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SACRAMENTO VALLEY
WATER QUALITY COALITION

Monitoring and Reporting Program Plan

Annual Monitoring Report 2010

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Executive Summary

SUMMARY OF MONITORING PROGRAM

The Sacramento Valley Water Quality Coalition (Coalition) has developed and implemented a Monitoring and Reporting Program Plan (MRPP) to meet the requirements of the *Conditional Waiver for Irrigated Lands* (hereinafter abbreviated as *ILRP* for *Irrigated Lands Regulatory Program*) and subsequent amendments to the *ILRP* requirements (WQO-2004-0003, SWRCB 2004, R5-2005-0833, R5-2008-0005). The scope of the MRPP and the sampling and analytical methods used in the Coalition and subwatershed 2010 monitoring have been approved by the Central Valley Regional Water Quality Control Board (Water Board).

In accordance with the ILRP requirements, the Coalition is achieving these objectives by implementing an MRPP that evaluates samples for the presence of statistically significant toxicity and exceedances of applicable numeric water quality objectives and ILRP trigger limits. The Coalition initiates follow-up actions designed to identify constituents causing significant toxicity when toxicity is of sufficient magnitude. Exceedances of numeric objectives and ILRP trigger limits for chemical, physical and microbiological biological parameters trigger follow-up actions designed to identify potential sources and to inform potential users of the constituents of concern. Additionally, the Coalition is evaluating the degree of implementation of current management practices in priority watersheds and recommending additional practices as water quality results indicate a need to do so. The Coalition is committed to the principle of adaptive management to control specific discharges of waste that are having an impact on water quality. This iterative approach allows for the most effective use of scarce human and fiscal resources. The 2010 monitoring effort has been conducted in coordination with the Northeastern California Water Association, the Napa County Putah Creek Watershed Group, and the Upper Feather River Watershed Group. The Coalition is also coordinating with the California Rice Commission (CRC) under the December 2004 Coalition-CRC Memorandum of Understanding.

The parameters monitored by the Coalition to achieve these objectives are as specified in the *ILRP* and in subsequent amendments to the *ILRP* requirements (WQO-2004-0003, SWRCB 2004, R5-2005-0833, R5-2008-0005). The following environmental monitoring elements are included in the Coalition's MRPP:

- Water column and sediment toxicity
- Physical and conventional parameters in water and sediment
- Organic carbon
- Pathogen indicator organisms in water
- Trace metals in water
- Pesticides in water and sediments
- Nitrogen and phosphorus compounds in water

The MRP also requires testing for 303(d)-listed constituents identified in waterbodies downstream from Coalition sites and discharged within the watershed. Note that not all

parameters are monitored at every site for every event. Specific individual parameters measured for the 2010 Coalition monitoring effort are listed in **Table 2**.

A total of 25 regular sampling sites were monitored by the Coalition and coordinating subwatershed monitoring programs during 2010 (**Table 3**). A map of these sites is presented in **Figure 1**.

As required by the *ILRP*, Coalition monitoring events includes storm season monitoring and irrigation season monitoring. The sites and numbers of samples to be collected for the Coalition's 2010 monitoring are summarized in **Table 4**. This *Annual Monitoring Report 2010* (AMR) includes results for October 2009 through September 2010.

Sample collection and analysis has been performed by the following agencies and subcontractors. Pacific EcoRisk (Fairfield, California) conducts sampling and performs toxicity analyses for all sites except for the following:

- Kleinfelder (Sacramento, California) conducts sampling and perform toxicity analyses for the sites coordinated with the California Rice Commission (CRC);
- The Northeastern California Water Association conducts sampling for the Pit River subwatershed site;
- Napa County Resource Conservation District staff conducts sampling for the two Napa County sites in the Lake-Napa subwatershed.
- Caltest Analytical Laboratory (Napa, California), Basic Lab (Redding, California), and Sierra Environmental Monitoring (Reno, Nevada) conduct all conventional and microbiological analyses; and
- CRG Marine Laboratories (Torrance, California) and APPL (Fresno, California) conduct pesticide analyses.

MANAGEMENT PRACTICES AND ACTIONS TAKEN

To address specific water quality exceedances, the Coalition and its partners developed a Management Plan in 2008, subsequently approved by the Water Board. The Coalition also previously developed a *Landowner Outreach and Management Practices Implementation Communications Process for Monitoring Results (Management Practices Process)* to address exceedances. Implementation of the approved management plan is the primary mechanism for addressing exceedances observed in the Coalition's *ILRP* monitoring.

The Coalition submitted an annual Management Plan Progress Report (MPPR) to the Regional Water Board in March 2010. The MPPR that documenting the status and progress toward Management Plan requirements for 2010 will be provided to the Water Board at the end of March 2011. Activities conducted in 2010 to implement the Coalition's Management Plan included addressing exceedances of objectives for registered pesticides, completion of source evaluations for pesticides and toxicity, surveys for pathogen identification source evaluations, and monitoring required for toxicity and pesticide management plans and TMDLs.

Implementation completed specifically for registered pesticides included review and evaluation of pesticide application data, identification of potential sources, and determination of likely

agricultural sources. These evaluations were documented in Source Evaluation Reports for each water body and management plan element. For registered pesticides and identified causes of toxicity, surveys of Coalition members operating on high priority parcels were conducted to determine the degree of implementation of relevant management practices. These survey results will be used to establish goals for additional management practice implementation needed to address exceedances of Basin Plan water quality objectives and *ILRP* trigger limits.

The Coalition and its subwatersheds, working with the Coalition for Urban/Rural Environmental Stewardship (CURES), stand committed to working with the Regional Water Board and its staff to implement the *Management Practices Process* and the Coalition's approved Management Plan to address water quality problems identified in the Sacramento Valley. The primary strategic approach taken by the Coalition is to notify and educate the subwatershed landowners, farm operators, and/or wetland managers about the cause(s) of toxicity and/or exceedance(s) of water quality standards. Notifications are focused on (but not limited to) growers who operate directly adjacent to or within close proximity to the waterway. The broader outreach program, which includes both grower meetings and the notifications distributed through direct mailings, encourages the adoption of BMPs and modification of the uses of specific farm and wetland inputs to prevent movement of constituents of concern into Sacramento Valley surface waters.

RESULTS AND CONCLUSIONS

The Coalition submits this *2010 Annual Monitoring Report* (AMR) as required under the Water Board's Irrigated Lands Regulatory Program (*ILRP*). The AMR provides a detailed description of our monitoring results as part of our ongoing efforts to characterize irrigated agricultural and wetlands related water quality in the Sacramento River Basin.

To summarize, the results from the ILRP monitoring in 2010 continue to indicate that with few exceptions, there are no major water quality problems with agricultural and managed wetlands discharges in the Sacramento River Basin.

This AMR characterizes potential water quality impacts of agricultural drainage from a broad geographic area in the Sacramento Valley from October 2009 through September 2010. To date, a total of 55 Coalition storm and irrigation season events have been completed, with additional events collected by coordinating programs. For the period of record in this AMR (October 2009 through September 2010), samples were collected during 10 scheduled monthly events and 2 storm events.

Pesticides were infrequently detected (<3.4% of 2010 pesticide results), and when detected, rarely exceeded applicable objectives. Five registered pesticides (chlorpyrifos, dimethoate, diuron, malathion, simazine) exceeded applicable water quality objectives in a total of nine samples in 2010 Coalition monitoring.

Many of the pesticides specifically required to be monitored by the *ILRP* have rarely been detected in Coalition water samples, including glyphosate, paraquat, and all of the pyrethroid pesticides. Glyphosate, one of the most widely used agricultural pesticides, has been detected in only seven Coalition samples to date, and has never approached concentrations likely to cause toxicity to sensitive test species. Over 98.5% of all pesticide analyses performed to date for the Coalition have been below detection. This indicates that monitoring for many of these pesticides in water is unlikely to provide meaningful results regarding sources or needs for changes in management practices. Based on these results, the Coalition proposed that monitoring of

pesticides for the ILRP be conducted based on pesticide use in the subwatersheds. Similarly, the Coalition proposed to conduct more focused monitoring of most trace elements (arsenic, cadmium, lead, molybdenum, nickel, selenium, and zinc); the Coalition's monitoring has demonstrated that these metals do not exceed objectives and are not likely to cause adverse impacts to aquatic life or human health in waters receiving agricultural runoff in the Coalition watershed. A more focused strategy for monitoring pesticides and trace metals has been implemented in 2011 with the Coalition's 2009 MRP (Order No. R5-2009-0875, CVRWQCB 2009[1]).

The majority of exceedances of adopted numeric objectives consisted of conductivity and *E. coli*. Although agricultural runoff and irrigation return flows may contribute to exceedances of these objectives, all of these parameters are controlled or significantly affected by natural processes and sources that are not controllable by agricultural management practices. Sources of *E. coli* exceedances have been investigated through a region-wide pilot study conducted by the Coalition. The Coalition also continues to participate in the *ILRP* Technical Issues Committee (TIC) workgroups to develop procedures and guidelines for *ILRP* monitoring and evaluation of exceedances. The TIC has worked with Water Board *ILRP* staff to develop recommendations incorporated into the revised *ILRP* Monitoring and Reporting Program requirements and procedures adopted by the Water Board in 2008 (*Order No. R5-2008-0005*) and 2009 (*Order No. R5-2009-0875*). The Coalition has also been an active participant in the Water Board's stakeholder process to develop a Long-Term *ILRP*.

The Coalition has implemented the required elements of the *ILRP* since 2004. The Coalition developed a Watershed Evaluation Report (WER) that set the priorities for development and implementation of the Monitoring and Reporting Program Plan (MRPP). The Coalition successfully developed the MRPP, QAPP, and Management Plan as required by the *ILRP* and these documents have been approved by the Water Board. Subsequent revisions requested by the Water Board have been incorporated into these documents and were implemented during the 2006 Irrigation Season monitoring, and continued through the Coalition's 2009 and 2010 *ILRP* monitoring efforts. The Coalition continues to adapt and improve elements of the monitoring program based on the knowledge gained through *ILRP* monitoring efforts.

The Coalition has implemented the approved monitoring program in coordination with its subwatershed partners, has initiated follow-up activities to address observed exceedances, and is continuing implementation of the approved Management Plan. Throughout this process, the Coalition has kept an open line of communication with the Water Board and has made every effort to fulfill the requirements of the *ILRP* in a cost-effective and scientifically defensible manner. This annual monitoring report is documentation of the success and continued progress of the Coalition in achieving these objectives.

[1] CVRWQCB 2009. Monitoring and Reporting Program Order No. R5-2009-0875 for Sacramento Valley Water Quality Coalition under Amended Order No. R5-2006-0053, Coalition Group Conditional Waiver Of Waste Discharge Requirements For Discharges From Irrigated Lands. California Regional Water Quality Control Board, Central Valley Region.

Introduction

The primary purpose of this report is to document the monitoring efforts and results of the Sacramento Valley Water Quality Coalition (Coalition) Monitoring and Reporting Program Plan (MRPP). This Annual Monitoring Report also serves to document the Coalition's progress toward fulfilling the requirements of the Conditional Waiver for Irrigated Lands (hereinafter abbreviated as ILRP for Irrigated Lands Regulatory Program) and subsequent amendments to the ILRP requirements (WQO-2004-0003, SWRCB 2004, R5-2005-0833, R5-2008-0005).

The Annual Monitoring Report includes the following elements, as specified in the ILRP:

Table 1. ILRP Annual Monitoring Report Requirements

ILRP Annual Report Requirement	Report Section Headings	Page
1. Signed Transmittal Letter	NA	-
2. Title page	Title page	-
3. Table of contents	Table of contents	*i*
4. Executive Summary	Executive Summary	*v*
5. Description of the Coalition Group geographical area	Description of the Watershed	3
6. Monitoring objectives and design	Monitoring Objectives	4
7. Sampling site descriptions and rainfall records for the time period covered under the AMR	Sampling Site Locations and Land Uses; Summary of Sampling Conditions	7; 38
8. Location map(s) of sampling sites, crops and land uses	Appendix E: Drainage Maps	CD
9. Tabulated results of all analyses	Appendix C: Tabulated Monitoring Results	CD
10. Discussion of data	Data Interpretation	38
11. Electronic data submitted in a SWAMP comparable format	Submitted quarterly; Appendix C	CD
12. Sampling and analytical methods used	Sampling and Analytical Methods	14
13. Copy of chain-of-custody forms	Appendix B: Lab Reports and Chains of Custody	CD
14. Field data sheets, signed laboratory reports, laboratory raw data (as identified in Attachment C)	Appendix A: Field Log Copies; Appendix B: Lab Reports and Chains of Custody	CD
15. Associated laboratory and field quality control samples results	Appendix B: Lab Reports and Chains of Custody	CD
16. Summary of Quality Assurance Evaluation results (as identified in Attachment C for Precision, Accuracy and Completeness)	Monitoring Results	24

ILRP Annual Report Requirement	Report Section Headings	Page
17. Specify the method used to obtain flow at each monitoring site during each monitoring event	Appendix A: Field Log Copies	CD
18. Electronic or hard copies of photos obtained from all monitoring sites, clearly labeled with site ID and date	Appendix A: Field Log Copies	CD
19. Summary of Exceedance Reports submitted during the reporting period and related pesticide use information	Exceedances of Relevant Water Quality Objectives; Appendix D: Exceedance Reports	51; CD
20. Actions taken to address water quality exceedances that have occurred, including but not limited to, revised or additional management practices implemented	Management Practices and Actions Taken	65
21. Status update on preparation and implementation of all Management Plans and other special projects	Management Practices and Actions Taken	65
22. Conclusions and recommendations	Conclusions and Recommendations	80

All report elements required by the ILRP or subsequently requested by the California Regional Water Quality Control Board, Central Valley Region (Water Board) are included in this report.

Description of the Watershed

The Sacramento River watershed drains over 27,000 square miles of land in the northern part of California's Central Valley into the Sacramento River. The upper watersheds of the Sacramento River region include the Pit River watershed above Lake Shasta and the Feather River above Lake Oroville. The Sacramento Valley drainages include the Colusa, Cache Creek, and Yolo Bypass watersheds on the west side of the valley, and the Feather and American River watersheds on the east side of the valley. The Coalition also monitors in the Cosumnes River watershed, which is not part of the Sacramento River watershed.

Beginning near the town of Red Bluff at its northern terminus, the Sacramento Valley stretches about 150 miles to the southeast where it merges into the Sacramento-San Joaquin River Delta south of the Sacramento metropolitan area. The valley is 30 to 45 miles wide in the southern to central parts but narrows to about 5 miles wide near Red Bluff. Its elevation decreases from 300 feet at its northern end to near sea level in the delta. The greater Sacramento River watershed includes sites from 5,000 feet in elevation to near sea level.

The Sacramento River Basin is a unique mosaic of farm lands, refuges, and managed wetlands for waterfowl habitat; spawning grounds for numerous salmon and steelhead trout; and the cities and rural communities that make up this region. This natural and working landscape between the crests of the Sierra Nevada and the Coast Range includes the following:

- More than a million acres of family farms that provide the economic engine for the region; provide a working landscape and pastoral setting; and serve as valuable habitat for waterfowl along the Pacific Flyway. The predominant crops include: rice, general grain and hay, improved pasture, corn, tomatoes, alfalfa, almonds, walnuts, prunes, safflower, and vineyards.
- Habitat for 50% of the threatened and endangered species in California, including the winter-run and spring-run salmon, steelhead, and many other fish species.
- Six National Wildlife Refuges, more than fifty state Wildlife Areas, and other privately managed wetlands that support the annual migration of waterfowl, geese, and water birds in the Pacific Flyway. These seasonal and permanent wetlands provide for 65% of the North American Waterfowl Management Plan objectives.
- The small towns and rural communities that form the backbone of the region, as well as the State Capital that serves as the center of government for the State of California.
- The forests and meadows in the numerous watersheds of the Sierra Nevada and Coast Range.

Monitoring Objectives

The Coalition's MRPP will achieve the following objectives as a condition of the *ILRP*:

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

In accordance with the ILRP requirements, the Coalition is achieving these objectives by implementing an MRPP that evaluates samples for the presence of statistically significant toxicity and exceedances of applicable numeric water quality objectives and ILRP trigger limits. The Coalition initiates follow-up actions designed to identify constituents causing significant toxicity when toxicity is of sufficient magnitude. Exceedances of numeric objectives and ILRP trigger limits for chemical, physical and microbiological biological parameters trigger follow-up actions designed to identify potential sources and to inform potential users of the constituents of concern. Additionally, the Coalition is evaluating the degree of implementation of current management practices in priority watersheds and recommending additional practices as water quality results indicate a need to do so. The Coalition is committed to the principle of adaptive management to control specific discharges of waste that are having an impact on water quality. This iterative approach allows for the most effective use of scarce human and fiscal resources.

The parameters monitored by the Coalition to achieve these objectives are as specified in the *ILRP* and in subsequent amendments to the *ILRP* requirements (WQO-2004-0003, SWRCB 2004, R5-2005-0833, R5-2008-0005, R5-2009-0875). The following environmental monitoring elements are included in the Coalition's MRPP:

- Water column and sediment toxicity
- Physical and conventional parameters in water and sediment
- Organic carbon
- Pathogen indicator organisms in water
- Trace metals in water
- Pesticides in water and sediment
- Nitrogen and phosphorus compounds in water

The MRP also requires testing for 303(d)-listed constituents identified in waterbodies downstream from Coalition sites and discharged within the watershed. Note that not all parameters are monitored at every site for every event. Specific individual parameters measured for the Coalition monitoring effort are listed in **Table 2**.

Table 2. Constituents Monitored, 2010

Analyte	Quantitation Limit	Reporting Unit
Physical Parameters		
Flow	NA	CFS (Ft^3/Sec)
pH	0.1 (a)	-log[H^+]
Conductivity	0.1 (a)	μmhos/cm
Dissolved Oxygen	0.1 (a)	mg/L
Temperature	0.1 (a)	˚C
Hardness, total as $CaCO_3$	10	mg/L
Turbidity	1.0	NTU
Total Suspended Solids	3.0	mg/L
Total Organic Carbon	0.5	mg/L
Grain size (in sediment)	1	% fraction
Total Organic Carbon (in toxic sediments)	200	mg/kg d.w.
Pathogen Indicators		
E. coli bacteria	2	MPN/100 mL
Water Column Toxicity		
Ceriodaphnia, 96-h acute	NA	% Survival
Pimephales, 96-h acute	NA	% Survival
Selenastrum, 96-h short-term chronic	NA	Cell Growth
Pesticides		
Carbamates	(b)	ug/L
Organochlorine	(b)	ug/L
Organophosphorus	(b)	ug/L
Pyrethroids and chlorpyrifos (in toxic sediments)	(b)	ug/kg, d.w.
Herbicides	(b)	ug/L
Trace Elements		
Arsenic	0.5	ug/L
Boron	10	ug/L
Cadmium	0.1	ug/L
Copper	0.5	ug/L
Lead	0.25	ug/L
Molybdenum	1	ug/L
Nickel	0.5	ug/L
Selenium	1.0	ug/L
Zinc	1.0	ug/L
Nutrients		
Total Kjeldahl Nitrogen	0.1	mg/L
Phosphorus, total	0.1	mg/L
Soluble Orthophosphate	0.01	mg/L
Nitrate + Nitrite as N	0.1	mg/L
Ammonia as N	0.1	mg/L

Notes:
(a) Detection and reporting limits are not strictly defined. Value is required reporting precision.
(b) Limits are different for individual pesticides.

Sampling Site Descriptions

To successfully implement the monitoring and reporting program requirements contained in the *ILRP* adopted by the Water Board in June 2003, the Coalition worked directly with landowners in the twenty-one county watershed to identify and develop ten subwatershed groups. Representatives from each subwatershed group utilized agronomic and hydrologic data generated by the Coalition in an attempt to prioritize watershed areas for initial evaluation to ultimately select monitoring sites in their respective areas based upon existing infrastructure, historical monitoring data, land-use patterns, historical pesticide use, and the presence of 303(d)-listed water bodies.

