to those fine particles) prior to surface water discharge. Using PAM is effective in certain situations where water can be held for a certain amount of time prior to discharge. The remaining practices documented as newly implemented are specific to drift management and include: shutting off outside nozzles when spraying outer rows next to sensitive sites, spraying areas close to waterbodies when the wind is blow away from them, using air blast applications when the wind is 3-10 mph and upwind of sensitive sites, using electronic spray nozzles and using nozzles that provide the largest effect droplet size to minimize drift (Table 67).

In the fourth priority subwatersheds, Deadman Creek @ Hwy 59 and Hilmar Drain @ Central Ave had 80 acres with newly implemented management practices for storm and irrigation runoff control including placing berms between fields and waterways. The largest percentage (7%) of recommended newly implemented management practice by growers is a reduction in the amount of water used in surface irrigation (Table 67).

QUESTION 5: ARE IMPLEMENTED MANAGEMENT PRACTICES EFFECTIVE IN MEETING APPLICABLE RECEIVING WATER LIMITATIONS?

The Coalition completed two years of its focused outreach strategy in all first, second, third, and fourth priority site subwatersheds including documenting management practices. Management Plan Monitoring occurred during years of focused outreach and continues until the site/constituent is removed from a management plan (Table 70). The Coalition analyzes the results of all monitoring (Assessment, Core, and MPM) to evaluate the effectiveness of current and newly implemented management practices. Across the 15 site subwatersheds, 38 members implemented 54 new management practices from 2009 through 2013 (Tables 66 and 67). The most common practices implemented include reducing the volume of water used for irrigation and installing a device to control the timing of discharge (tailwater and/or storm water runoff, Table 67). Implemented management practices have been effective at improving water quality as indicated by the significant decrease of exceedances of the WQTLs for high priority constituents throughout the first through fourth site subwatersheds.

Due to improved water quality, the Coalition received approval to remove multiple constituents from first through fourth site subwatershed management plans: chlorpyrifos was removed from six management plans, diazinon was removed from all management plans (2 total), diuron was removed from three management plans, and copper was removed from three management plans. Exceedances of the WQTL for chlorpyrifos, diazinon, diuron, malathion, copper, and water and sediment toxicities are still occurring in site subwatersheds across the Coalition region (Tables 36-41). Non-members do not receive focused outreach and could be contributing to exceedances. Until the Coalition has 100% membership, effective management practices implemented by members of the Coalition may not be enough to improve water quality due to discharges by non-members who have not implemented similar practices. In addition, managing constituents that are naturally occurring in the environment (salts, metals) may be beyond the scope of what the Coalition can achieve through management practice implementation alone.

A complete evaluation of management practice effectiveness based on water quality results in the first through fourth priority site subwatersheds is provided in the Evaluation of Management Practices section of this report.

QUESTION 6: ARE THE APPLICABLE SURFACE WATER QUALITY MANAGEMENT PLANS EFFECTIVE IN ADDRESSING IDENTIFIED WATER QUALITY PROBLEMS?

The Coalition's management plan strategy has been effective in addressing identified water quality impairments. Effective outreach implemented through annual grower meetings and one on one farm visits has resulted in additional management practices implemented by members. The Coalition has demonstrated the effectiveness of those practices with improved water quality and the removal of constituents from site subwatershed management plans sometimes in as little as two years. Growers have taken steps to prevent the offsite movement of agricultural constituents, including implementing additional management practices, regardless of the priority level of their subwatershed. A complete evaluation of the Coalition's management plans and effectiveness of outreach and management practices is included in the Management Plan section of this report.

Coalition Wide Evaluation

Monitoring results indicate the Coalition's focused management practice outreach and tracking strategy has been effective in improving water quality across the Coalition region in several high priority site subwatersheds. The Coalition received approval on October 15, 2013 to remove eight specific site subwatershed/constituent pairs from seven site subwatershed management plans.

The Coalition focused on water quality impairments due to applied pesticides (e.g. chlorpyrifos) during general and focused outreach in high priority site subwatersheds (focused outreach began in 2009). Since the implementation of the Coalition's Management Plan in 2008, there has been an overall decrease in the number and percentage of chlorpyrifos exceedances across the entire ESJWQC region (Table 89 and Figure 59). Growers applied less chlorpyrifos across the Coalition region since outreach began in 2009; 145,936 lbs AI in 2009 compared to 111,960 lbs of AI in 2013 (Figure 36). From January through September 2013, only 1% of the samples collected for chlorpyrifos resulted in an exceedance of the WQTL (Table 89). The single exceedance occurred in Zone 1 at Dry Creek @ Wellsford Rd during September MPM (0.14 µg/L). According to the PUR data, the most likely source is a chlorpyrifos application to corn made by a non-member to a parcel near the creek (Figure 10). Both general outreach and focused outreach have been successful in significantly decreasing the amount of chlorpyrifos in the waterways and have resulted in lower frequency or no exceedances of the WQTL for chlorpyrifos.