Coalition members selected sampling sites in priority watersheds based upon the following fundamental assumptions regarding management of non-point source discharges to surface water bodies: 1) Landscape scale sampling at the bottom of drainage areas allows for determinations regarding the presence of a water quality problems using a variety of analytical methods including water column and sediment toxicity testing as well water chemistry analyses and bioassessment; 2) Strategic source investigations utilizing Geographic Information Systems can be used to identify upstream parcels with attributes that may be related to the analytical results, including crops, pesticide applications, and soil type; and 3) Though recognizably complex, management practice effectiveness can best be assessed by coalitions at the drainage and watershed scale to determine compliance with water quality objectives in designated water bodies. Results from farm-level management practices evaluations will be used to complement Coalition efforts on the watershed scale by providing crop-specific information that will support management practice recommendations.

In January 2009, the Coalition implemented a revised MRPP responsive to the new ILRP MRP (ORDER NO. R5-2008-0005). The Coalition MRPP included an analysis of historical data and basic patterns and processes related to potential water quality impacts from agricultural discharges. There were no changes in monitoring objectives, but there were several modifications to monitoring strategy in the MRP. These included the following significant revisions in monitoring approach:

- Monitoring at sites in drainages representative of larger regions based on shared agricultural and geographic characteristics
- A three-year cycle of one year of Assessment monitoring for the broad suite of ILRP analytes and two years of Core monitoring of a reduced set of analytes.
- Customization of monitoring schedules and the analytes monitored based on the characteristics of individual subwatersheds.

Representative monitoring sites for 2010 were selected primarily from previously monitored locations. A total of 19 sites were monitored for the Core monitoring analytes. All of these sites had already completed Assessment level monitoring in previous years. No sites were monitored according to the Assessment monitoring parameter schedule in 2010. Additionally, Management Plan water sampling was conducted at 14 of the Core monitoring sites and at 3 additional sites. Management Plan sediment chemistry sampling was conducted at one of the Core sites.

SAMPLING SITE LOCATIONS AND LAND USES

The water and sediment sites monitored by the Coalition in 2010 are listed in **Table 3**. All sites monitored in 2010 have been approved by the Water Board as ILRP compliance sites. An overall map of Coalition and subwatershed sites is presented in **Figure 1**. Site-specific drainage maps with land use patterns for all monitoring locations are also provided in **Appendix E**.

Table 3. Coalition Monitoring Sites, 2010

Subwatershed	Site Name	Latitude	Longitude	Implementing Agency	Site ID (Fig. 1)
ButteYubaSutter	Butte Slough at Pass Rd	39.1873	-121.90847	SVWQC	BTTSL
ButteYubaSutter	Gilsizer Slough at George Washington Rd	39.009	-121.6716	SVWQC	GILSL
ButteYubaSutter	Lower Honcut Creek at Hwy 70	39.30915	-121.59542	SVWQC	LHNCT
ButteYubaSutter	Lower Snake R. at Nuestro Rd	39.18531	-121.70358	SVWQC	LSNKR
ButteYubaSutter	Pine Creek at Nord Gianella Rd	39.78114	-121.98771	SVWQC	PNCGR
ButteYubaSutter	Sacramento Slough bridge near Karnak	38.785	-121.6533	SVWQC/CRC	SSKNK
ButteYubaSutter	Wadsworth Canal at South Butte Rd	39.15337	-121.73435	SVWQC	WADCN
ColusaGlenn	Colusa Basin Drain above KL	38.8121	-121.7741	SVWQC/CRC	COLDR
ColusaGlenn	Freshwater Creek at Gibson Rd	39.17664	-122.18915	SVWQC	FRSHC
ColusaGlenn	Rough and Ready Pumping Plant (RD 108)	38.86209	-121.7927	SVWQC	RARPP
ColusaGlenn	Walker Creek near 99W and CR33	39.62423	-122.19652	SVWQC	WLKCH
ElDorado	North Canyon Cr	38.7604	-120.7102	SVWQC	NRTCN
LakeNapa	Middle Creek u/s from Highway 20	39.17641	-122.91271	SVWQC	MDLCR
LakeNapa	Pope Creek upstream from Lake Berryessa	38.64637	-122.36424	PCWG	PCULB
PitRiver	Pit River at Pittville	41.0454	-121.3317	NECWA	PRPIT
PNSSNS	Coon Creek at Brewer Rd	38.93399	-121.45184	SVWQC	CCBRW
PNSSNS	Coon Creek at Dowd Road[1]	38.93126	-121.37709	SVWQC	CCDOW
SacramentoAmador	Cosumnes River at Twin Cities Rd	38.29098	-121.38044	SVWQC	CRTWN
SacramentoAmador	Grand Island Drain near Leary Rd	38.2399	-121.5649	SVWQC	GIDLR
ShastaTehama	Anderson Creek at Ash Creek Rd	40.418	-122.2136	SVWQC	ACACR
SolanoYolo	Shag Slough at Liberty Island Bridge	38.30677	-121.69337	SVWQC	SSLIB
SolanoYolo	Ulatis Creek at Brown Rd	38.307	-121.794	SVWQC	UCBRD
SolanoYolo	Willow Slough Bypass at Pole Line	38.59015	-121.73058	SVWQC	WLSPL
SolanoYolo	Z Drain – Dixon RCD[2]	38.45215	-121.6752	SVWQC	ZDDIX
UpperFeatherRiver	Middle Fork Feather River above Grizzly Cr	39.816	-120.426	UFRW	MFFGR

Note:

1. For the January 2010 event, Coon Creek at Brewer Road (CCBRW) was moved to Coon Creek at Dowd Road (CCDOW).
2. Sediment chemistry monitoring was conducted at ZDDIX.

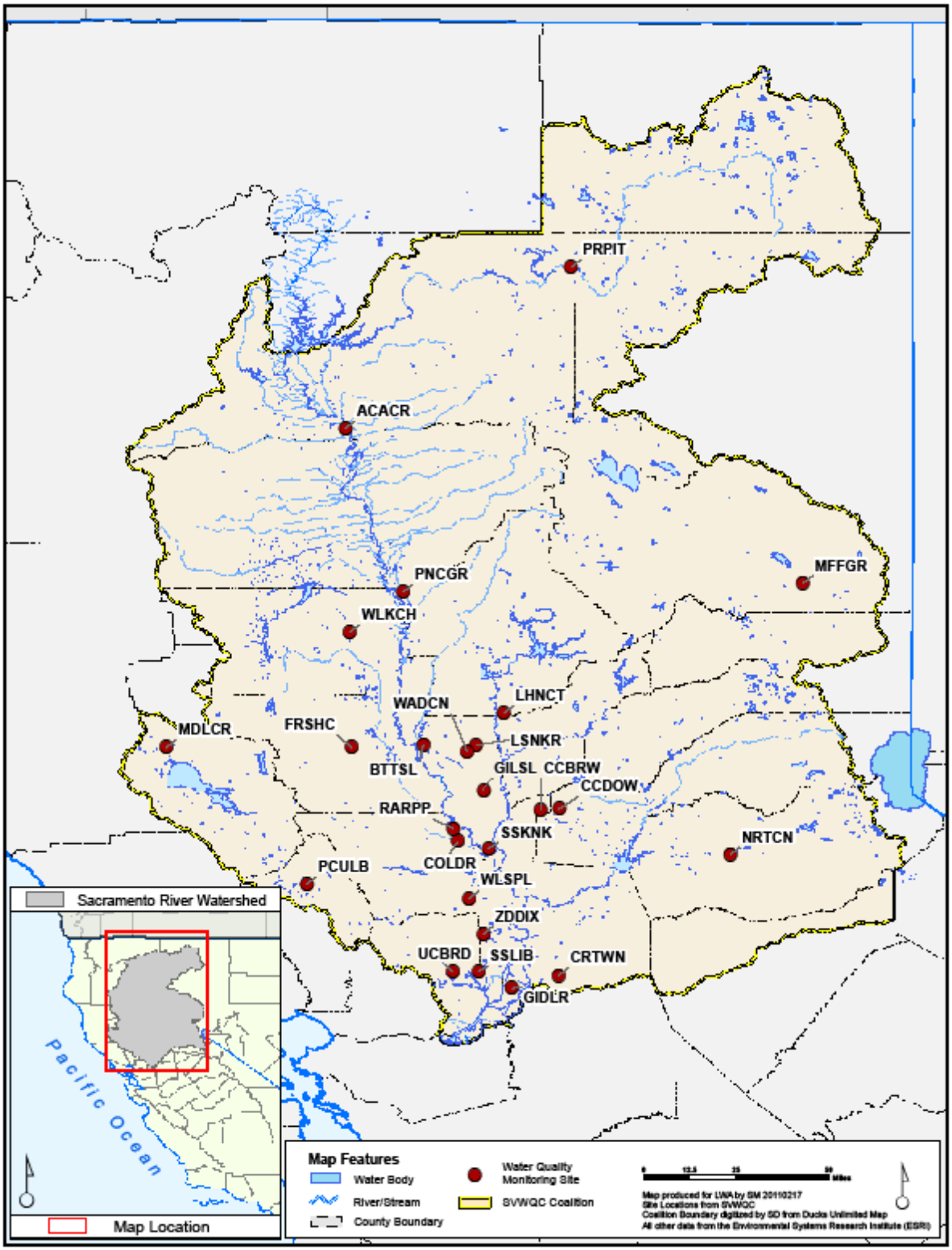

Figure 1. Coalition Monitoring Sites

SITE DESCRIPTIONS

Butte/Yuba/Sutter Subwatershed

Butte Slough at Pass Road (BTTSL)

Butte Slough is a tributary of Butte Creek. It joins Butte Creek near its outflow to the Sacramento River. The sampling location is approximately 1.5 miles from the confluence with Butte Creek. Butte Creek is a source of water in Butte Slough when irrigation withdrawals are being made. In addition to the water from Butte Creek, Butte Slough receives drainage from the wetlands of Gray Lodge Waterfowl Management Area, Butte Sink Wildlife Management Area, the fields surrounding Cherokee Canal and the orchards and fields west of Gridley and the Buttes.

Gilsizer Slough at George Washington Road (GILSL)

Gilsizer Slough is an unlined storm drainage outfall canal that runs from the Gilsizer County Drainage District's north pump station approximately 15 miles to the Sutter Bypass, draining 6,005 total acres. The monitoring location is located roughly 1.5 drainage miles from its confluence with the Sutter bypass and is a natural drainage channel that historically has drained Yuba City and the area south of town. Principal crops grown in this area include prunes, walnuts, peaches, and almonds.

Lower Honcut Creek at Highway 70 (LHNCT)

Lower Honcut Creek (in the Lower Honcut Creek drainage) was selected to represent the drainages in the eastern part of the Butte-Yuba-Sutter subwatershed. This drainage includes the dominant crops and typically has flows allowing sampling through irrigation season. The sampling site is located approximately 3.5 miles from its confluence with the Feather River. Dominant crops in this drainage include rice, walnuts, prunes, pasture, citrus, olive, grapes, Lower Honcut receives flows from North Honcut Creek and South Honcut Creek, which extend up into the foothills and include more pasture acreage.

Lower Snake River at Nuestro Road (LSNKR)

The Lower Snake River is an unlined irrigation supply and runoff canal that serves approximately 25,000 total acres and includes a relatively high percentage of rice acreage. The other predominant crops include prunes, peaches, idle acreage, and operations producing flowers, nursery stock, and Christmas trees.

Pine Creek at Nord-Gianella Road (PNCGR)

The watershed sampled upstream from the monitoring site represents approximately 13,440 acres of varied farmland, riparian habitat and farmsteads. The predominant crops in this area are walnuts, almonds, prunes, wheat, oats, barley, beans, squash, cucumbers, alfalfa, pasture, and safflower.

Sacramento Slough Bridge near Karnak (SSKNK)

This site aggregates water from all areas in the subwatershed between the Feather and Sacramento Rivers. The major contributing areas include the areas downstream of the Butte

Slough and Wadsworth monitoring sites. These areas include Sutter Bypass and its major inputs from Gilsizer Slough, RD 1660, RD 1500, and the Lower Snake River. Monitoring at this site is coordinated with the California Rice Commission.

Wadsworth Canal (WADCN)

This site characterizes water downstream of approximately 22,000 irrigated acres in the Wadsworth drainage. The drainage includes primarily prunes, with additional acreage of peaches, walnuts, pasture, wheat, and almonds.

Colusa Glenn Subwatershed

Colusa Basin Drain above Knights Landing (COLDR)

This site is near the outfall gates of the Colusa Basin Drain before its confluence with the Sacramento River. This site is downstream of all of the other monitoring sites within the basin. The upstream acreage consists of almonds, tomatoes, wetlands, pasture, corn, and walnuts. Monitoring at this site is coordinated with the California Rice Commission.

Freshwater Creek at Gibson Road (FRSHC)

The Freshwater Creek drainage includes approximately 83,000 total acres. Irrigated acreage (excluding rice acreage) is approximately 19,000 acres. Predominant crops in the drainage are rice, tomatoes, idle, squash, grain, pasture, and safflower.

Rough and Ready Pumping plant, RD 108 (RARPP)

The Rough & Ready Pumping Plant aggregates runoff and return flows for the Sycamore drainage. The pumps lift the water into the Sacramento River. This drainage area contains large amounts of tomatoes, safflower, wheat, melons, corn, and pasture.

Walker Creek near 99W and CR33 (WLKCH)

The Walker Creek drainage is located east of Wilson Creek in Glenn County, and the Walker Creek monitoring site is located 1.3 miles north of the Town of Willows. The Walker Creek drainage includes approximately 27,000 total irrigated acres. Predominant crops in this drainage are almonds, rice, corn, and alfalfa.

El Dorado County Subwatershed

North Canyon Creek (NRTCN)

This site captures representative agricultural drainage from the Camino-"Apple Hill" drainage in El Dorado County. Crops grown in this region include apples, pears, wine grapes, stone fruit, and Christmas trees. This site is approximately one (1) mile upstream from the confluence with the South Fork American River and is a perennial stream.

Lake/Napa Subwatershed

Middle Creek Upstream from Highway 20 (MDLCR)

The Middle Creek drainage contains approximately 60,732 acres. Over 55,000 acres are listed as Native Vegetation with the US Forest Service controlling the majority of the land. Irrigated agriculture constitutes approx 1,112 acres participating in the Lake County Watershed group. This includes 374 acres of walnuts, 308 acres of grapes, 186 acres of pears 159 acres of hay/pasture, 10 acres of specialty crops/nursery crops and about 70 acres of wild rice.

The sampling location was chosen to avoid influence for the town of Upper Lake, and captures approximately 60% of irrigated agricultural operations within this drainage. Due to the ephemeral nature of the creek, sampling at this site is planned to be conducted three times per year: twice during the storm season, and once after commencement of the irrigation season.

Pope Creek (PCULB)

The site on Pope Creek in Napa County is downstream of major storm runoff but is above the level of the receiving waters of Lake Berryessa. Collectively, these sites capture drainage from approximately 3,400 acres of irrigated lands. Primary crops include vineyards and olive orchards. Based upon the ephemeral nature of this Napa County creek, samples are planned to be collected from December through May.

Pit River Subwatershed

Pit River at Pittville Bridge (PRPIT)

This site captures drainage from Big Valley, Ash Creek and Horse Creek. This site captures drainage from the primary land-use, native pasture, as well as alfalfa, oat hay, grain and duck marsh, ultimately incorporating approximately 9,000 acres in the Fall River Valley.

Placer/Nevada/South Sutter/North Sacramento Subwatershed

Coon Creek at Brewer Road (CCBRW)

This site captures drainage from the Middle Coon Creek drainage areas as identified in the Placer-Northern Sacramento Drainage Prioritization Table in the Coalition's Watershed Evaluation Report (WER). This site is on Coon Creek about six miles northwest of the town of Lincoln and includes predominantly agricultural acreage. The drainage includes approximately 65,000 irrigated acres of rice, rice, pasture, grains, and sudan grass, with a high percentage of rice acreage.

Sacramento/Amador Subwatershed

Cosumnes River at Twin Cities Road (CRTWN)

This site characterizes flows from the east via the Cosumnes River and a handful of tributary creeks that originate in the foothills. Contributing agricultural acreage including pasture, vineyards, corn and grains. This site captures drainage from the two largest drainages in the subwatershed: Lower Cosumnes and Middle Cosumnes, which drain approximately 55,000 irrigated acres.

Grand Island Drain near Leary Road (GIDLR)

Grand Island is located in the heart of the Sacramento Delta. Crops include alfalfa, corn, safflower, apples, pears, cherries, blueberries, asparagus, grapes, and pasture land. Water is pumped on to the island at several locations. The monitoring site is located just up-slough from a station that returns water to the Delta. Approximately 8,000 acres drains to the monitoring site.

Shasta/Tehama Subwatershed

Anderson Creek at Ash Creek Road (ACACR)

Anderson Creek was identified as the highest priority drainage in the Shasta county portion of the Shasta/Tehama subwatershed. This ranking was based on total irrigated acreage, crop types by acreage, and amount and type of pesticide use. Anderson Creek originates about three miles west of the city of Anderson and then flows into the Sacramento River. Crops are predominantly pasture, followed by walnuts and alfalfa/hay and then smaller amounts of other field and orchard crops. Total irrigated land is 8,989 acres.

Solano/Yolo Subwatershed

Shag Slough at Liberty Island Bridge (SSLIB)

Due to the access difficulties, Toe Drain was replaced with Shag Slough in late 2005. Shag Slough drains a large portion of the South Yolo Bypass. Crops grown in this drainage area include corn, safflower, grain, vineyards, tomatoes, and irrigated pasture. The Liberty Island Bridge site is approximately 2.5 to 3 miles southwest of the Toe Drain in Shag Slough. Like the Toe Drain, it is a tidally influenced site and is likely to contain a mixture of Toe Drain water along with water from other sub-drainages within the South Yolo Bypass and the Southwest Yolo Bypass.

Ulatis Creek at Brown Road (UCBRD)

Ulatis Creek is a flood control project (FCP) that drains the majority of the central portion of Solano County. The Ulatis Creek FCP monitoring site is approximately 8.5 miles south of Dixon and 1.5 miles east of State Highway 113 on Brown Road. This site drains the Cache Slough area, as designated in the Yolo/Solano subwatershed map, and empties into Cache Slough. The major crops in this area include wheat, corn, pasture, tomatoes, alfalfa, Sudan grass, walnuts and almonds.

Willow Slough Bypass at Pole Line Road (WLSPL)

The Willow Slough is a large drainage including approximately 102,000 total acres. Irrigated acreage (excluding rice acreage) is approximately 66,000 acres. Predominant crops in the drainage are grain, pasture, corn, tomatoes, rice, and walnuts.

Z Drain (ZDDIX)

The Z-Drain is a major input into the Yolo Bypass south of Interstate 80. This site drains the SW Yolo Bypass drainage area. The major crops in this drainage include pasture, wheat, corn, tomatoes, and alfalfa.

Upper Feather River Watershed

Agriculture in this subwatershed is localized in mountain valleys that are suitable for grazing and growing alfalfa, hay and grain crops. Monitoring in this subwatershed is therefore focused on characterizing drainage from three valleys with considerable agricultural acreage. Monitoring in this subwatershed has been conducted in coordination with the Upper Feather River Watershed (UFRW) group.

Middle Fork Feather River above Grizzly Creek (MFFRG)

The Middle Fork above Grizzly Creek is below the last irrigated site in the Sierra Valley sub-watershed and has year-round flow in most years. This site replaced Middle Fork Feather River at County Rd A-23, which lacks year-round flows (often dry by mid-July) and has numerous non-agricultural uses, including recreation and water trucks.

Sampling and Analytical Methods

The objective of data collection for this monitoring program is to produce data that represent, as closely as possible, *in situ* conditions of agricultural discharges and water bodies in the Central Valley. This objective will be achieved by using standard accepted methods to collect and analyze surface water and sediment samples. Assessing the monitoring program's ability to meet this objective will be accomplished by evaluating the resulting laboratory measurements in terms of detection limits, precision, accuracy, representativeness, comparability, and completeness, as described in the Coalition's QAPP (SVWQC 2010) and approved by the Water Board.

Surface water samples were collected for analysis of the constituents listed in **Table 2** as specified in the Coalition's Monitoring Plans. Surface water and sediment samples were collected for chemical analyses and toxicity testing. All samples were collected and analyzed using the methods specified in the QAPP; any deviations from these methods were explained.

SAMPLE COLLECTION METHODS

All samples were collected in a manner appropriate for the specific analytical methods used and to ensure that water column samples were representative of the flow in the channel cross-section. Water quality samples were collected using clean techniques that minimize sample contamination. Samples were cross-sectional composite samples or mid-stream, mid-depth grab samples, depending on sampling site and event characteristics. When grab sample collection methods were used, samples were taken at approximately mid-stream and mid-depth at the location of greatest flow (where feasible). Where appropriate, water samples were collected using a standard multi-vertical depth integrating method. Abbreviated sampling methods (i.e., weighted-bottle or dip sample) may be used for collecting representative water samples.

Sediment sampling was conducted at one sampling site (ZDDIX) on an approximately 50 meter reach of the waterbody near the same location. If USGS methods were applicable, sediment sub-samples were collected from five to ten wadeable depositional zones. Depositional zones include areas on the inside bend of a stream or areas downstream from obstacles such as boulders, islands, sand bars, or simply shallow waters near the shore. In low-energy low-gradient waterbodies, composite samples may be collected from the bottom of the channel using appropriate equipment, as specified in the Coalition's QAPP.

Details of the standard operating procedures (SOPs) for collection of surface water and sediment samples are provided in the Coalition's QAPP. The sites and number of samples for the Coalition's 2010 monitoring are summarized in **Table 4**. The Coalition's monitoring strategy for 2010 was designed to characterize high priority drainages that are representative of subwatershed's dominant agricultural crops and practices. This sampling approach was initially designed to comply with the requirements in *Order No. R5-2008-0005* and with the later adopted ILRP MRP (*Monitoring and Reporting Program Order No. R5-2009-0875*). The elements that are key to achieving the Coalition's goals and satisfying the intent of the requirements of the R5-2009-0875 MRP are (1) the Coalition's prioritization process for selecting representative drainages and monitoring sites, and (2) identification of monitoring parameters and schedules appropriate for these representative drainages. This approach is documented in the Coalition's 2009 Monitoring and Reporting Program Plan, as required by *Order No. R5-2008-0005*.

Table 4. Coalition 2010 Monitoring: Planned Annual Sampling Frequency

Subwatershed	Location	Category	Core and Assessment Sampling Schedule	Water Column Sample Events	Sediment Sample Events	Inflependent MP Sediment Samples	pH, conductivity, DO, temperature, flow	Turbidity, TSS, TOC	Nutrients	Pathogen Indicators: *E. Coli*	Trace metals and Hardness	Organophosphate pesticides	Triazines	Organonochlorines in water	Organonochlorines in sediment	Pyrethroids and Chlorpyrifos in sediment	Carbamate and Urea Pesticides	trifluralin	glyphosate	paraquat	Ceriodaphnia, 96-h acute	Pimephales, 96-hour acute	Selenastrum, 96-h short-term chronic	Hyalella, 10-day short-term chronic	grain size in sediments	OPs and pyrethroids and TOC in sediments	Implementation
Butte-Sutter-Yuba	Lower Snake R. at Nuestro Rd	Core & SP	JAN-DEC	12	0	0	12	12	9	12	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Butte-Sutter-Yuba	Sacramento Slough bridge near Karnak	Core & SP	JAN-DEC	12	0	0	12	12	9	12	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Butte-Sutter-Yuba	Lower Honcut Creek at Hwy 70	Core	JAN-DEC	12	0	0	12	12	9	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Butte-Sutter-Yuba	Pine Creek at Nord Gianelli Rd	Core & SP	JAN-DEC	12	0	0	12	12	9	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Butte-Sutter-Yuba	Gilsizer Sl. at G. Washington Rd	SP only		2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Butte-Sutter-Yuba	Butte Slough at Pass Road	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Butte-Sutter-Yuba	Wadsworth Canal at S. Butte Rd	SP only		2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Colusa Glenn	Colusa Drain above KL	Core	JAN-DEC	12	0	0	12	12	8	12	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Colusa Glenn	Freshwater Creek at Gibson Rd	Core & SP	JAN-DEC	12	0	0	12	12	8	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Colusa Glenn	Walker Creek at 99W and CR33	Core & SP	JAN-DEC	12	0	0	12	12	8	12	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Colusa Glenn	Logan Cr. at 4 Mile-Excelsior Rd	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Colusa Glenn	Lurline Creek at 99W	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Colusa Glenn	Rough and Ready Pumping Plant (RD 108)	SP only		8	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Colusa Glenn	Stone Corral Creek near Maxwell Road	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Colusa Glenn	Stony Creek on Hwy 45 near Rd 24	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
El Dorado	North Canyon Creek	Core & SP	DEC-AUG	9	0	0	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
El Dorado	Coon Hollow Creek	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Lake-Napa	Middle Creek u/s Hwy 20	Core	DEC-SEP	10	0	0	10	10	5	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Lake-Napa	McGaugh Slough	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Lake-Napa	Pope Cr u/s from L. Berryessa	Core	DEC-MAY	5	0	0	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	PCWG
Lake-Napa	Capell Cr u/s from L. Berryessa	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	PCWG
Pit River	Pit River at Pittville	Core & SP	APR-NOV	8	0	0	8	8	5	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NECWA
Pit River	Pit River at Canby Bridge	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NECWA
Pit River	Fall R. at Fall R. Ranch Bridge	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NECWA
PNSNSS	Coon Creek at Brewer Rd	Core & SP		12	0	0	12	12	8	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
PNSNSS	Coon Creek at Striplin Rd	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
PNSNSS	Coon Creek at DLX Ranch	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Sac-Amador	Cosumnes River at Twin Cities Rd	Core & SP	JAN-DEC	12	0	0	12	12	8	12	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Sac-Amador	Grand Island Drain near Leary Road	Core & SP	JAN-DEC	12	0	0	12	12	8	12	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Sac-Amador	Dry Creek at Alta Mesa Road	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Sac-Amador	Laguna Creek at Alta Mesa Rd	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Shasta-Tehama	Anderson Creek at Ash Creek Road	Core & SP		12	0	0	12	12	9	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC

Subwatershed	Location	Category	Core and Assessment Sampling Schedule	Water Column Sample Events	Sediment Sample Events	Independent MP Sediment Samples	pH, conductivity, DO, temperature, flow	Turbidity, TSS, TOC	Nutrients	Pathogen Indicators: *E. Coli*	Trace metals and Hardness	Organophosphate pesticides	Triazines	Organonochlorines in water	Organonochlorines in sediment	Pyrethroids and Chlorpyrifos in sediment	Carbamate and Urea Pesticides	trifluralin	glyphosate	paraquat	Ceriodaphnia, 96-h acute	Pimephales, 96-hour acute	Selenastrum, 96-h short-term chronic	Hyalella, 10-day short-term chronic	grain size in sediments	OPs and pyrethroids and TOC in sediments	Implementation
Shasta-Tehama	Burch Creek west of Rawson Rd	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Shasta-Tehama	Coyote Creek at Tyler Road	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Solano-Yolo	Shag Sl. at Liberty Island Bridge	Core		12	0	0	12	12	12	12	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Solano-Yolo	Willow Sl. Bypass at Pole Line	Core & SP		12	0	0	12	12	12	12	0	4	0	0	0	1	6	6	0	0	0	0	0	0	0	0	SVWQC
Solano-Yolo	Cache Cr. at Diversion Dam	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Solano-Yolo	Tule Canal at I-80	SP only		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SVWQC
Solano-Yolo	Ulatis Creek at Brown Road	Core & SP		12	0	0	12	12	12	12	0	0	0	0	0	0	6	6	0	0	0	0	0	0	0	0	SVWQC
Solano-Yolo	Z Drain	SP only		0	0	4	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	SVWQC
Upper Feather	Middle Fork Feather River above Grizzly Creek	Core & SP	MAY-SEP	5	0	0	5	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UFRW
Upper Feather	Spanish Creek below Greenhorn Creek	SP only	MAY-SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UFRW
Upper Feather	Indian Creek below Arlington Bridge	SP only	MAY-SEP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UFRW

Note: *Implementation* indicates whether monitoring is conducted by the Coalition (SVWQC), Northeastern California Water Association (NECWA), Napa County Putah Creek Watershed Group (PCWG), Upper Feather River Watershed Prop 50 Project Team (UFRW), or in coordination with California Rice Commission (CRC).

ANALYTICAL METHODS

Water chemistry samples were analyzed for filtered (dissolved) and unfiltered/whole (total) fractions of the samples. Pesticide analyses were conducted only on unfiltered (whole) samples. Laboratories analyzing samples for this program have demonstrated the ability to meet the minimum performance requirements for each analytical method, including the ability to meet the project-specified quantitation limits (QL), the ability to generate acceptable precision and recoveries, and other analytical and quality control parameters documented in the Coalition's QAPP. Analytical methods used for chemical analyses follow accepted standard methods or approved modifications of these methods, and all procedures for analyses are documented in the QAPP or available for review and approval at each laboratory.

Toxicity Testing and Toxicity Identification Evaluations

Water quality samples were analyzed for toxicity to *Ceriodaphnia dubia*, *Pimephales promelas*, and *Selenastrum capricornutum*. Sediment samples were analyzed for toxicity to *Hyalella azteca*. Toxicity tests were conducted using standard USEPA methods for these species.

- Determination of acute toxicity to *Ceriodaphnia* and *Pimephales* was performed as described in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition* (USEPA 2002a). Toxicity tests with *Ceriodaphnia* and *Pimephales* were conducted as 96-hour static renewal tests, with renewal 48 hours after test initiation. If found to be necessary to control pathogen-related mortality for acute tests with *Pimephales*, test procedures may be modified as described in Geis *et al*. (2003). These modifications consist of using smaller test containers (30 mL), including only two fish per container, and increasing the number of replicates to ten.
- Determination of toxicity to *Selenastrum* was performed using the non-EDTA procedure described in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition* (USEPA 2002b). Toxicity tests with *Selenastrum* were conducted as a 96-hour static non-renewal test.

For all initial screening toxicity tests at each site, 100% ambient water and a control were used for the acute water column tests. If 100% mortality to a test species was observed any time after the initiation of the initial screening toxicity test, a multiple dilution test using a minimum of five sample dilutions was conducted with the initial water sample to estimate the magnitude of toxicity.

Procedures in the Coalition's QAPP state that if any measurement endpoint from any of the three aquatic toxicity tests exhibits a statistically significant reduction in survival (*Ceriodaphnia* and *Pimephales*) or cell density (*Selenastrum*) of greater than or equal to 50% compared to the control, Toxicity Identification Evaluation (TIE) procedures will be initiated using the most sensitive species to investigate the cause of toxicity. The 50% mortality threshold is consistent with the approach recommended in guidance published by USEPA for conducting TIEs (USEPA 1996b), which recommends a minimum threshold of 50% mortality because the probability of completing a successful TIE decreases rapidly for samples with less than this level of toxicity. For samples that met these trigger criteria, Phase 1 TIEs to determine the general class of constituent (*e.g.*, metal, non-polar organics) causing toxicity or pesticide-focused TIEs were conducted. TIE methods generally adhere to the documented USEPA procedures referenced in

the QAPP. TIE procedures were initiated as soon as possible after toxicity is observed to reduce the potential for loss of toxicity due to extended sample storage. Procedures for initiating and conducting TIEs are documented in the QAPP (SVWQC 2010).

Detection and Quantitation Limits

The Method Detection Limit (MDL) is the minimum analyte concentration that can be measured and reported with a 99% confidence that the concentration is greater than zero. The Quantitation Limit (QL) represents the concentration of an analyte that can be routinely measured in the sampled matrix within stated limits and confidence in both identification and quantitation. For this program, QLs were established based on the verifiable levels and general measurement capabilities demonstrated by labs for each method. Note that samples required to be diluted for analysis (or corrected for percent moisture for sediment samples) may have sample-specific QLs that exceed the established QLs. This is unavoidable in some cases.

Project Quantitation Limits

Laboratories generally establish QLs that are reported with the analytical results—these may be called *reporting limits*, *detection limits*, *reporting detection limits*, or several other terms by different laboratories. In most cases, these laboratory limits are less than or equal to the project QLs listed in **Table 5** and **Table 6**. Wherever possible, project QLs are lower than the proposed or existing relevant numeric water quality objectives or toxicity thresholds, as required by the *ILRP*.

All analytical results between the MDL and QL are reported as numerical values and qualified as estimates (Detected, Not Quantified (DNQ), or sometimes, “J-values”).

Table 5. Laboratory Method Detection Limit (MDL) and Quantitation Limit (QL) Requirements for Analyses of Surface Water for Coalition Monitoring and Reporting Program Plan

Method	Analyte	Fraction	Units	MDL	QL
Physical and Conventional Parameters					
EPA 130.2	Hardness, total as $CaCO_3$	Unfiltered	mg/L	3	5
EPA 180.1; SM2130B	Turbidity	Unfiltered	NTU	0.1	1.0
EPA 160.2; SM2540D	Total Suspended Solids (TSS)	Particulate	mg/L	2	3
EPA 415.1; SM5310C	Organic Carbon, Total (TOC)	Unfiltered	mg/L	0.1	0.5
Pathogen Indicators					
SM 9223	*E. Coli* bacteria	NA	MPN/100 mL	2	2
Organophosphorus Pesticides					
EPA 625(m)	Azinphos-methyl	Unfiltered	µg/L	0.05	0.1
EPA 625(m)	Chlorpyrifos	Unfiltered	µg/L	0.005	0.01
EPA 625(m)	Diazinon	Unfiltered	µg/L	0.005	0.01
EPA 625(m)	Demeton-S	Unfiltered	µg/L	0.005	0.01
EPA 625(m)	Dichlorvos	Unfiltered	µg/L	0.005	0.01
EPA 625(m)	Dimethoate	Unfiltered	µg/L	0.005	0.01
EPA 625(m)	Disulfoton	Unfiltered	µg/L	0.01	0.02
EPA 625(m)	Malathion	Unfiltered	µg/L	0.005	0.01
EPA 625(m)	Methamidophos	Unfiltered	µg/L	0.05	0.1
EPA 625(m)	Methidathion	Unfiltered	µg/L	0.01	0.02
EPA 625(m)	Parathion, Methyl	Unfiltered	µg/L	0.01	0.02
EPA 625(m)	Parathion, Ethyl	Unfiltered	µg/L	0.01	0.02
EPA 625(m)	Phorate	Unfiltered	µg/L	0.01	0.02
EPA 625(m)	Phosmet	Unfiltered	µg/L	0.05	0.1
Organochlorine Pesticides					
EPA 625(m)	4,4'-DDT (o,p' and p,p')	Unfiltered	µg/L	.001	.005
EPA 625(m)	4,4'-DDE (o,p' and p,p')	Unfiltered	µg/L	.001	.005
EPA 625(m)	4,4'-DDD (o,p' and p,p')	Unfiltered	µg/L	.001	.005
EPA 625(m)	Dieldrin	Unfiltered	µg/L	.001	.005
EPA 625(m)	Endrin	Unfiltered	µg/L	.001	.005
EPA 625(m)	Methoxychlor	Unfiltered	µg/L	.001	.005
EPA 625(m)	Aldrin	Unfiltered	µg/L	.001	.005
EPA 625(m)	Dicofol	Unfiltered	µg/L	.05	.1
EPA 625(m)	Dieldrin	Unfiltered	µg/L	.001	.005
EPA 625(m)	Chlordane	Unfiltered	µg/L	.001	.005
EPA 625(m)	Endrin	Unfiltered	µg/L	.001	.005
EPA 625(m)	Endosulfan	Unfiltered	µg/L	.001	.005
EPA 625(m)	Heptachlor	Unfiltered	µg/L	.001	.005
EPA 625(m)	Heptachlor epoxide	Unfiltered	µg/L	.001	.005
EPA 625(m)	Hexachlorocyclohexane	Unfiltered	µg/L	.001	.005
EPA 625(m)	Methoxychlor	Unfiltered	µg/L	.001	.005
EPA 625(m)	Toxaphene	Unfiltered	µg/L	.01	.05

Method	Analyte	Fraction	Units	MDL	QL
Carbamate and Urea Pesticides					
EPA 8321	Aldicarb	Unfiltered	µg/L	0.2	0.4
EPA 8321	Carbaryl	Unfiltered	µg/L	0.05	0.07
EPA 8321	Carbofuran	Unfiltered	µg/L	0.05	0.07
EPA 8321	Diuron	Unfiltered	µg/L	0.2	0.4
EPA 8321	Linuron	Unfiltered	µg/L	0.2	0.4
EPA 8321	Methiocarb	Unfiltered	µg/L	0.2	0.4
EPA 8321	Methomyl	Unfiltered	µg/L	0.05	0.07
EPA 8321	Oxamyl	Unfiltered	µg/L	0.2	0.4
Pyrethroid Pesticides					
EPA 625(m)	Biphenthrin	Unfiltered	µg/L	.005	.025
EPA 625(m)	Cyfluthrin	Unfiltered	µg/L	.005	.025
EPA 625(m)	Cypermethrin	Unfiltered	µg/L	.005	.025
EPA 625(m)	Esfenvalerate/Fenvalerate	Unfiltered	µg/L	.005	.025
EPA 625(m)	Lambda-Cyhalothrin	Unfiltered	µg/L	.005	.025
EPA 625(m)	Permethrin	Unfiltered	µg/L	.005	.025
Herbicides					
EPA 625(m)	Atrazine	Unfiltered	µg/L	0.005	0.01
EPA 625(m)	Simazine	Unfiltered	µg/L	0.005	0.01
EPA 625(m)	Cyanazine	Unfiltered	µg/L	0.005	0.01
EPA 625(m)	Trifluralin	Unfiltered	µg/L	0.001	0.005
EPA 549.2	Paraquat	Unfiltered	µg/L	0.2	0.5
EPA 547	Glyphosate	Unfiltered	µg/L	4	5
Trace Elements					
EPA 200.8	Arsenic	Filtered, Unfiltered	µg/L	0.08	0.5
EPA 2008	Boron	Filtered, Unfiltered	µg/L	1	10
EPA 200.8	Cadmium	Filtered, Unfiltered	µg/L	0.04	0.1
EPA 200.8	Copper	Filtered, Unfiltered	µg/L	0.2	0.5
EPA 200.8	Lead	Filtered, Unfiltered	µg/L	0.02	0.25
EPA 200.8	Molybdenum	Filtered, Unfiltered	µg/L	0.01	0.1
EPA 200.8	Nickel	Filtered, Unfiltered	µg/L	0.2	0.5
EPA 200.8	Selenium	Unfiltered	µg/L	0.5	1
EPA 200.8	Zinc	Filtered, Unfiltered	µg/L	0.6	1
Nutrients					
EPA 351.3; EPA 351.2	Total Kjeldahl Nitrogen	Unfiltered	mg/L	0.07	0.1
EPA 353.2	Nitrate + Nitrite as N	Unfiltered	mg/L	0.02	0.05
EPA 350.1; EPA 350.2	Ammonia as N	Unfiltered	mg/L	0.02	0.1
EPA 365.2; SM4500-P E	Soluble Orthophosphate	Filtered	mg/L	0.01	0.05
EPA 365.2; SM4500-P E	Phosphorus, Total	Unfiltered	mg/L	0.02	0.05

Table 6. Laboratory Method Detection Limit (MDL) and Quantitation Limit (QL) Requirements for Analyses of Sediments for the Coalition Monitoring and Reporting Program Plan

Method	Analyte	Fraction	Units	MDL	QL	LAB
Physical and Conventional Parameters						
SM 2560D	Grain Size Analysis	various	% fraction	NA	1	ABC
EPA 160.3	Solids (TS)	Total	%	NA	0.1	CALTEST
EPA 9060	Organic Carbon	Total	mg/kg d.w.	50	200	AMS
Pyrethroids and Chlorpyrifos						
EPA 8270C(m)	Biphenthrin	Total	ng/g d.w.	0.1	1	CRG
EPA 8270C(m)	Chlorpyrifos	Total	ng/g d.w.	0.1	3	CRG
EPA 8270C(m)	Cyfluthrin	Total	ng/g d.w.	0.1	1	CRG
EPA 8270C(m)	Cypermethrin	Total	ng/g d.w.	0.1	1	CRG
EPA 8270C(m)	Esfenvalerate/Fenvalerate	Total	ng/g d.w.	0.15	1	CRG
EPA 8270C(m)	Fenpropathrin	Total	ng/g d.w.	0.15	1	CRG
EPA 8270C(m)	Lambda-Cyhalothrin	Total	ng/g d.w.	0.1	1	CRG
EPA 8270C(m)	Permethrin	Total	ng/g d.w.	0.1	1	CRG
Organochlorine Pesticides						
EPA 8270C(m)	4,4'-DDT (o,p' and p,p')	Total	ng/g d.w.	1	5	CRG
EPA 8270C(m)	4,4'-DDE (o,p' and p,p')	Total	ng/g d.w.	1	5	CRG
EPA 8270C(m)	4,4'-DDD (o,p' and p,p')	Total	ng/g d.w.	1	5	CRG
EPA 8270C(m)	Dieldrin	Total	ng/g d.w.	1	5	CRG
EPA 8270C(m)	Endrin	Total	ng/g d.w.	1	5	CRG
EPA 8270C(m)	Methoxychlor	Total	ng/g d.w.	1	5	CRG

Monitoring Results

The following sections summarize the monitoring conducted by the Coalition and its subwatershed partners in 2010 (October 2009 through September 2010).