Exceedances of the diazinon WQTL have also decreased since focused outreach began; diazinon has been removed from all management plans for site subwatersheds that have received focused outreach (2 site subwatersheds). In 2013, one exceedance of the WQTL occurred in February at Miles Creek @ Reilly Rd in the field duplicate sample; the environmental sample had no detectable concentration of diazinon in it. Miles Creek @ Reilly Rd is a fifth priority site subwatershed and focused outreach is still ongoing. There is currently no reported use of diazinon within one month of this exceedance; the last application of diazinon in the subwatershed was on December 12, 2012. It has been 5 years since the last exceedances of the diazinon WQTL occurred in samples collected within the ESJWQC boundary.

Eighteen exceedances of the WQTL for diuron occurred throughout the Coalition boundary from 2007 through 2013 (Table 38); 14 of those exceedances occurred before 2009. A single exceedance of the WQTL for diuron occurred in samples collected from Dry Creek @ Rd 18 in January 2013 and was the first time that an exceedance occurred at that site. The PUR data associated with the January exceedance indicate there were 13 applications between 64 and 1184 lbs AI (4384 lbs AI total) of diuron across 1370 acres of oranges and tangerines from November 14, 2012 through December 8, 2012. There were no applications within four weeks of the exceedance. If a second exceedance of the diuron WQTL occurs at this subwatershed, it will go into a management plan for diuron. Management practices have been documented for members in this subwatershed, such as installing or improving berms between the fields and waterways and installing a device to control amount/timing of discharge to waterway, that have been effective in improving water quality, especially in relation to exceedances of the WQTLs for chlorpyrifos and diazinon.

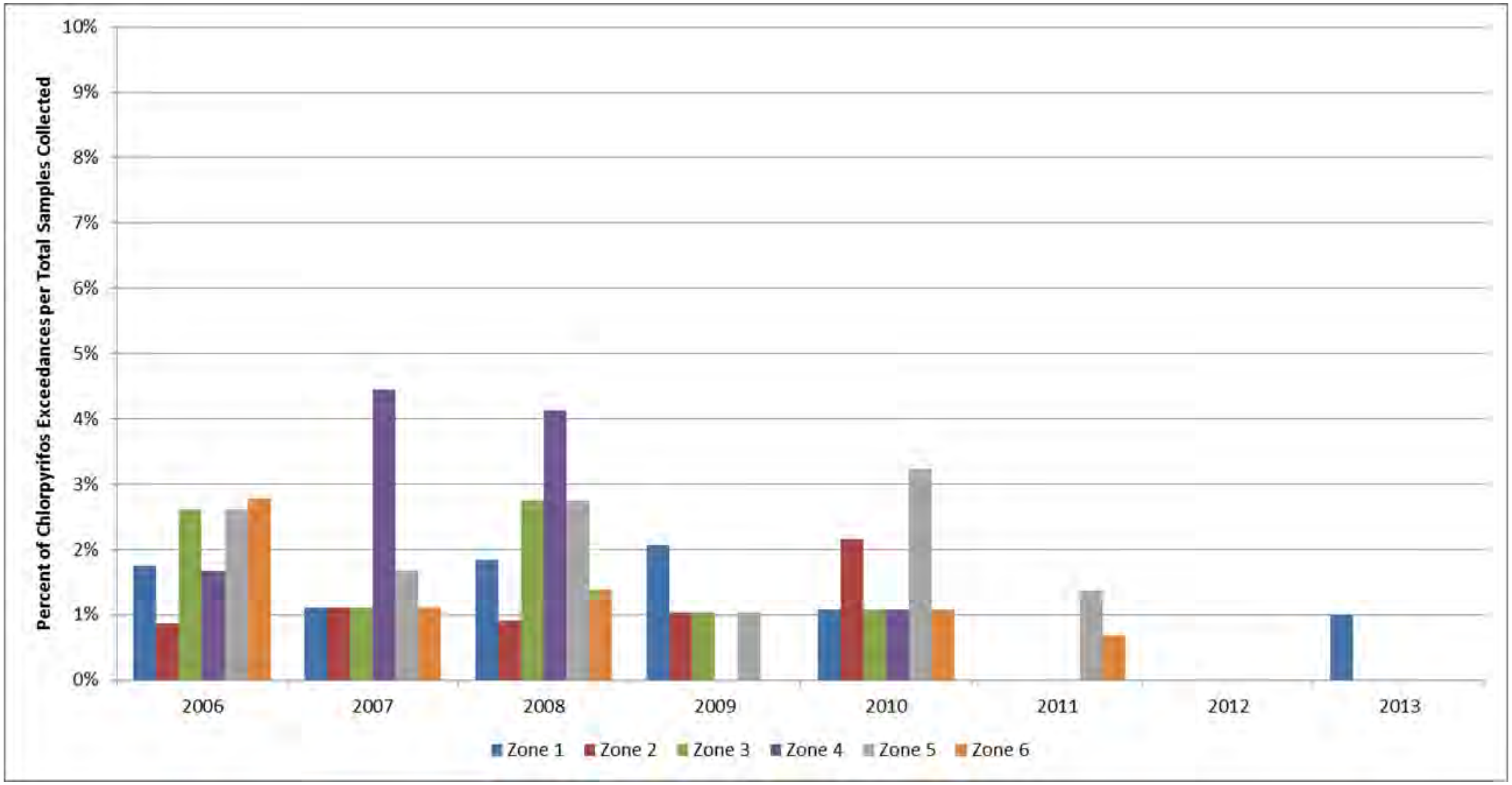
Exceedances of the hardness based WQTL for dissolved copper continue to occur throughout the Coalition boundary; 13 exceedances occurred from January through September 2013 in Zone 3 (Highline Canal @ Hwy 99, Highline Canal @ Lombardy Rd), Zone 4 (Howard Lateral @ Hwy 140, McCoy Lateral @ Hwy 140, Unnamed Drain @ Hwy 140), and Zone 6 (Cottonwood Creek @ Rd 20, Dry Creek @ Rd 18). The Coalition discussed copper during focused outreach and growers implemented management practices designed to reduce the offsite movement of copper. Sources of copper in waterways within the ESJWQC region include naturally elevated concentrations of copper in the soils or source waters and anthropogenic sources including applications by growers and applications by water districts.