SUMMARY OF SAMPLE EVENTS CONDUCTED

This report presents monitoring results from twelve Coalition sampling events (Events 044-055), as well as data for events conducted by coordinating Subwatershed monitoring programs between October 2009 and September 2009. Samples collected for all of these events are listed in **Table 8**. Monitoring conducted by Subwatershed monitoring programs coordinating with the Coalition monitoring effort is included in this document and also summarized in **Table 8**. Samples collected for organochlorine pesticides in sediment are summarized in **Table 9**.

The Coalition and Subwatershed monitoring events were conducted throughout the year. Event monitoring analyses included water chemistry only. During the 2010 monitoring year, pesticides were generally monitored during months when higher use is typical. Sediment chemistry testing for pyrethroids and chlorpyrifos was also conducted by the Coalition at ZDDIX in April, May, July, and September as part of the source evaluation efforts for the Management Plan requirement for sediment toxicity. The sites and parameters for all events were monitored in accordance with the Coalition's current MRP (*Order No. R5-2009-0875*) and QAPP.

The field logs for all Coalition and Subwatershed samples collected for the October 2009 through September 2010 events, as well as associated photographs, are provided in **Appendix A**.

Table 7. Sampling for 2010 Coalition Monitoring

		Sample Count		2009			2010								
Agency/Subwatershed	**Site ID**	**Planned**	**Collected**	**OCT**	**NOV**	**DEC**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**
PCWG															
PopeCreek	PCULB	6	6	-	-	W	W	W	W	W	W	-	-	-	-
NECWA															
PitRiver	PRPIT	8	8	W	-	W	-	-	-	W	W	W	W	W	W
UFRW															
UpperFeatherRiver	MFFGR	5	5	-	-	-	-	-	-	-	W	W	W	W	W
SVWQC															
ButteYubaSutter	BTTSL	1	1	-	W	-	-	-	-	-	-	-	-	-	-
	GILSL	2	2	-	-	-	W	W	-	-	-	-	-	-	-
	LHNCT	12	12	W	W	W	W	W	W	W	W	W	W	W	W
	LSNKR	12	12	W	W	W	W	W	W	W	W	W	W	W	W
	PNCGR	12	7	D	D	W	F	W	W	W	W	W	W	D	D
	SSKNK	8	8	W	W	W	W	W	W	W	W	-	-	-	-
	WADCN	2	2	-	-	-	W	W	-	-	-	-	-	-	-
ColusaGlenn	COLDR	8	8	W	W	W	W	W	W	W	-	-	-	-	W
	FRSHC	12	12	W	W	W	W	W	W	W	W	W	W	W	W
	RARPP	8	8	-	-	-	W	W	W	W	W	W	W	W	-
	WLKCH	12	12	W	W	W	W	W	W	W	W	W	W	W	W
ElDorado	NRTCN	6	6	-	-	W	W	W	W	W	W	-	-	-	-
LakeNapa	MDLCR	9	9	-	-	-	W	W	W	W	W	W	W	W	W
PNSSNS	CCBRW	12	11	W	W	W	F	W	W	W	W	W	W	W	W
	CCDOW	0	1	-	-	-	W	-	-	-	-	-	-	-	-
SacramentoAmador	CRTWN	12	10	W	W	W	W	W	W	W	W	W	W	D	D
	GIDLR	12	12	W	W	W	W	W	W	W	W	W	W	W	W
ShastaTehama	ACACR	12	12	W	W	W	W	W	W	W	W	W	W	W	W
SolanoYolo	SSLIB	12	12	W	W	W	W	W	W	W	W	W	W	W	W
	UCBRD	12	12	W	W	W	W	W	W	W	W	W	W	W	W
	WLSPL	12	12	W	W	W	W	W	W	W	W	W	W	W	W
	ZDDIX	4	4	-	-	-	-	-	-	S	S	-	S	-	S
	Totals	**211**	**204**												

Notes:
W = Water sample collected
S = Sediment chemistry sample collected
D = Site was dry; no samples collected.
F = Site flooded; Samples not collected
"—" = no samples planned.
PCWG = Putah Creek Watershed Group
NECWA = Northeastern California Watershed Association
UFRW = Upper Feather River Watershed Group
SVWQC = Sacramento Valley Water Quality Coalition
PNSSNS = PlacerNevadaSSutterNSacramento

SAMPLE CUSTODY

All samples that were collected for the Coalition monitoring effort met the requirements for sample custody. Sample custody must be traceable from the time of sample collection until results are reported. A sample is considered under custody if:

- it is in actual possession;
- it is in view after in physical possession; and
- it is placed in a secure area (i.e., accessible by or under the scrutiny of authorized personnel only after in possession).

The chain-of-custody forms (COCs) for all samples collected by Coalition contractors for the monitoring events conducted from October 2009 through September 2010 are included with the related lab reports and are provided in **Appendix B**. All COCs for *ILRP* monitoring conducted by Coalition partners during this same period are also provided in **Appendix B** with their associated lab reports.

QUALITY ASSURANCE RESULTS

The Data Quality Objectives (DQOs) used to evaluate the results of the Coalition monitoring effort are detailed in the Coalition's QAPP (SVWQC 2010). These DQOs are the detailed quality control specifications for precision, accuracy, representativeness, comparability, and completeness. These DQOs are used as comparison criteria during data quality review to determine if the minimum requirements have been met and the data may be used as planned.

Results of Field and Laboratory QC Analyses

Quality Control (QC) data are summarized in **Table 8** through **Table 15** and discussed below. All program QC results are included with the lab reports in **Appendix B** of this document, and any qualifications of the data provided were retained and are presented with the tabulated monitoring data. Monitoring results for all programs discussed are tabulated in **Appendix C**.

Hold Times

Results were evaluated for compliance with required preparation and analytical hold times. All analyses met the target data quality objectives for hold times.

Method Detection Limits and Quantitation Limits

Target Method Detection Limits (MDL) and Quantitation Limits (QL) were assessed for all parameters. With the exceptions discussed below, analyses met the target data quality objectives:

- 3 of 310 herbicide results and 7 of 1176 organophosphosphate pesticide results had QLs greater than the project DQO due to the laboratory not meeting the project DQO or to receiving insufficient sample volume due to bottle breakage. The elevated QLs did not affect assessment of exceedances or toxicity.
- 2 of 3 hardness results had MDLs and QLs greater than the project DQO due to dilution required to analyze the samples. The elevated analytical QLs for hardness were adequate to assess exceedances of associated water quality objectives for trace metals.

- 1 of 108 triazine pesticide results had MDLs marginally greater than the project DQO due to the laboratory not meeting the project DQO. Assessment of compliance and toxicity potential were not affected for any results.
- 1 of 153 total phosphorus as P results had QLs greater than the project DQO due to the laboratory not meeting the project DQO.
- 3 of 45 dissolved orthophosphate results had QLs greater than the project DQO due to the laboratory not meeting the project DQO.
- 12 of 153 total Nitrate+Nitrite, as N results had MDLs and QLs greater than the project DQO due to the laboratory not meeting the project DQO. Assessment of compliance was not affected for any results.
- 2 of 34 total Kjeldahl nitrogen (TKN) results had MDLs and QLs greater than the project DQO due to the laboratory not meeting the project DQO.
- 11 of 207 total organic carbon (TOC) results had QLs greater than the project DQO due to dilution required to analyze the samples.
- 9 of 210 total suspended solids (TSS) results had QLs greater than the project DQO due to dilution required to analyze the samples.
- 6 of 229 turbidity results had MDLs greater than the project DQO due to dilution required to analyze the samples.

Field Blanks

Field blanks were collected and analyzed for all analyses (**Table 8**). With the exceptions discussed below, analytes of interest were generally not detected in field blanks:

- Nitrate+nitrite, as N was detected above the QL in two field blanks. This resulted in two environmental results being qualified due to potential contamination. The qualification did not affect assessment of any exceedances.
- Total phosphorus was detected above the QL in five field blank analyses. One environmental result required qualification. Assessment of exceedances was not affected.
- Total suspended solids was detected above the QL in one field blank analysis. One environmental result required qualification. Assessment of exceedances was not affected.
- Zinc was detected above the QL in one field blank analysis. One environmental result required qualification. Assessment of exceedances was not affected.
- Turbidity was detected above the QL in six field blank analyses. One environmental result required qualification. Assessment of exceedances was not affected.
- Total organic carbon was detected above the QL in one field blank analysis. One environmental sample was qualified.
- Hardness was detected above the QL in one field blank analysis. No environmental results were qualified.

Field Duplicates

Field duplicate samples were collected and analyzed for all parameters (**Table 9**). The data quality objective for field duplicates is a Relative Percent Difference (RPD) not exceeding 25% or a difference between duplicates that is less than the QL. With the exceptions discussed below, all field replicates met this data quality objective:

- Field duplicate RPD results exceeded the DQO for one nitrate + nitrite as N test. One environmental result was qualified as estimated on this basis. The qualifications did not affect assessment of any exceedances.
- Field duplicate RPD results exceeded the DQO for one turbidity test. One environmental result was qualified as estimated on this basis. The qualifications did not affect assessment of any exceedances.

Method Blanks

Method blanks were analyzed for TSS, TOC, hardness, turbidity, trace metals, nutrients, *E. coli*, herbicides, and pesticides (**Table 10**). The data quality objective for method blanks is no detectible concentrations of the analyte of interest above the QL. All analyses met this data quality objective.

Laboratory Control Spikes and Surrogates

Laboratory Control Spike (LCS) recoveries were analyzed for TSS, TOC, hardness, turbidity, trace metals, nutrients, and pesticides (**Table 11**). Surrogate recoveries were analyzed for organophosphorus, organochlorine, and triazine pesticides (**Table 12**). The data quality objective for Laboratory Control Spikes (LCS) is 80-120% recovery of the analytes of interest for most analytes. The data quality objectives for Laboratory Control Sample recoveries and surrogate recoveries of pesticides vary by analyte and surrogate and are based on the standard deviation of actual recoveries for the method.

- The results of 14 LCS recovery analyses for herbicides by EPA 8321A were outside the acceptable recovery DQO. One analytical result was qualified as low biased as a result of low recoveries. A total of 13 analytical results were qualified as high biased as a result of high recoveries.
- The result of 1 LCS recovery analysis for organochlorine pesticides by EPA 625 was outside the acceptable recovery DQO. One analytical result was qualified as low biased as a result of low recoveries. No analytical results were qualified as high biased as a result of high recoveries.
- The results of 30 LCS recovery analyses for organophosphate pesticides by EPA 625 were outside the acceptable recovery DQO. A total of 17 analytical results were qualified as low biased as a result of low recoveries. A total of 12 analytical results were qualified as high biased as a result of high recoveries.
- The results of 10 LCS recovery analyses for pyrethroid pesticides in sediment by EPA 8270C were outside the acceptable recovery DQO. No analytical results were qualified as low biased as a result of low recoveries. A total of 10 analytical results were qualified as high biased as a result of high recoveries.

- The results of 2 LCS recovery analyses for triazine pesticides by EPA 625 were outside the acceptable recovery DQO. Two analytical results were qualified as low biased as a result of low recoveries. No analytical results were qualified as high biased as a result of high recoveries.
- The results of 3 surrogate recovery analysis for organophosphorus, organochlorine, and triazine pesticides by EPA 625 were outside the acceptable recovery DQO. No analytical results were qualified as low biased as a result of low recoveries. Three analytical results were qualified as high biased as a result of high recoveries.
- Recoveries of continuing calibration verification (CCV) standards were outside of the method DQO for two samples analyzed for triazine pesticides by EPA 625m. The samples were reanalyzed and the CCV results failed a second time; therefore, the results for this analysis were not reportable.

Laboratory Duplicates

Laboratory Duplicates were analyzed for TOC, TSS, turbidity, and pesticides (**Table 13**). The data quality objective for laboratory duplicates is a Relative Percent difference (RPD) not exceeding 25%. All laboratory duplicate analyses met this data quality objective.

Matrix Spikes and Matrix Spike Duplicates

Matrix Spikes and Matrix Spike Duplicates were analyzed for trace metals, nutrients, and pesticides (**Table 14**). The data quality objective for matrix spikes is 80-120% recovery of most analytes of interest. The data quality objective for matrix spike recoveries of pesticides varies for each analyte or surrogate and is based on the standard deviation of actual recoveries for the method. With the exceptions discussed below, all analyses met these data quality objectives:

- Matrix Spike recoveries for 4 nitrate+nitrite as N analyses by EPA 351.3 were outside the DQO. 3 associated environmental results required qualification as high biased. Assessment of exceedances was not affected.
- Matrix Spike recoveries for 21 pesticide analyses by EPA 8321A were outside the DQO. 13 results were high biased and one required qualification. 8 associated results required qualification as low biased.
- Matrix Spike recoveries for 40 pesticide analyses by EPA 8270Cm were outside the DQO. 39 results were high biased and 3 required qualification. Only one result required qualification as low biased.
- Matrix Spike recoveries for 99 pesticide analyses by EPA 625m were outside the DQO. All 35 results associated with high recoveries were below detection did not require qualification. 65 associated results required qualification as low biased.
- For Event 050, no matrix spikes were run on water samples; however, matrix spikes were run on sediment samples and the results for water analyses were accepted based on LCS and surrogate recoveries.

Matrix Spike RPDs

Matrix Spikes and Matrix Spike Duplicates and the associated Relative Percent Differences (RPDs) were analyzed for trace metals, nutrients, and pesticides (**Table 15**). The data quality objective for matrix spike duplicates is an RPD not exceeding 25%. With the exceptions discussed below, all analyses met these data quality objectives:

- Matrix spike duplicate results exceeded the DQO on 5 results for pesticides by EPA 8270C. Five environmental results were qualified as estimated on this basis. The qualifications did not affect assessment of any exceedances.
- Matrix spike duplicate results exceeded the DQO for 27 results for pesticides by EPA 625. 17 results were qualified as estimated on this basis. The qualifications did not affect assessment of any exceedances.
- Matrix spike duplicate results exceeded the DQO for 25 results for pesticides by EPA 8321A. All 25 results were qualified as estimated on this basis. The qualifications did not affect assessment of any exceedances.

Summary of Precision and Accuracy

Based on the QC data for the monitoring discussed above, the precision and accuracy of the majority of monitoring results meet the DQOs, and there were no systematic sampling or analytical problems. These data are adequate for the purposes of the Coalition's monitoring program, and few results required qualification. Of the 187 total qualified data, 2 results were qualified as *estimated* due to high variability in lab or field replicate analyses, 59 results were qualified as *high biased* or *low biased* and 6 results were potentially affected by contamination and qualified as *upper limits*. Of the results qualified as *upper limits*, one was below the QL, and none of the data qualified as *upper limits* was an exceedance. Of the 4,807 environmental analytical results generated from October 2009 through September 2010, 4,694 results required no qualification, resulting in 97.7% valid and unqualified data with no restrictions on use.

Completeness

The objectives for completeness are intended to apply to the monitoring program as a whole. As summarized in **Table 7**, 204 of the 211 initial water column and sediment toxicity sample events planned by the Coalition and coordinating programs were conducted, for an overall sample event success rate of 97%. Seven (7) planned water column samples were not collected because the respective sites were dry or inaccessible due to flooding. Planned sampling that was not completed successfully is summarized below:

- Samples for two events planned for Cosumnes River (CRTWN) were not collected because the sampling site was dry.
- Samples for four events planned for Pine Creek (PNCGR) were not collected because the sampling site was dry. Samples for one planned event at PNCGR were not collected due to site inaccessibility from flooding.
- One sample planned for Coon Creek (CCBRW) was collected at an alternate site because access was prevented by flooding

Sample containers are occasionally lost or broken in transit due to shipping and handling factors beyond the Coalition's control. Broken containers are relevant to program completeness if the incident prevents the Coalition from completing the required sample analyses or if they are analyzed and may potentially affect analytical quality. In general, broken bottles do not impact completeness of analyses. In most cases, sufficient remaining sample volume is available to complete the planned environmental and quality assurance analyses. If program completeness was affected, the issue of broken bottles is discussed in the AMR. The protocol that is followed if a broken bottle is reported is to contact the sampling crew and let them know of the issue so that they may review their packing and shipping procedures. Any known shipping and handling deficiencies are also noted. If samples lost or broken in shipping affect overall completeness for specific analyses at a specific location and the analyses are relevant to synoptically collected toxicity samples, additional sample volume is preferentially aliquoted from the sample collected for toxicity. If additional sample volume from another appropriately collected and preserved sample container is not available, the analyses are rescheduled for future events to ensure program completeness objectives are met. It has not been the practice of the Coalition report on these sample management logistics in the AMR when they have not affected holding times or analytical quality.

- Five of twelve bottles (collected in October 2009 for Event 45) to be analyzed for triazines were received broken at CRG Marine Laboratories. There was sufficient additional sample remaining from QA samples to complete the scheduled environmental analyses. However, the results for the analyses did not meet the internal standard recovery DQO and were rejected.
- One of 38 bottles received by CRG Marine Laboratories was received broken and one bottle was missing the cap for samples collected in January 2010 for Event 47. There was sufficient sample remaining from QA samples to complete the scheduled environmental and QA analyses.
- Samples collected in February 2010 for Event 48 were received by CRG Marine Laboratories above the recommended temperature range (6˚C), and one bottle was broken. The broken bottle resulted in reporting limits that were slightly above the program DQO for 7 organophosphorus pesticide analytes in one sample, but assessment of exceedances was not affected. The appropriate SWAMP qualification[2] (BY) has been added to the Coalition's dataset and the revised results will be resubmitted to the Water Board to update their ILRP database.
- One sediment sample was received in a broken container (051-ZDDIX-SE1, sampled on 5/18/2010): the sample was analyzed based on the receiving lab's assessment that the broken container minimally affected the sample quality, either by contamination or analyte degradation. Although the breakage was noted in the lab report narrative, the assessment of sample integrity was not explicitly documented and the results were not appropriately qualified in the report or the EDD. The appropriate SWAMP qualification (BRKA) has been added to the Coalition's dataset and the revised results will be resubmitted to the Water Board to update their ILRP database.

[2] A full list of SWAMP qualification codes and their definitions is available here: http://ftp.mpsl.mlml.calstate.edu/DisplayLookUp.php?List=QALookUp

With the exception of the two analyses for simazine that were rejected due to failed internal standard recoveries, all samples collected were analyzed, for an analytical success rate of greater than 99%.

As summarized in **Table 7**, 4 of the 4 sediment samples planned by the Coalition for pesticide analysis were collected for an overall sample event success rate of 100%. In addition, all of the sediment samples collected were analyzed for pyrethroids and chlorpyrifos, for an analytical success rate of 100% in this matrix.