Table 89. Count of exceedances of the WQTL and samples collected for chlorpyrifos from 2006 through September 2013 across the ESJWQC region.

Year	Exceedance Count	Samples[1]	% Exceedance	Lbs Applied[2]
2006	17	115	15%	199,664
2007	19	180	11%	157,374
2008	27	218	12%	117,874
2009	5	97	5%	145,748
2010	9	93	10%	116,018
2011	3	147	2%	102,479
2012	0	82	0%	85,066
Jan- Sept 2013	1	92	1%	89,219

[1] Samples refers to all samples collected for constituent analysis (dry sites included).
[2] All PUR data are considered preliminary until received from CalPIP; CalPIP data are available through December 2011.

Figure 59. Percentage of exceedances of the WQTL for chlorpyrifos from 2006 through September 2013 in the ESJWQC region.



Funding Resources

In 2013, some growers across the Coalition region utilized external funding resources to aid in the implementation of management practices designed to address water quality impairments. The Coalition reviewed funding data provided by organizations managing the distribution of financial support to growers for the implementation of management practices. The two main organizations are the Coalition for Urban/Rural Environmental Stewardship (CURES) and the Natural Resource Conservation Service (NRCS). The NRCS offices manage the distribution of the Agricultural Water Enhancement Program (AWEP) and the Environmental Quality Incentives Program (EQIP) funding cost share programs. The CURES office manages the distribution of Proposition 84 funds and the associated cost share program. Data from CURES and the NRCS offices (from Madera, Merced, and Stanislaus County offices) provide insight as to the type of management practices growers are implementing in the ESJWQC region.

The Proposition 84 funds focus on irrigation management. The data obtained from CURES regarding Proposition 84 funding indicate there were no new contracts awarded to the ESWQC since the 2012-2013 funding cycle (reported in the ESJWQC 2013 MPUR). There were two contracts totaling $211,093.06 awarded to growers within the ESJWQC during the 2012-2013 funding cycle (Table 90). Proposition 84 funding is a 50% cost share program; therefore, the total cost of implementing the management practices is twice the amount listed. Growers utilized Proposition 84 funds to install pressurized irrigation systems. Proposition 84 funds awarded during the 2012-2013 funding cycle were associated with 311 acres in Merced and Stanislaus Counties (Table 90).