Table 8. Summary of Field Blank Quality Control Sample Evaluations for 2010 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
EPA 350.2 / SM20-4500-NH3 C	Ammonia, Total as N	< PQL	3	3	100%
EPA 8321A	Carbamate Pesticides	< PQL	78	78	100%
SM20-9223	*E. coli*	< PQL	14	14	100%
EPA 354.1 / SM4500-NO2 B	Hardness	< PQL	1	0	0%
EPA 8321A/625	Herbicides	< PQL	84	84	100%
EPA 353.2	Nitrate+Nitrite, as N	< PQL	13	11	85%
EPA 625	Organophosphate Pesticides	< PQL	221	221	100%
EPA 365.2 / SM20-4500-P E	Orthophosphate/Phosphorus, as P	< PQL	17	12	71%
EPA 160.1 / SM2540C	Surrogates	< PQL	38	38	100%
SM20-9221 B/E	Total Coliforms	< PQL	1	1	100%
EPA 351.3 / SM4500-NH3 C	Total Kjeldahl Nitrogen	< PQL	3	3	100%
SM20-5310 B/ SM5310C	Total Organic Carbon	< PQL	13	12	92%
EPA 160.2 / SM2540D	Total Suspended Solids	< PQL	14	13	93%
EPA 200.8	Trace Metals	< PQL	9	8	89%
EPA 625	Triazine Pesticides	< PQL	36	36	100%
EPA 180.1	Turbidity	< PQL	14	8	57%
Totals			**559**	**542**	**96.9%**

Table 9. Summary of Field Duplicate Quality Control Sample Results for 2010 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
EPA 350.2 / SM20-4500-NH3 C	Ammonia, Total as N	RPD ≤25%	3	3	100%
EPA 8321A	Carbamate Pesticides	RPD ≤25%	91	91	100%
Toxicity	*Ceriodaphnia, Selenastrum*	RPD ≤25%	4	4	100%
SM20-9223	*E. coli*	RPD ≤25%	13	13	100%
EPA 8321A/625	Herbicides	RPD ≤25%	96	96	100%
EPA 353.2	Nitrate+Nitrite, as N	RPD ≤25%	13	12	92%
EPA 625	Organochlorine Pesticides	RPD ≤25%	29	29	100%
EPA 625	Organophosphate Pesticides	RPD ≤25%	221	221	100%
EPA 365.2 / SM20-4500-P E	Orthophosphate/Phosphorus, as P	RPD ≤25%	16	16	100%
SM20-9221 B/E	Total Coliforms	RPD ≤25%	1	1	100%
EPA 351.3 / SM4500-NH3 C	Total Kjeldahl Nitrogen	RPD ≤25%	3	3	100%
SM20-5310 B/ SM5310C	Total Organic Carbon	RPD ≤25%	14	14	100%
EPA 160.2 / SM2540D	Total Suspended Solids	RPD ≤25%	12	12	100%
EPA 200.8	Trace Metals	RPD ≤25%	6	6	100%
EPA 625	Triazine Pesticides	RPD ≤25%	24	24	100%
EPA 180.1	Turbidity	RPD ≤25%	13	12	92%
Totals			**559**	**557**	**99.5%**

Table 10. Summary of Method Blank Results for 2010 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
EPA 350.2 / SM20-4500-NH3 C	Ammonia, Total as N	< MDL	13	13	100%
EPA 8321A	Carbamate Pesticides	< MDL	91	91	100%
SM20-9223	E. coli	< MDL	40	40	100%
EPA 130.2 / SM2340B	Hardness as CaCO3	< MDL	2	2	100%
EPA 8321A/625	Herbicides	< MDL	105	105	100%
EPA 353.2	Nitrate+Nitrite, as N	< MDL	46	46	100%
EPA 625	Organochlorine Pesticides	< MDL	33	33	100%
EPA 625	Organophosphate Pesticides	< MDL	413	413	100%
EPA 365.2 / SM20-4500-P E	Orthophosphate/Phosphorus, as P	< MDL	54	54	100%
EPA 8270C	Pyrethroid Pesticides in Sediment	< MDL	44	44	100%
EPA 351.3 / SM4500-NH3 C	Total Kjeldahl Nitrogen	< MDL	13	13	100%
SM20-5310 B/ SM5310C	Total Organic Carbon	< MDL	58	58	100%
EPA 160.2 / SM2540D	Total Suspended Solids	< MDL	50	50	100%
EPA 200.8	Trace Metals	< MDL	39	39	100%
EPA 625	Triazine Pesticides	< MDL	36	36	100%
EPA 180.1	Turbidity	< MDL	48	48	100%
Totals			**1085**	**1085**	**100%**

Table 11. Summary of Lab Control Spike Results for 2010 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
EPA 350.2 / SM20-4500-NH3 C	Ammonia, Total as N	90 - 110%	13	13	100%
EPA 8321A	Carbamate Pesticides	[1]	91	91	100%
EPA 130.2 / SM2340B	Hardness as CaCO3	80 - 120%	2	2	100%
EPA 8321A/625	Herbicides	50 - 141%	125	111	89%
EPA 353.2	Nitrate+Nitrite, as N	90 - 110%	46	46	100%
EPA 625	Organochlorine Pesticides	[1]	66	65	98%
EPA 625	Organophosphate Pesticides	[1]	814	784	96%
EPA 365.2 / SM20-4500-P E	Orthophosphate/Phosphorus, as P	90 - 110%	54	54	100%
EPA 8270C	Pyrethroid Pesticides in Sediment	[1]	88	78	89%
EPA 351.3 / SM4500-NH3 C	Total Kjeldahl Nitrogen	90 - 110%	13	13	100%
SM20-5310 B/ SM5310C	Total Organic Carbon	80 - 120%	61	61	100%
EPA 160.2 / SM2540D	Total Suspended Solids	80 - 120%	49	49	100%
EPA 200.8	Trace Metals	85 - 115%	39	39	100%
EPA 625	Triazine Pesticides	80 - 120%	72	70	97%
EPA 180.1	Turbidity	90 - 110%	50	50	100%
Totals			**1583**	**1526**	**96.3%**

1. Data Quality Objectives for pesticide LCS recoveries vary by parameter and are based on 3x the standard deviation of the lab's actual recoveries for each parameter.

Table 12. Summary of Surrogate Recovery Results for 2010 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
EPA 625	Organophosphorus, Organochlorine and Triazine Pesticides	[1]	703	700	99.6%
Totals			**703**	**700**	**99.6%**

1. Data Quality Objectives for pesticide surrogate recoveries vary by parameter and are based on 3x the standard deviation of the lab's actual recoveries for each parameter.

Table 13. Summary of Lab Duplicate Results for 2010 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
EPA 8321A/625	Herbicides	RPD ≤25%	5	5	100%
EPA 625	Organochlorine Pesticides	RPD ≤25%	29	29	100%
EPA 625	Organophosphate Pesticides	RPD ≤25%	125	125	100%
SM20-5310 B/ SM5310C	Total Organic Carbon	RPD ≤25%	1	1	100%
EPA 160.2 / SM2540D	Total Suspended Solids	RPD ≤25%	8	8	100%
EPA 625	Triazine Pesticides	RPD ≤25%	24	24	100%
EPA 180.1	Turbidity	RPD ≤25%	23	23	100%
Totals			**215**	**215**	**100%**

Table 14. Summary of Matrix Spike Recovery Results for 2010 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
EPA 8321A	Carbamate Pesticides	[1]	182	175	96%
EPA 8321A/625	Herbicides	80 - 120%	206	192	93%
EPA 353.2	Nitrate+Nitrite, as N	90 - 110%	18	14	78%
EPA 625	Organochlorine Pesticides	80 - 110%	66	58	88%
EPA 625	Organophosphate Pesticides	[1]	668	569	85.2%
EPA 365.2 / SM20-4500-P E	Orthophosphate/Phosphorus, as P	90 - 110%	34	34	100%
EPA 8270C	Pyrethroid Pesticides in Sediment	[1]	88	48	55%
SM20-5310 B/ SM5310C	Total Organic Carbon	80 - 120%	40	40	100%
EPA 200.8	Trace Metals	85 - 115%	12	12	100%
EPA 625	Triazine Pesticides	50 - 141%	72	64	89%
Totals			**1386**	**1206**	**87.0%**

1. Data Quality Objectives for pesticide matrix spike recoveries vary by parameter and are based on 3x the standard deviation of the lab's actual recoveries for each parameter.

Table 15. Summary of Matrix Spike Duplicate Precision Results for 2010 Coalition Monitoring

Method	Analyte	DQO	Number of Pairs Analyzed	Number Passing	% Success
EPA 8321A	Carbamate Pesticides	RPD ≤20%	91	78	86%
EPA 8321A/625	Herbicides	RPD ≤20%	103	91	88%
EPA 353.2	Nitrate+Nitrite, as N	RPD ≤20%	9	9	100%
EPA 625	Organochlorine Pesticides	RPD ≤20%	33	32	97%
EPA 625	Organophosphate Pesticides	RPD ≤30%	334	306	91.6%
EPA 365.2 / SM20-4500-P E	Orthophosphate/Phosphorus, as P	RPD ≤20%	17	17	100%
8270C	Pyrethroid Pesticides in Sediment	RPD ≤30%	44	39	89%
SM20-5310 B/ SM5310C	Total Organic Carbon	RPD ≤20%	20	20	100%
EPA 200.8	Trace Metals	RPD ≤20%	6	6	100%
EPA 625	Triazine Pesticides	RPD ≤20%	36	36	100%
Totals			**693**	**634**	**91.5%**

TABULATED RESULTS OF LABORATORY ANALYSES

Copies of final laboratory reports, including chromatographs for pesticide analyses, and all reported QA data for Coalition monitoring results are provided in **Appendix B**. The tabulated results for all validated and Quality Assurance-evaluated (QA) data are provided in **Appendix C**. These data were submitted previously with the quarterly data submittals.

Data Interpretation

SUMMARY OF SAMPLING CONDITIONS

Samples were collected throughout the year for the Coalition (see **Table 7**, Sampling for 2010 Coalition Monitoring). Sample collection for the October 2009 – March 2010 Coalition Storm Season was characterized by above-average precipitation during the months of October and January, and below-average precipitation during the months of November, December, February, and March.[3] Sample collection for the April 2010 – September 2010 Coalition Irrigation Season was characterized by predominantly dry weather with mean temperatures mostly lower than historical temperatures.

The 2010 Water Year (October – September) was classified as a "Wet" year by the Department of Water Resources, and was the first in four years to be slightly above the average precipitation and runoff for the Sacramento Valley. Regional precipitation patterns for October 2009 – September 2010 are illustrated in **Figure 2-a** through **Figure 2-e**. Storm flows through the watershed exhibited typical wet season variability during the storm season (**Figure 3-a** through **Figure 3-f**), and samples were successfully collected to characterize a wide range of hydrological conditions.

Table 16. Summary of Climate Data at Sacramento Executive Airport, October 2009 – September 2010

Month	Departure from Normal Mean Temperature	Days with Maximum Temperature ≥ 90°F	Precipitation Total (Inches)
October 2009	-2.3	0	3.24
November 2009	-0.5	0	0.26
December 2009	-0.5	0	3.64
January 2010	2	0	4.8
February 2010	0.9	0	2.3
March 2010	-0.8	0	2.98
April 2010	-3.4	0	2.65
May 2010	-4	1	0.75
June 2010	1	12	0
July 2010	-1.5	16	0
August 2010	-2.8	13	0
September 2010	0.9	15	0.01

[3] Climate data (general trends) for the Sacramento-Delta region available at: http://www.wrcc.dri.edu/monitor/cal-mon/frames_version.html

Based on climate data available for the Sacramento Executive Airport weather station[4] there was moderate rainfall during the 2010 irrigation season (**Table 16**). No precipitation occurred from June to August. Precipitation during the months of November, February, and September were below normal. The maximum temperature exceeded 90 degrees Fahrenheit on one day in May, 12 days in June, 16 days in July, 13 days in August, and 15 days in September. The average maximum temperatures at the Sacramento Executive Airport were 75.2, 87.7, 91, 88.3, and 88.7 degrees Fahrenheit, respectively.

[4] Climate data (temperature and precipitation) for Sacramento Executive Airport available at: http://www.weather.gov/climate/index.php?wfo=sto

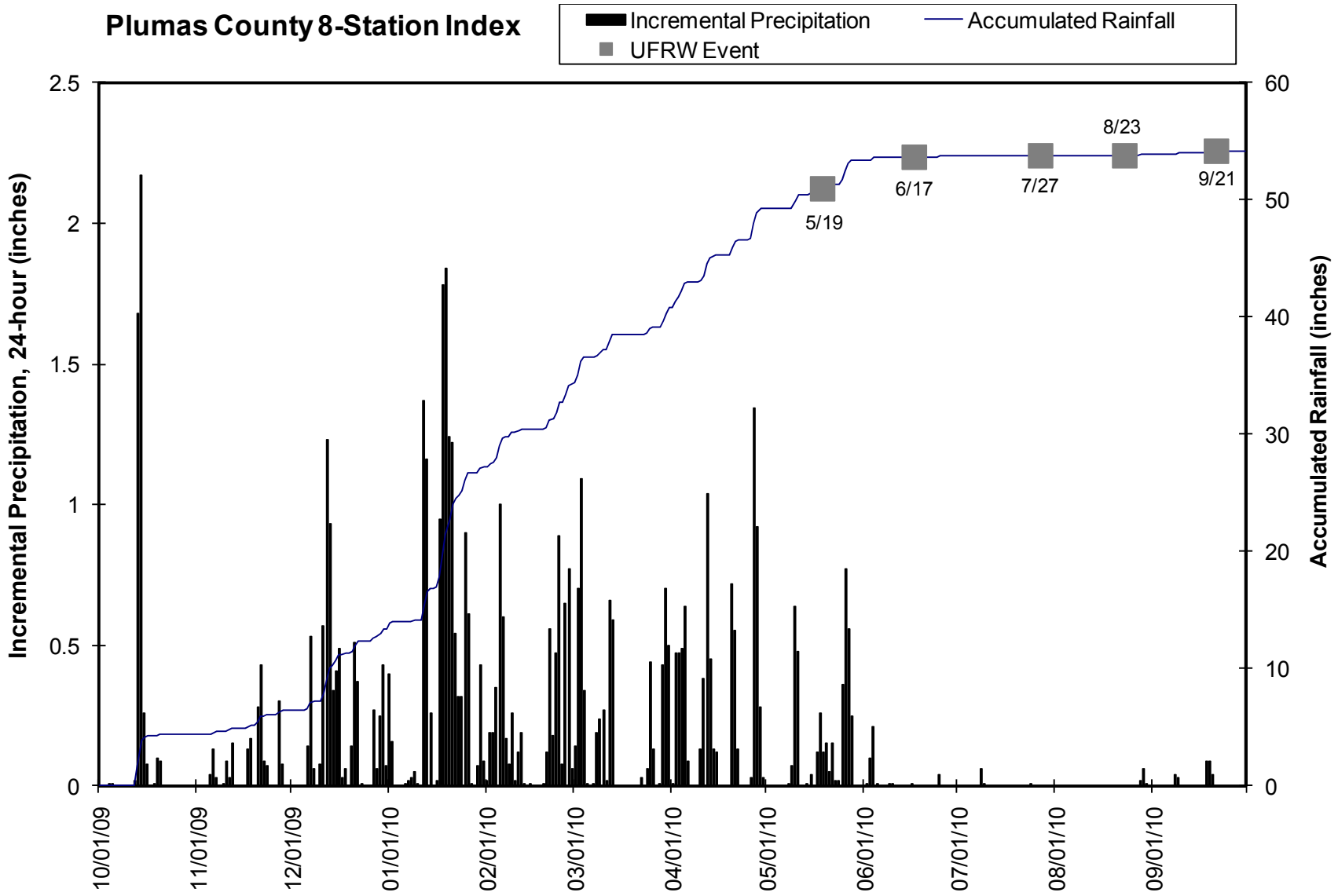

Figure 2-a. Precipitation during October 2009 – September 2010 Coalition Monitoring: Plumas County

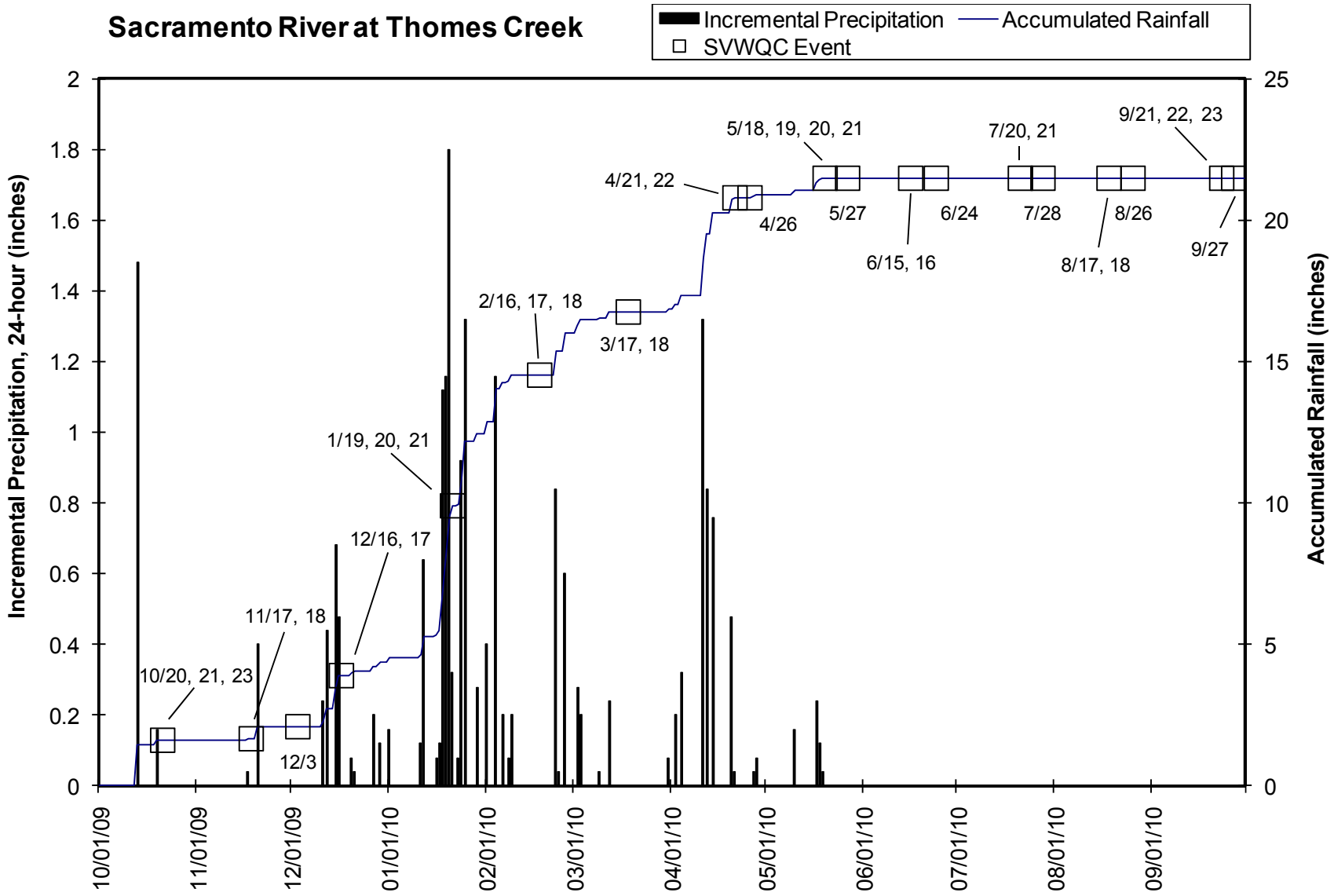

Figure 2-b. Precipitation during October 2009 – September 2010 Coalition Monitoring: Upper Sacramento Valley