Table 90. Proposition 84 funding contracts awarded, contract dollars and contract acres Merced County. Data provided to the Coalition are considered preliminary.

County	Funding Year	Practice Name	Number of Contracts Awarded	Total Contract Dollars[1]	Total Contract Acreage
Merced	2012-2013	Microirrigation	2	$211,093.06	311

[1] Proposition 84 funding is a 50% cost share program, therefore the total cost of the management practices is twice the amount listed.

The NRCS offices for the three counties in the ESJWQC region award 100% of their appropriated AWEP and EQIP funds and always have more applications than available funds to be awarded. Table 91 summarizes total contract acreage associated with EQIP and AWEP funded management practices awarded in 2013. Growers from ESWQC received funding to implement management practices across 38,534 acres of land (Table 91).

Table 91. Acres associated with management practices awarded AWEP and EQIP funding in ESJWQC counties during 2013.

Data provided to the Coalition are considered preliminary since counties may still be updating funding award records.

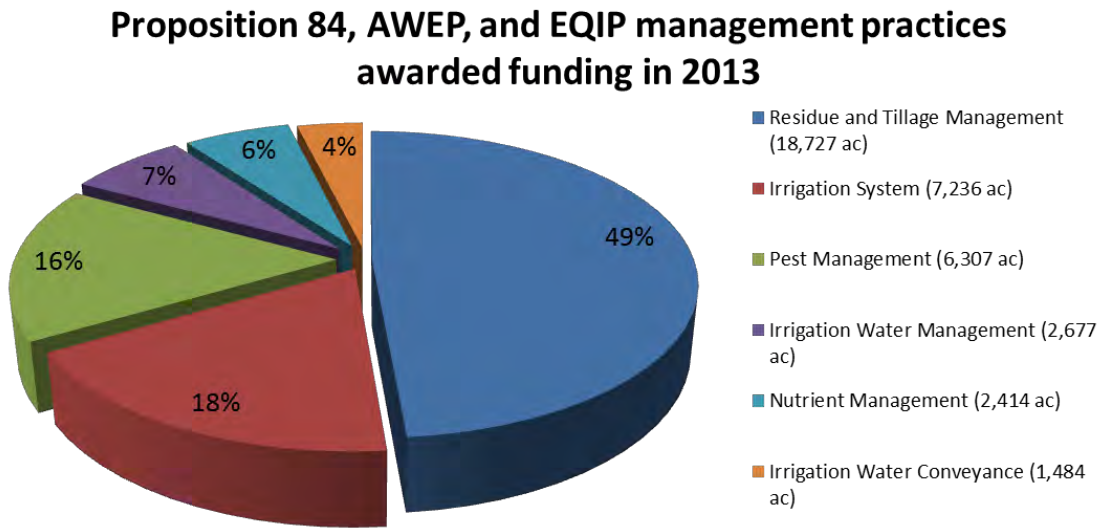
Practice Group	Practice Name	Madera		Merced		Stanislaus		Total Acres
		AWEP	EQIP	AWEP	EQIP	AWEP	EQIP	
Irrigation System	Sprinkler System				52	17		69
	Microirrigation	540	336	598	2748	736	1727	6685
	Tailwater Recovery				111		61	172
Total Irrigation System Acreage								**6926**
Irrigation Water Conveyance	Ditch and canal lining, high/low pressure pipelines	137	49	133	888	41	235	1483
Total Irrigation Water Conveyance Acreage								**1483**
Irrigation Water Management	Irrigation Reservoir					36		36
	Irrigation Water Management		584		930			1514
	Irrigation Land Leveling			26	1102			1128
Total Irrigation Water Management Acreage								**2678**
Nutrient Management	Cover Crop		141		117		40	298
	Comprehensive Nutrient Management Plan		140		53			193
	Nutrient Management		959		261		702	1922
Total Nutrient Management Acreage								**2413**
Pest Management	Integrated Pest Management (IPM)		262		1525		375	2162
	Precision Pest Control Application		1203		958		1985	4146
Total Pest Management Acreage								**6308**
Residue and Tillage Management	No-Till, reduced-Till		839		15,861		2027	18,727
Total Residue and Tillage Management								**18,727**
Total Acres Per County		**677**	**4513**	**757**	**24,606**	**830**	**7152**	**38,535**

Of the management practices funded by AWEP, EQIP, and Prop84 in the Coalition region during 2013, Residue and Tillage Management was associated with the most acreage (18,727 acres), followed by Irrigation Systems like microspray and sprinklers (6,926 acres), and Pest Management (6,308 acres). Funding awarded for other management practices (Irrigation Water Conveyance, Irrigation Water Management, and Nutrient Management) was for 6,574 acres or 17% of the total acreage funded (Figure 60).