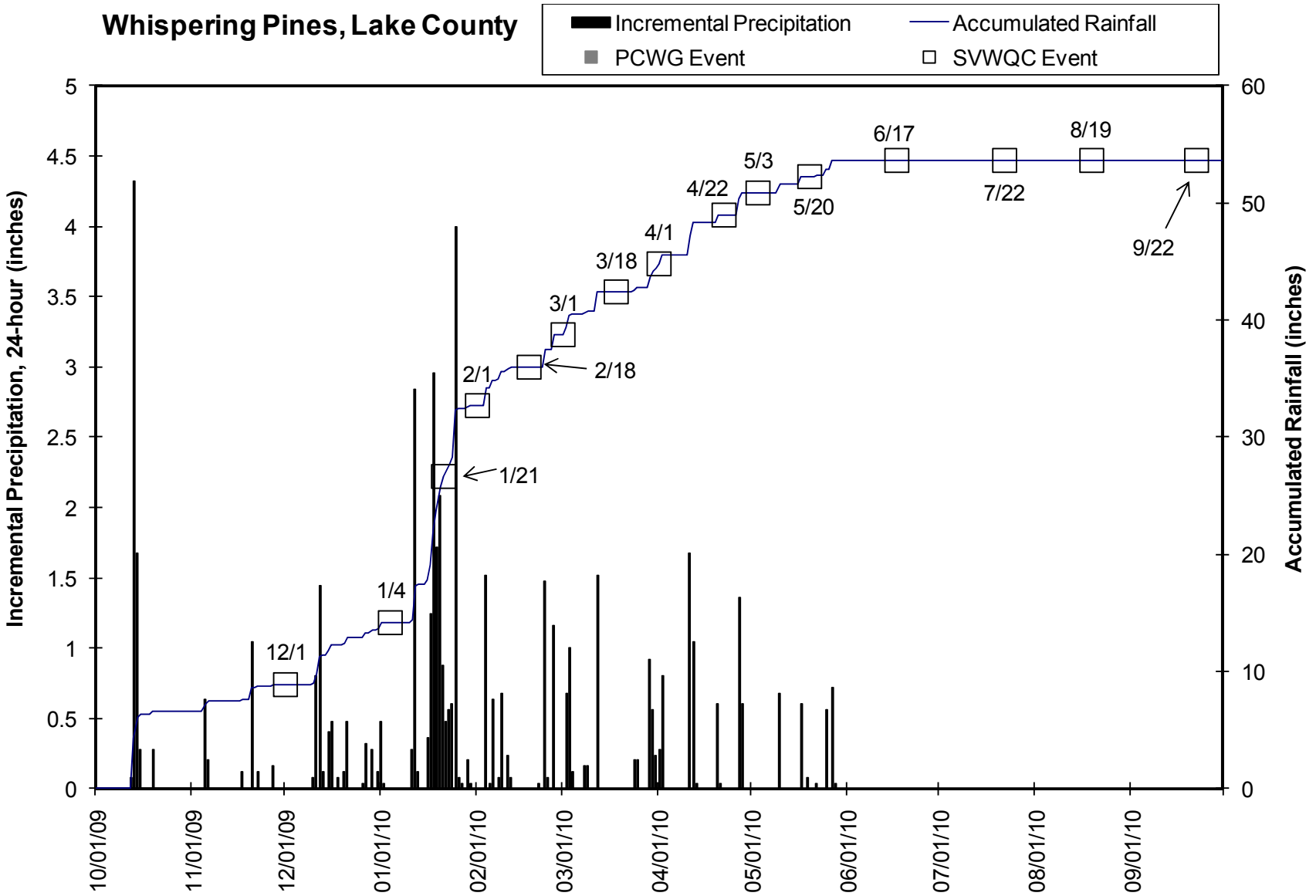

Figure 2-c. Precipitation during October 2009 – September 2010 Coalition Monitoring: Lake County

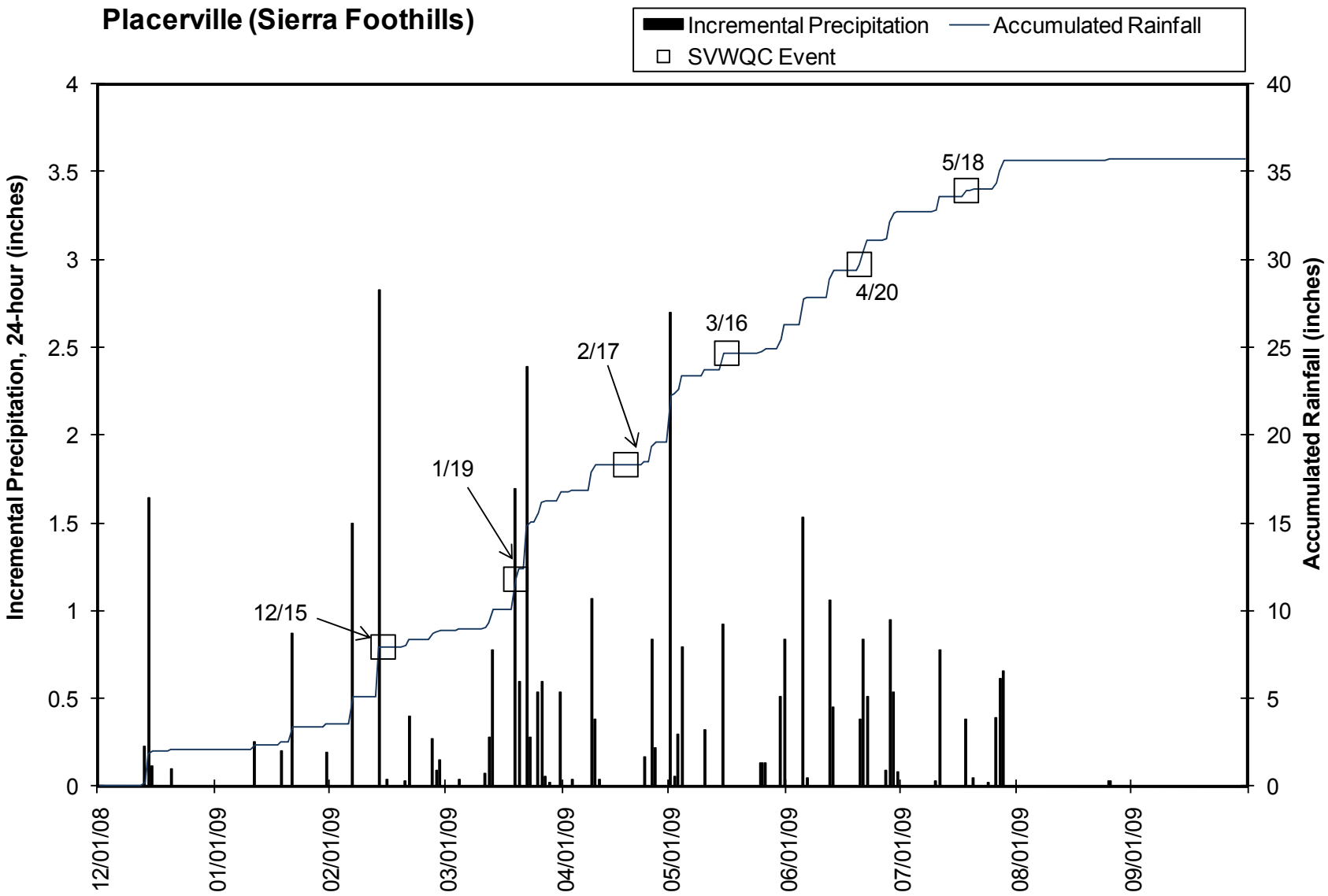

Figure 2-d. Precipitation during October 2009 – September 2010 Coalition Monitoring: Sierra Foothills

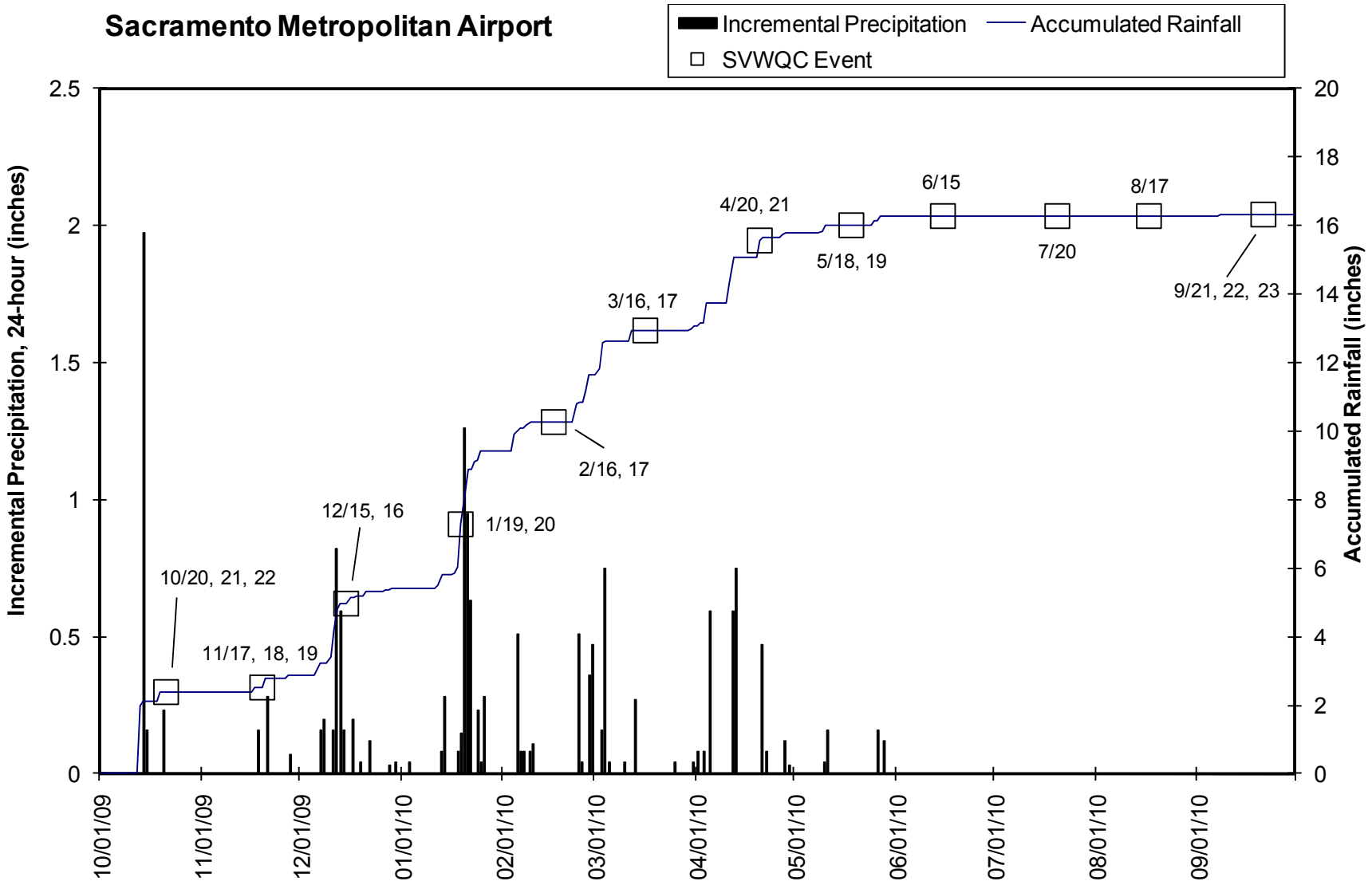

Figure 2-e. Precipitation during October 2009 – September 2010 Coalition Monitoring: Lower Sacramento Valley

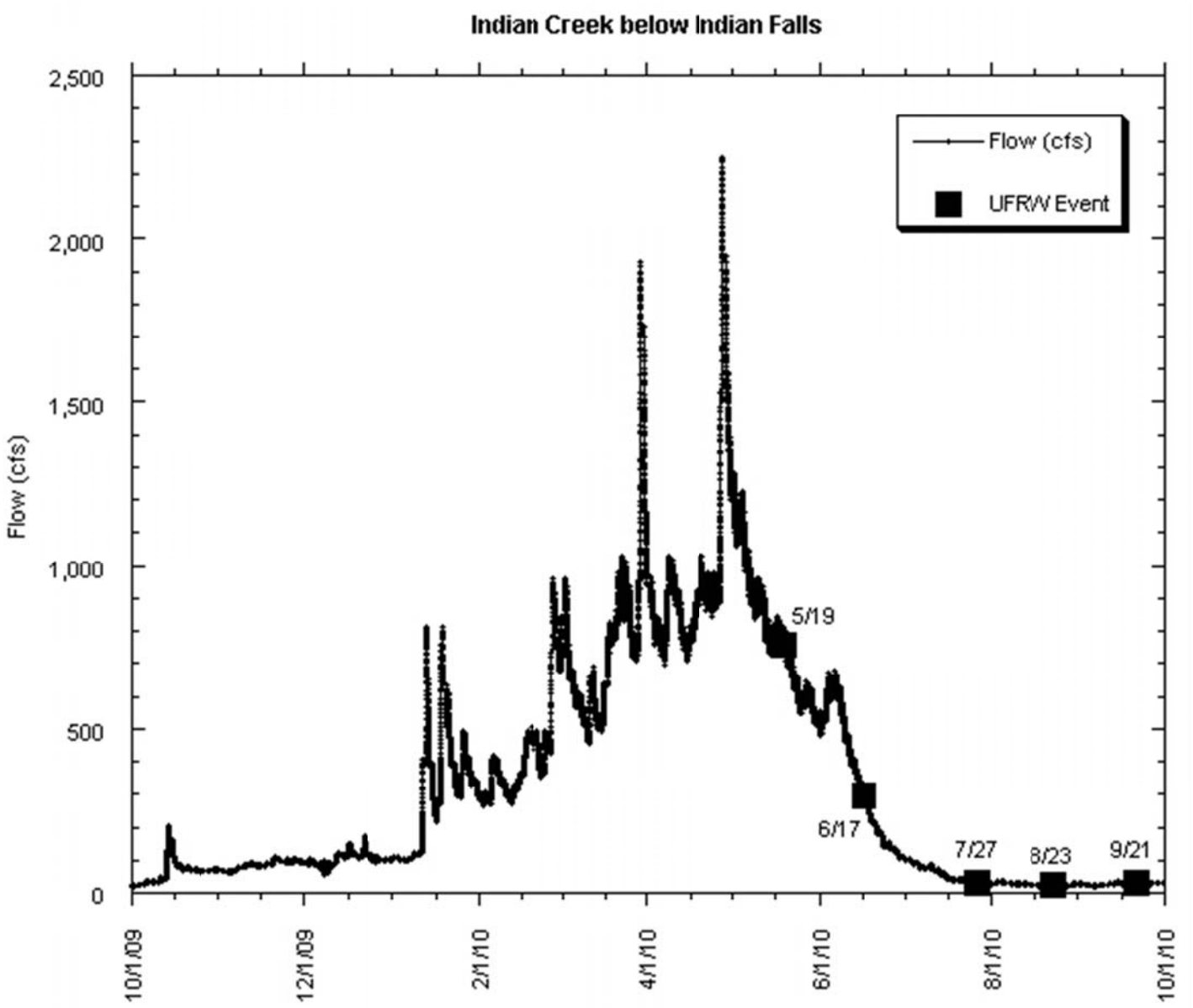

Figure 3-a. Flows during October 2009 – September 2010 Coalition Monitoring: Plumas County

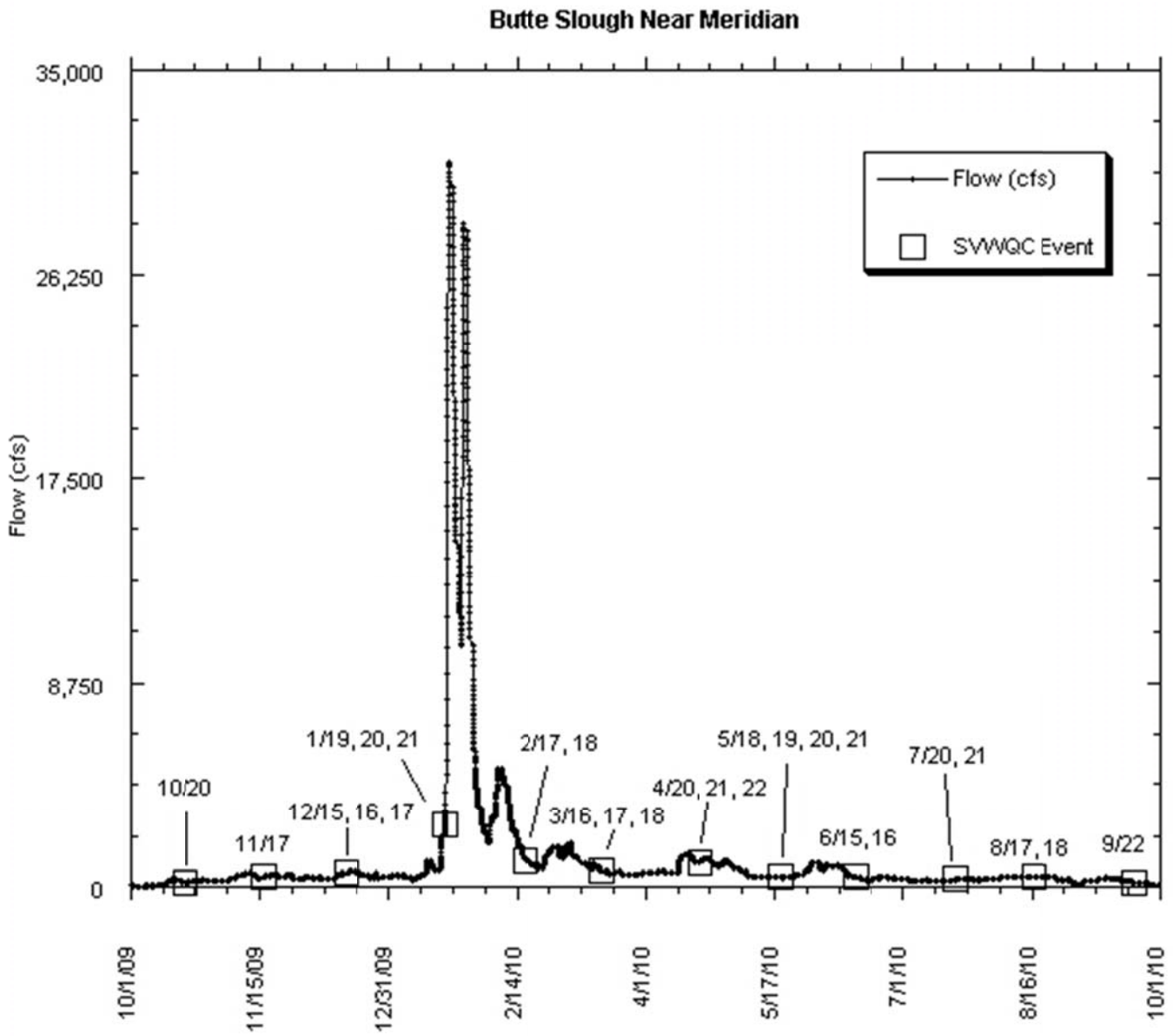

Figure 3-b. Flows during October 2009 – September 2010 Coalition Monitoring: East Sacramento Valley

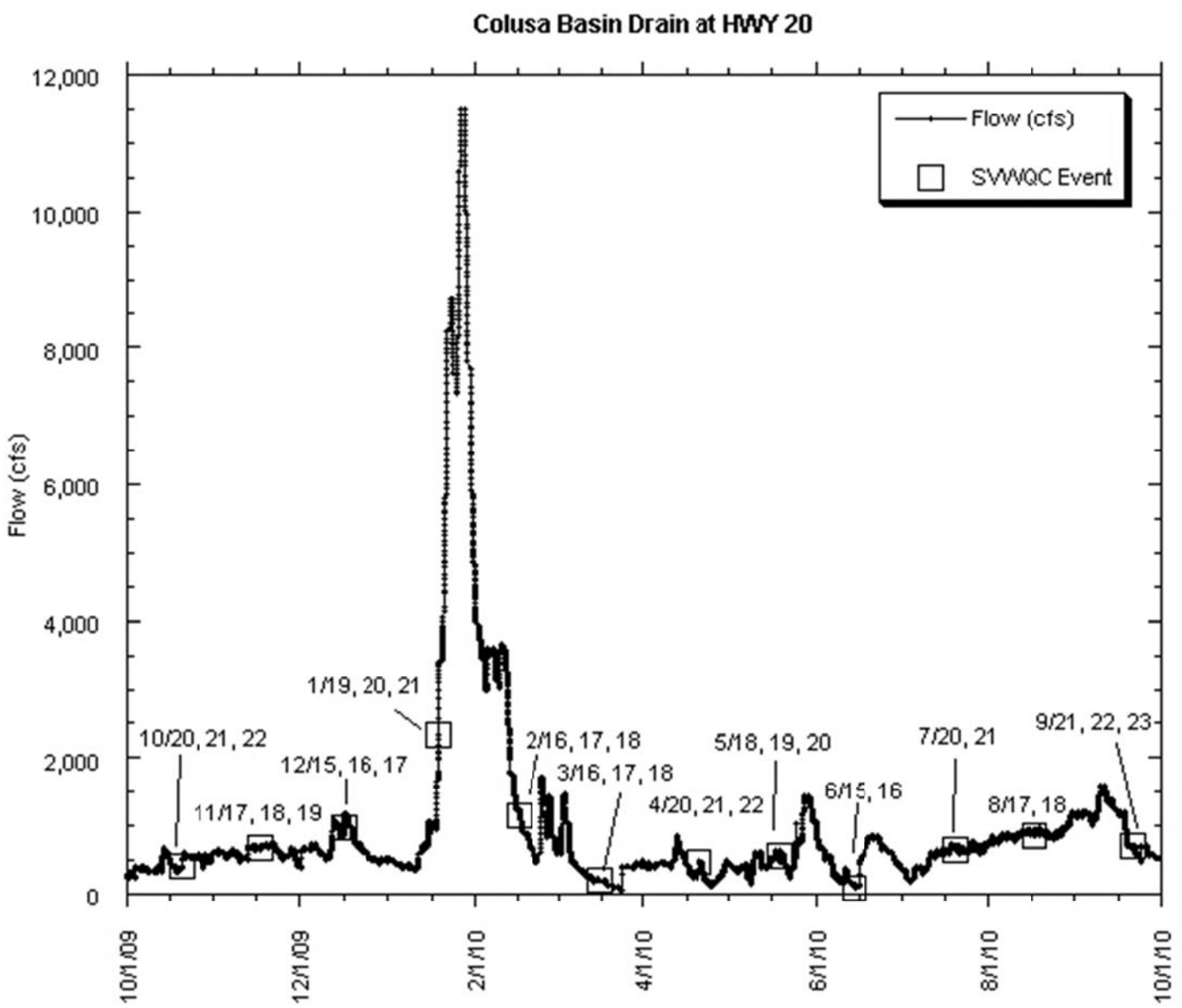

Figure 3-c. Flows during October 2009 – September 2010 Coalition Monitoring: West Sacramento Valley