The management practices funded by Proposition 84, AWEP, and EQIP programs to date include several of the management practices recommended by the Coalition during focused outreach. Proposition 84, AWEP, and EQIP funding information indicate growers are utilizing financial resources to implement management practices. These management practices are designed to prevent offsite movement of agricultural constituents to adjacent waterways, therefore improving water quality.

Figure 60. Proposition 84, AWEP and EQIP management practice acreages awarded funding in Madera, Merced and Stanislaus Counties during 2013.

Refer to Tables 90 and 91 for all management practice categories.



CONCLUSIONS AND RECOMMENDATIONS

Monitoring results from January through September 2013 indicate that although there are substantial improvements in water quality in many areas, water quality is still not protective of beneficial uses across the entire Coalition region. The most common exceedances of WQTLs involved field and physical parameters (such as DO and salts) resulting in impaired Agricultural and Aquatic Life beneficial uses (BUs). Other constituents that impaired Aquatic Life BUs were ammonia and dissolved copper. Impairment to the Municipal and Domestic Supply BU occurred as a result of elevated concentrations of diuron, nitrate/nitrite, and ammonia. Numerous exceedances of the WQTL for *E. coli* resulted in impaired Recreational BU in many waterbodies. The most common exceedances involve constituents for which irrigated agriculture may not be the driving factor despite the fact that the landscape consists primarily of irrigated agriculture.

Discharges from irrigated lands are only one of many possible sources of impairments to beneficial uses. For many parameters, it is not clear to what extent WQTL exceedances result from agricultural activities. Source identification is difficult especially for non-conserved constituents such as DO and pH. Many although not all pesticide detections are the result of agricultural applications that enter surface waters from spray drift or surface water runoff. In the event of exceedances of pesticide WQTLs or the occurrence of toxicity, the Coalition identifies sources through the analysis of preliminary PUR data, assessment of water quality data and evaluation of current management practices of targeted growers.

Conclusions from data provided in the Management Practice Effectiveness, Coalition Wide Evaluation, Status of TMDL Constituents, and Spatial Trends analysis sections of this report include:

Conclusions from data provided in the Management Practice Effectiveness, Coalition Wide Evaluation, Status of TMDL Constituents, and Spatial Trends analysis sections of this report include:

1. Individual grower visits continue to be an effective method of communicating with members.
2. Implementation of management practices continues to improve water quality in the Coalition region.
3. Growers across the ESJWQC region are aware of water quality impairments and are implementing management practices designed to address these impairments even if the Coalition has yet to conduct focused outreach in the site subwatershed.
4. Growers in the ESJWQC region are taking advantage of available funding resources to implement management practices that improve water quality.
5. Results from January through September 2013 monitoring indicate fewer exceedances in high priority site subwatersheds where both general and focused outreach occurred, as well as in site subwatersheds where only general outreach occurred.
6. Remaining exceedances may be difficult to eliminate because the cause/source of the problems may not be irrigated agriculture and if they are, management practices that are very effective in eliminating exceedances of pesticides are not effective in reducing exceedances of WQTLs for parameters such as DO, SC (salts), *E. coli*, ammonia/nitrates, or pH.

7. Agriculture may not be the only cause of water quality impairments that are the result of elevated concentrations of copper in the Coalition region.
8. The Coalition's focused management practice outreach and tracking strategy is effective at improving water quality. The Coalition received approval on October 15, 2013 to remove eight specific site subwatershed/ constituent pairs from the active management plan of seven site subwatersheds.
9. Continued improvements in water quality are expected based on past grower outreach efforts and upcoming focused outreach in new priority subwatersheds.
10. Lack of improvement in the future will result if there remain growers in the Coalition region who do not have to comply with discharge requirements.

Based on the information provided in the response to the programmatic questions, the Coalition will pursue the following during the 2014 WY:

1. Monitor according to the WDR adopted in December 2012 and the monitoring outline in the Monitoring Plan Update (MPU).
2. Continue to document and assess management practices implemented by Coalition growers.
3. Continue to focus outreach and education efforts around constituents applied by agriculture while also educating growers about non-conserved constituents such as dissolved oxygen and salinity.

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

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

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