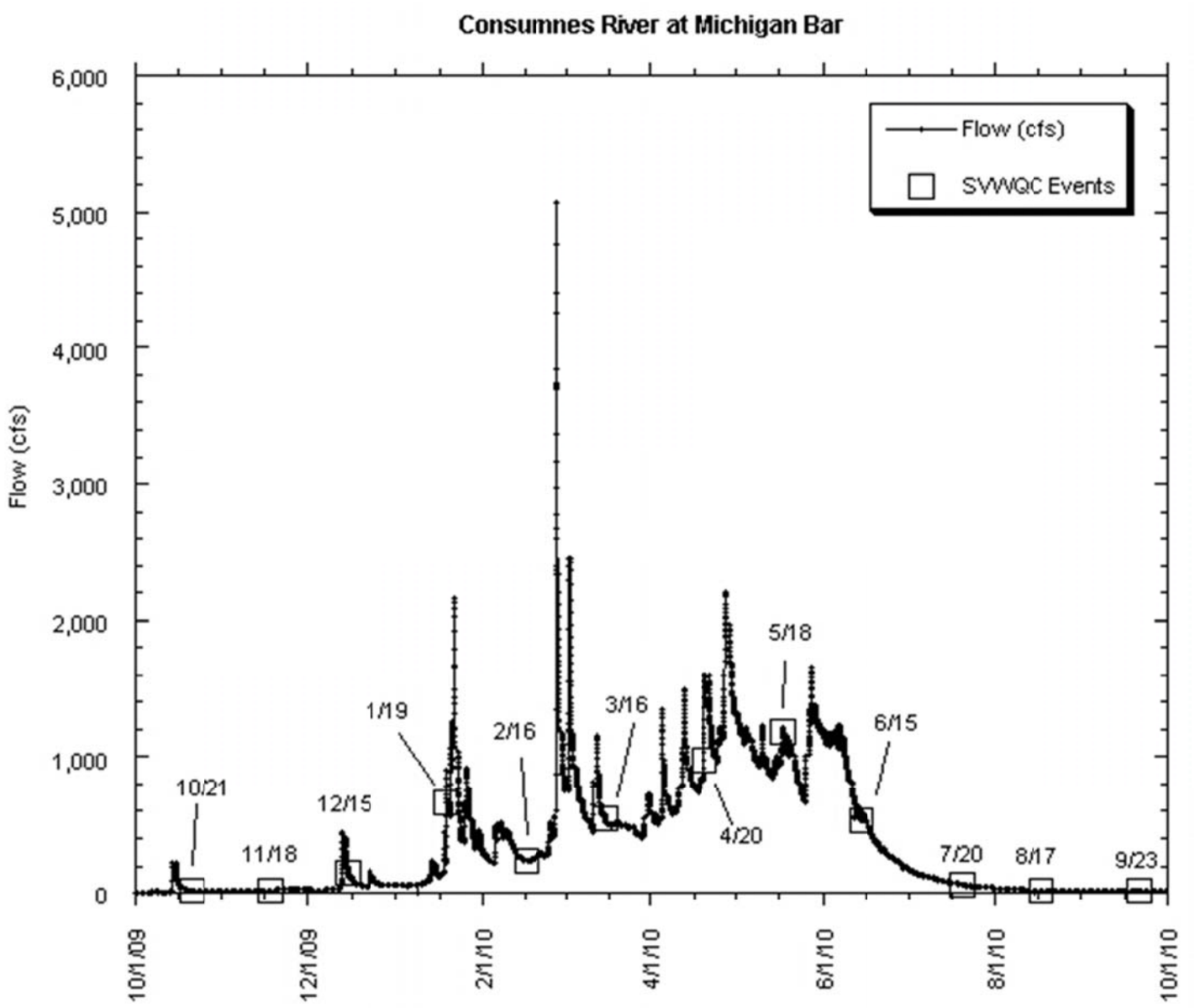

Figure 3-d. Flows during October 2009 – September 2010 Coalition Monitoring: Lower Sacramento Valley

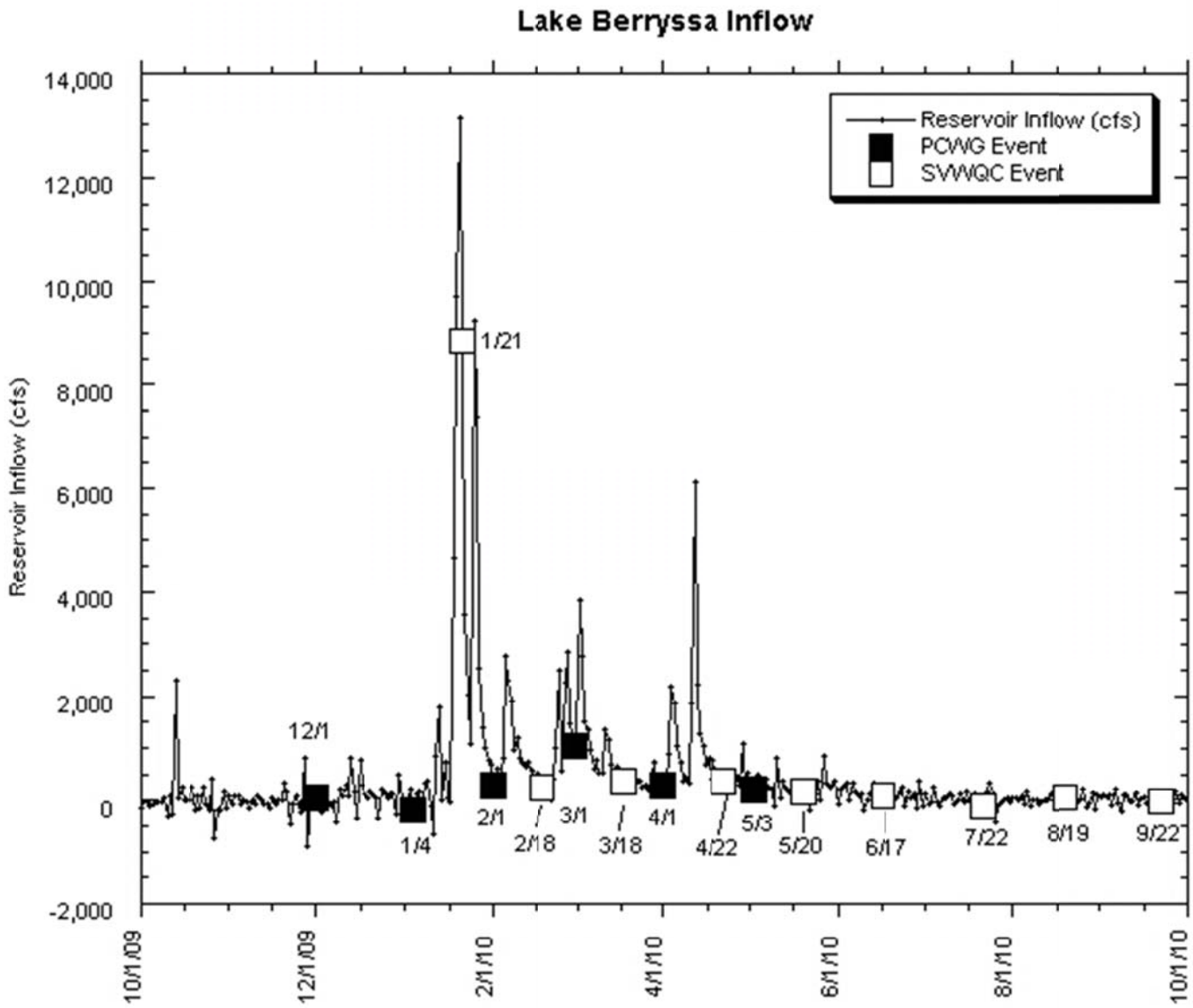

Figure 3-e. Flows during October 2009 – September 2010 Coalition Monitoring: Lake Berryessa (Reservoir Inflow)

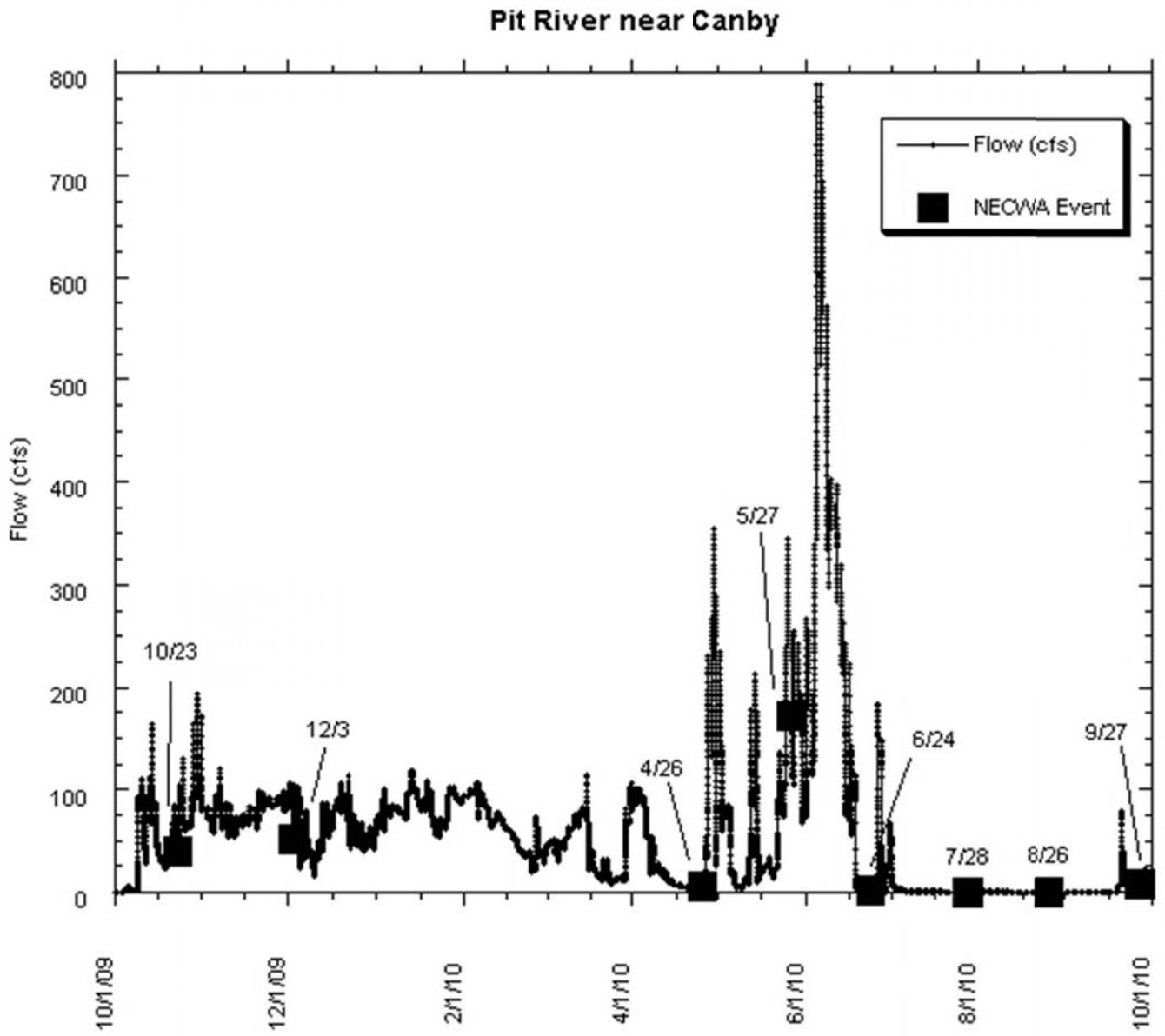

Figure 3-f. Flows during October 2009 – September 2010 Coalition Monitoring: Pit River near Canby

ASSESSMENT OF DATA QUALITY OBJECTIVES

The QC data for the Coalition's monitoring program have been evaluated and discussed previously in this document (Quality Assurance Results, beginning **page 24**). Based on these evaluations, the program data quality objectives of completeness, representativeness, precision, and accuracy of monitoring data have largely been achieved. These results indicate that the data collected are valid and adequate to support the objectives of the monitoring program, and demonstrate compliance with the requirements of the *ILRP*. The results of these evaluations were summarized previously in **Table 8** through **Table 15**.

EXCEEDANCES OF RELEVANT WATER QUALITY OBJECTIVES

Coalition and subwatershed monitoring data were compared to *ILRP* Trigger Limits. Generally, these trigger limits are based on applicable narrative and numeric water quality objectives in the Central Valley Basin Plan (CVRWQCB 1995), subsequent adopted amendments, the California Toxics Rule (USEPA 2000), and numeric interpretations of the Basin Plan narrative objectives. Observed exceedances of the ILRP trigger limits are the focus of this discussion.

Other relevant non-regulatory toxicity thresholds were also considered for the purpose of identifying potential causes of observed toxicity. It should be noted that these unadopted non-regulatory toxicity thresholds are not appropriate criteria for determining exceedances for the purpose of the Coalition's monitoring program and evaluating compliance with the *ILRP*. The additional toxicity thresholds were acquired from USEPA's Office of Pesticide Programs (OPP) Ecotoxicity database (USEPA 2007).

Water quality objectives and other relevant water quality thresholds discussed in this section are summarized in **Table 17** and **Table 18**. Monitored analytes without relevant water quality objectives or trigger limits are listed in **Table 19**.

The data evaluated for exceedances in this document include all Coalition collected results, as well as the compiled results from the Subwatershed monitoring programs presented in this report. The results of these evaluations are discussed below.

Table 17. Adopted Basin Plan and California Toxics Rule Objectives for Analytes Monitored for 2010 Coalition Monitoring

Analyte	Most Stringent Objective[1]	Units	Objective Source[2]
Ammonia, Total as N	narrative	mg/L	Basin Plan
Arsenic, dissolved	150	ug/L	CTR
Arsenic, total	50	ug/L	CA 1˚ MCL
Atrazine	1	ug/L	CA 1˚ MCL
Cadmium, dissolved	hardness dependent[4]	ug/L	CTR
Carbofuran	0.4	ug/L	Basin Plan
Chlorpyrifos	0.015	ug/L	Basin Plan
Color	15(3)	CU	CA 1˚ MCL
Copper, dissolved	hardness dependent[4]	ug/L	CTR
DDD (o,p' and p,p')	0.00083	ug/L	CTR
DDE (o,p' and p,p')	0.00059	ug/L	CTR
DDT (o,p' and p,p')	0.00059	ug/L	CTR
Diazinon	0.10	ug/L	Basin Plan
Dieldrin	0.00014	ug/L	CTR
Dissolved Oxygen	5	mg/L	Basin Plan
Endrin	0.036	ug/L	CTR
Fecal coliform	400	MPN/100mL	Basin Plan
Glyphosate	700	ug/L	CA 1˚ MCL
Lead, dissolved	hardness dependent[4]	ug/L	CTR
Malathion	0.1	ug/L	Basin Plan
Molinate	10	ug/L	Basin Plan
Nickel, dissolved	hardness dependent[4]	ug/L	CTR
Nitrate, as N	10	mg/L	CA 1˚ MCL
Oxamyl	50	ug/L	CA 1˚ MCL
Parathion, Methyl	0.13	ug/L	Basin Plan
pH	6.5-8.5	-log[H+]	Basin Plan
Selenium, total	5	ug/L	Basin Plan
Simazine	4	ug/L	CA 1˚ MCL
Temperature	narrative	ug/L	Basin Plan
Thiobencarb	1	ug/L	Basin Plan
Total Suspended Solids	narrative	mg/L	Basin Plan
Toxicity, Algae Cell Density	narrative	ug/L	Basin Plan
Toxicity, Fathead Minnow Survival	narrative	ug/L	Basin Plan
Toxicity, Water Flea Survival	narrative	ug/L	Basin Plan
Turbidity	narrative	ug/L	Basin Plan
Zinc, dissolved	hardness dependent[4]	ug/L	CTR

Notes:

1. For analytes with more than one limit, the most limiting applicable adopted water quality objective is listed.
2. *CA 1˚ MCLs* are California's Maximum Contaminant Levels for treated drinking water; *CTR* = California Toxics Rule criteria.
3. Applies only to treated drinking water.
4. Objective varies with the hardness of the water.

Table 18. Unadopted Water Quality Limits Used to Interpret Narrative Water Quality Objectives for Analytes Monitored for 2010 Coalition Monitoring

Analyte	Unadopted Limit[1]	Units	Limit Source
Boron, total	700	ug/L	Ayers and Westcott 1988
Conductivity	900	uS/cm	CA Recommended 2° MCL
E. coli [1]	235	MPN/100mL	Basin Plan Amendment
Conductivity	700	uS/cm	Ayers and Westcott 1988
Total Dissolved Solids	500	mg/L	CA Recommended 2° MCL
Total Dissolved Solids	450	mg/L	Ayers and Westcott 1988

Note:
1. Adopted by the Water Board but not approved by State Water Resources Control Board

Table 19. Analytes Monitored for 2010 Coalition Monitoring without Applicable Adopted or Unadopted Limits

Analytes		
Allethrin	Fenthion	Prallethrin
Ametryn	Fenuron	Prometon
Aminocarb	Fenvalerate	Prometryn
Atraton	Fluometuron	Propachlor
Barban	Fluvalinate	Propazine
Benomyl/Carbendazim	Hardness as CaCO3	Propham
Bifenthrin	HCH, delta	Propoxur
Bromacil	L-Cyhalothrin	Secbumeton
Chloroxuron	Merphos	Siduron
Chlorpropham	Mevinphos	Simetryn
Cyfluthrin	Mexacarbate	Sulprofos
Cypermethrin	Mirex	Tebuthiuron
Dacthal	Monuron	Terbuthylazine
Danitol	Neburon	Terbutryn
Deltamethrin	Nonachlor, cis-	Tetrachlorvinphos
Demeton	Nonachlor, trans-	Tokuthion
Dicofol	Orthophosphate, as P	Total Coliforms
Discharge	Oryzalin	Total Kjeldahl Nitrogen
Esfenvalerate/Fenvalerate	Oxychlordane	Total Organic Carbon
Ethoprop	Parathion, Ethyl	Total Suspended Solids
Fenchlorphos	Permethrin	Trichloronate
Fenitrothion	Perthane	
Fensulfothion	Phosphorus as P	

Toxicity and Pesticide Results

Statistically significant toxicity was not observed in any Coalition water quality samples collected from three different sites during 2010 Coalition Monitoring (November and December 2009).

Pesticides Detected in Coalition Monitoring

There were 2,034 individual pesticide results analyzed in water column samples collected from 14 different sites during 2010 Coalition Monitoring. Analyses were conducted for organophosphates, carbamates, organochlorines, triazines, pyrethroids, trifluralin, glyphosate, and paraquat. Within these categories, 11 different pesticides were detected in 31 separate samples (out of 73 samples, including field duplicates) collected for Coalition monitoring. More than 96% of the results were below detection. Legacy organochlorines were not detected in any samples.

It should be noted that detected pesticides are not equivalent to exceedances. Five registered pesticides (chlorpyrifos, dimethoate, diuron, malathion, simazine) exceeded applicable water quality objectives or *Trigger Limits* in a total of 14 2010 Coalition monitoring samples (including two field duplicates).

All detected pesticide concentrations for 2010 Coalition monitoring are summarized in **Table 20**. Pesticides were compared to relevant numeric and narrative water quality objectives, and to toxicity threshold concentrations published in USEPA's *ECOTOX Database (USEPA 2007; accessed on multiple occasions in 2010)*.

- The herbicide atrazine was detected in one sample from one site, Walker Creek; this sample was a field duplicate and atrazine was not detected in the primary samples. The detected value was greater than the method detection limit (MDL) but less than the quantitation or reporting limit (QL).
- The fungicide benomyl/carbendazim was detected in one sample and the field duplicate from one site, Ulatis Creek.
- The insecticide chlorpyrifos was detected in seven samples from four different sites. Chlorpyrifos exceeded the Basin Plan Amendment objective (0.015 ug/L) in four of these samples from three sites (Grand Island Drain, Shag Slough, and Willow Slough). Chlorpyrifos was applied to approximately 165 acres of apples and peaches in the Grand Island Drain drainage in the month prior to sampling. No chlorpyrifos applications were reported in the Willow Slough drainage in the month prior to sampling. It is unknown if chlorpyrifos was applied in the Shag Slough drainage in the month prior to sampling; chlorpyrifos is most commonly applied to alfalfa in May.
- The insecticide diazinon was detected in nine samples from eight different sites; one of these samples was a field duplicate, and one was a lab duplicate.
- The insecticide dimethoate was detected in one sample from one site. The detected concentration at Grand Island Drain exceeded the ILRP *Trigger Limit* (1 ug/L). No

dimethoate applications were reported in the Grand Island drainage in the month prior to sampling.

- The herbicide diuron was detected in eight samples from three different sites; three of these samples were field duplicates. Three of the detected values were greater than the method detection limit (MDL) but less than the quantitation or reporting limit (QL). Toxicity was tested at WLKCH for the December 2009 event, and no toxicity to *Selenastrum* was detected. Two detected concentrations at Ulatis Creek (one a field duplicate) exceeded the ILRP *Trigger Limit* (2 ug/L) and approached the EC50 for *Selanastrum* (2.4 ug/L). There were 38 applications of diuron to alfalfa reported in the Ulatis Creek drainage in the month prior to sampling. There were applications of diuron to approximately 1300 acres of alfalfa reported in the Willow Slough drainage in the month prior to sampling.
- Malathion was detected in six samples (including one field duplicate) from five sites. Detection of malathion is an exceedance of the Basin Plan prohibition if used on crops other than rice. Toxicity was not tested at these sites for these events; however, malathion is likely to be toxic to *Ceriodaphnia* at the detected concentration (0.5252 ug/L) observed in Sycamore Slough (RARPP). The *Ceriodaphia* two-day EC50 is 0.5 – 3.4 ug/L. There were 37 applications of malathion to approximately 2787 acres of alfalfa in the Sycamore Slough drainage in the three days before sampling. In addition:
    - Malathion was also detected at a concentration of 0.051 µg/L at Colusa Basin Drain (COLDR) in March and pesticide use data is still in the process of being obtained. Historically, March has been the month of greatest malathion use, and nearly all of the irrigated agricultural use in the Colusa Basin Drain drainage is for alfalfa. The detected concentration is not expected to cause toxicity.
    - At Gilsizer Slough (GILSL) there was a detected concentration of 0.017 µg/L in January, and there were no reported malathion applications in the month prior to sampling. The detected concentration is not expected to cause toxicity.
    - The detected concentrations at Lower Snake River (LSNKR) in August were 0.053 µg/L and 0.046 µg/L in the field duplicate. There were seven applications of malathion to 270 acres of walnuts and cotton in the month prior to sampling. The detected concentration is not expected to cause toxicity.
    - The detected concentration at Willow Slough was 0.0553 µg/L. There were no reported applications of malathion in the Willow Slough drainage in the month prior to sampling. The detected concentration is not expected to cause toxicity.
- The herbicide oryzalin was detected in five samples from three sites; two of these samples were field duplicates. Toxicity was tested at WLKCH for the December 2009 event and no toxicity to *Selenastrum* was detected. Oryzalin is not likely to be toxic to *Selenastrum* at the detected concentrations (*Selenastrum* five-day EC50 = 42 ug/L).
- The herbicide simazine was detected in five samples from one site; one of these samples was a field duplicate, and one was a lab duplicate. Simazine exceeded the California 1˚ MCL of 4 ug/L in one sample at Walker Creek. Toxicity was tested at WLKCH for the December 2009 event and no toxicity to *Selenastrum* was detected.

Simazine was not likely to be toxic to *Selenastrum* at the detected concentration (*Selenastrum* four-day EC50 = 100 ug/L). Simazine was applied in the Walker Creek drainage in the month prior to sampling; approximately 6,427 acres were treated with simazine.

- The herbicide tebuthiuron was detected in four samples from Walker Creek (two of these samples were field duplicates). Two of the detected values were less than the quantitation or reporting limit (QL). Toxicity was tested at WLKCH for the November 2009 event and no toxicity to *Selenastrum* was detected. The concentrations detected were well below published toxicity thresholds for *Selenastrum* (10 µg/L, 3-day EC50).
- The herbicide terbuthylazine was detected in one sample from one site (Walker Creek). Toxicity was tested at WLKCH for the December 2009 event; no toxicity to *Selenastrum, Ceriodaphnia,* or *Pimephales* was detected. The concentrations detected were well below published toxicity thresholds (>9 µg/L, 3-day EC50).

In addition, all detected pesticide concentrations for sediment chemistry analyses are included in Table 20. These sediment chemistry results were generated for Management Plan monitoring at the Z-Drain location and are not associated with toxicity analyses.

- Cypermethrin was detected in one sediment sample from one site (Z-Drain).
- Esfenvalerate was detected in two sediment samples from one site (Z-Drain).
- Fenvalerate was detected in two sediment samples from one site (Z-Drain).
- L-Cyhalothrin was detected in two sediment samples from one site (Z-Drain).

Table 20. Pesticides Detected in 2010 Coalition Monitoring

Site ID	Date Sampled	Analyte	Result[1] (µg/L)		Trigger Limit[2]	Basis for Limit[3]
WLKCH	1/21/2010	Atrazine[5]	DNQ	0.0086	1	CA 1° MCL
UCBRD	1/19/2010	Benomyl/Carbendazim	=	0.42		
UCBRD	1/19/2010	Benomyl/Carbendazim[5]	=	0.46		
GIDLR	**1/19/2010**	**Chlorpyrifos**	**=**	**0.1192**	**0.015**	**BPA**
RARPP	3/17/2010	Chlorpyrifos	=	0.0111	0.015	BPA
SSLIB	**5/18/2010**	**Chlorpyrifos**	**=**	**0.0271**	**0.015**	**BPA**
SSLIB	6/15/2010	Chlorpyrifos	=	0.0025	0.015	BPA
WLSPL	**3/16/2010**	**Chlorpyrifos**	**=**	**0.1521**	**0.015**	**BPA**
WLSPL	5/18/2010	Chlorpyrifos	=	0.01	0.015	BPA
WLSPL	**8/17/2010**	**Chlorpyrifos**	**=**	**0.0471**	**0.015**	**BPA**
COLDR	1/20/2010	Diazinon	=	0.0572	0.1	BP (chronic)
GIDLR	1/19/2010	Diazinon	=	0.0059	0.1	BP (chronic)
GILSL	1/21/2010	Diazinon	=	0.0628	0.1	BP (chronic)
GILSL	2/17/2010	Diazinon	=	0.0175	0.1	BP (chronic)
SSKNK	1/20/2010	Diazinon	=	0.0269	0.1	BP (chronic)
WADCN	1/21/2010	Diazinon	=	0.0747	0.1	BP (chronic)
WLSPL	1/19/2010	Diazinon	=	0.0137	0.1	BP (chronic)
SSLIB	2/16/2010	Diazinon[5]	=	0.0099	0.1	BP (chronic)
RARPP	6/15/2010	Diazinon[6]	=	0.0053	0.1	BP (chronic)
GIDLR	**3/16/2010**	**Dimethoate**	**=**	**1.1871**	**1**	**BP**
UCBRD	**1/19/2010**	**Diuron**	**=**	**2.3**	**2**	**Narrative**
UCBRD	**1/19/2010**	**Diuron[5]**	**=**	**2.4**	**2**	**Narrative**
UCBRD	2/16/2010	Diuron	DNQ	0.21	2	Narrative
UCBRD	2/16/2010	Diuron[5]	DNQ	0.2	2	Narrative
WLKCH	12/17/2009	Diuron	=	0.41	2	Narrative
WLKCH	12/17/2009	Diuron[5]	DNQ	0.39	2	Narrative
WLSPL	**1/19/2010**	**Diuron**	**=**	**9.5**	**2**	**Narrative**
WLSPL	2/16/2010	Diuron	=	0.4	2	Narrative
COLDR	**3/22/2010**	**Malathion**	**=**	**0.051**	**ND[4]**	**BP**
GILSL	**2/19/2010**	**Malathion**	**=**	**0.017**	**ND[4]**	**BP**
LSNKR	8/23/2010	**Malathion**	=	0.0528	**ND[4]**	**BP**
LSNKR	8/23/2010	**Malathion**	=	0.0459	**ND[4]**	**BP**
RARPP	**3/17/2010**	**Malathion**	**=**	**0.5252**	**ND[4]**	**BP**
WLSPL	**3/16/2010**	**Malathion**	**=**	**0.0553**	**ND[4]**	**BP**
UCBRD	1/19/2010	Oryzalin	=	1.4	–	–
UCBRD	1/19/2010	Oryzalin[5]	=	1.4	–	–

Site ID	Date Sampled	Analyte	Result[1] (µg/L)	Trigger Limit[2]	Basis for Limit[3]
WLKCH	12/17/2009	Oryzalin	= 4.9	–	–
WLKCH	12/17/2009	Oryzalin[5]	= 4.6	–	–
WLSPL	1/19/2010	Oryzalin	= 0.43	–	–
WLKCH	10/21/2009	Simazine	= 0.0277	4	CA 1° MCL
WLKCH	**12/17/2009**	**Simazine**	**= 10.089**	**4**	**CA 1° MCL**
WLKCH	1/21/2010	Simazine	= 0.4603	4	CA 1° MCL
WLKCH	1/21/2010	Simazine[5]	= 0.3821	4	CA 1° MCL
WLKCH	10/21/2009	Tebuthiuron	= 0.55	–	–
WLKCH	10/21/2009	Tebuthiuron[5]	= 0.58	–	–
WLKCH	11/17/2009	Tebuthiuron	DNQ 0.33	–	–
WLKCH	11/17/2009	Tebuthiuron[5]	DNQ 0.36	–	–
WLKCH	12/17/2009	Terbuthylazine	= 0.0118	–	–
		Sediment Samples (units = ng/g, d.w.)			
ZDDIX	7/20/2010	Cypremethrin	= 3.73	–	–
ZDDIX	4/20/2010	Esfenvalerate	= 15.2	–	–
ZDDIX	5/18/2010	Esfenvalerate	= 5.9	–	–
ZDDIX	4/20/2010	Fenvalerate	= 10.7	–	–
ZDDIX	5/18/2010	Fenvalerate	= 5.2	–	–
ZDDIX	4/20/2010	L-Cyhalothrin	= 9.3	–	–
ZDDIX	5/18/2010	L-Cyhalothrin	= 3.1	–	–

BOLD = Exceedance

1. "DNQ" (Detected Not Quantified) indicates that the detected value was greater than the method detection limit (MDL) but less than the quantitation or reporting limit (QL).
2. Water Quality Objective or Narrative Interpretation Limits for ILRP.
3. Water Quality Objective Basis: BP = Central Valley Basin Plan; BPA = Basin Plan Amendment; CTR = California Toxics Rule; Narrative = unadopted limits used to interpret Basin Plan narrative objectives by the Central Valley Regional Board.
4. The Basin Plan states: "…discharge is prohibited unless the discharger is following a management practice approved by the Board." This has been interpreted as an ILRP Trigger Limit of ND (*Not Detected*). The Basin Plan performance goal for malathion is 0.1 ug/L.
5. This environmental sample was a field duplicate.
6. This environmental sample was a lab duplicate. The pesticide was not detected in the primary sample.

Other Coalition-Monitored Water Quality Parameters

Exceedances of adopted Basin Plan objectives, CTR criteria, or ILRP *Trigger Limits* were observed for conductivity, dissolved oxygen, *E. coli*, nutrients (nitrate + nitrite as N), and pH during 2010 Coalition Monitoring (**Table 22**).

Conductivity

Conductivity was monitored in 212 samples from 25 Coalition sites. Conductivity exceeded the California recommended 2˚ MCL (900 µS/cm) for drinking water in 22 samples and the unadopted UN Agricultural Goal (700 µS/cm) in a total of 42 samples collected from nine different sites. Ten of the exceedances were observed at Ulatis Creek (UCBRD), and nine of the exceedances were observed at Willow Slough (WLSPL). In addition, three out of the five conductivity samples taken from the Middle Fork Feather River (MFFGR) in 2010 exceeded the 90th percentile site-specific water quality objective value set by the Basin Plan (150 µS/cm). The 90^{th} percentile of all samples (205 µS/cm) collected from the Middle Fork Feather River for the ILRP since 2005 also exceeded this site-specific objective.

Dissolved Oxygen

During 2010 Coalition Monitoring, dissolved oxygen was measured in 211 samples from 25 Coalition sites. Dissolved oxygen concentrations were below the Basin Plan lower limit of 5.0 mg/L for waterbodies with a WARM designated beneficial use in seven samples from five sites and below the Basin Plan lower limit of 7.0 mg/L for waterbodies with a COLD designated beneficial use in an additional three samples from two sites. Dissolved oxygen exceedances were primarily due to low flows, stagnant conditions, and/or extensive submerged aquatic vegetation. The low flows and stagnant conditions have the potential to limit oxygen production by instream algae and also to trap organic particulates that contribute to instream oxygen consumption. These exceedances occurred from May to October, and it was determined that the conditions contributing to low dissolved oxygen were typical for irrigation season at these sites.

E. coli *Bacteria*

E. coli bacteria were monitored in 207 samples from 20 sites. *E. coli* results exceeded the single sample maximum objective (235 MPN/100mL) in 50 samples from 16 different Coalition locations. The Basin Plan objectives are intended to protect contact recreational uses where ingestion of water is probable (e.g., swimming). Agricultural lands commonly support a large variety (and sometimes very large numbers) of birds and other wildlife. These avian and wildlife resources are expected to be significant sources of *E. coli* and other bacteria in agricultural runoff and irrigation return flows. Other sources include, but are not limited to cattle, horses, septic systems, treated wastewater, and urban runoff.

Nutrients

Nutrients monitored during 2010 Coalition Monitoring included nitrate + nitrite as N, total Kjeldahl nitrogen (TKN), ammonia, total phosphorus, and dissolved orthophosphate. Nutrients were monitored in 419 samples at 17 different Coalition sites. Nitrate as N results exceeded the Basin Plan objective (10 mg/L) in one sample from one site. Ammonia concentrations were typically below quantitation limits and did not exceed the temperature- and pH-dependent

national water quality criterion for this parameter in any sample. There are no applicable water quality objectives (adopted or unadopted) for TKN, total phosphorus, or orthophosphate.

pH

During 2010 Coalition Monitoring, pH was measured in 213 samples from 25 Coalition sites. pH exceeded the Basin Plan maximum of 8.5 Standard Units (-log[H+]) in six Coalition samples collected from three different sites. Three of these exceedances occurred at Pit River (PRPIT).

The Basin Plan limit for pH is intended to be assessed based on "*…an appropriate averaging period that will support beneficial uses*" (CVRWQCB 1995). This parameter typically exhibits significant natural diurnal variation over 24 hours in natural waters with daily fluctuations controlled principally by photosynthesis, rate of respiration, and buffering capacity of the water. These processes are controlled by light and nutrient availability, concentrations of organic matter, and temperature. These factors combine to cause increasing pH during daylight hours and decreasing pH at night. Diurnal variations in winter are typically smaller because less light is available and there are lower temperatures and higher flows. Irrigation return flows may influence this variation primarily by increasing or decreasing in-stream temperatures or by increasing available nutrients or organic matter.

Five of the six pH exceedances occurred during the irrigation season, between March and September. In general, the reason for these pH exceedances was not immediately obvious or easily determined. In most cases, the marginal pH exceedances were likely due primarily to in-stream algal respiration, caused in part by low flows or ponded and stagnant conditions. The elevated pH in Pope Creek (PCULB) and Pit River (PRPIT) appear to be within the normal naturally elevated range of ambient pH for these sites.

Trace Metals

Trace metals monitored one event during the 2010 Coalition Monitoring year, and included both total (arsenic, boron, cadmium, copper, lead, molybdenum, nickel, selenium, and zinc) and dissolved metals (arsenic, cadmium, copper, lead, nickel, and zinc). Total trace metals and dissolved trace metals were monitored in for one event at 2 different Coalition sites (Lower Honcut Creek (LHNCT) and Walker Creek (WLKCH)). No exceedances of hardness-adjusted water quality objectives for dissolved trace metals or other trigger limits were observed.

Table 21. Other Physical, Chemical, and Microbiological Parameters Observed to Exceed Numeric Objectives in 2010 Coalition Monitoring

Site ID	Sample Date	Analyte	Units	Result	Trigger Limit[1]	Basis for Limit[2]	Mgt Plan[3]
COLDR	3/17/10	Conductivity	µS/cm	902	900, 700[4]	Narrative	YES
COLDR	4/21/10	Conductivity	µS/cm	836	900, 700[4]	Narrative	YES
COLDR	6/16/10	Conductivity	µS/cm	798	900, 700[4]	Narrative	YES
FRSHC	10/21/09	Conductivity	µS/cm	806	900, 700[4]	Narrative	YES
FRSHC	11/18/09	Conductivity	µS/cm	778	900, 700[4]	Narrative	YES
FRSHC	12/17/09	Conductivity	µS/cm	792	900, 700[4]	Narrative	YES
FRSHC	2/17/10	Conductivity	µS/cm	930	900, 700[4]	Narrative	YES
FRSHC	3/17/10	Conductivity	µS/cm	892	900, 700[4]	Narrative	YES
FRSHC	4/21/10	Conductivity	µS/cm	750	900, 700[4]	Narrative	YES
FRSHC	9/22/10	Conductivity	µS/cm	783	900, 700[4]	Narrative	YES
GIDLR	12/15/09	Conductivity	µS/cm	769	900, 700[4]	Narrative	YES
GIDLR	1/19/10	Conductivity	µS/cm	827	900, 700[4]	Narrative	YES
GIDLR	2/16/10	Conductivity	µS/cm	1155	900, 700[4]	Narrative	YES
GIDLR	3/16/10	Conductivity	µS/cm	1233	900, 700[4]	Narrative	YES
GIDLR	4/20/10	Conductivity	µS/cm	825	900, 700[4]	Narrative	YES
MFFGR	5/19/10	Conductivity	µS/cm	186.5	900, 700[4], 150[5]	Narrative, BP	NO
MFFGR	6/17/10	Conductivity	µS/cm	177.8	900, 700[4], 150[5]	Narrative, BP	NO
MFFGR	7/27/10	Conductivity	µS/cm	201.8	900, 700[4], 150[5]	Narrative, BP	NO
RARPP	1/19/10	Conductivity	µS/cm	950	900, 700[4]	Narrative	YES
RARPP	2/16/10	Conductivity	µS/cm	776	900, 700[4]	Narrative	YES
RARPP	3/17/10	Conductivity	µS/cm	1255	900, 700[4]	Narrative	YES
RARPP	4/21/10	Conductivity	µS/cm	1402	900, 700[4]	Narrative	YES
RARPP	6/15/10	Conductivity	µS/cm	738	900, 700[4]	Narrative	YES
SSLIB	4/20/10	Conductivity	µS/cm	715	900, 700[4]	Narrative	YES
UCBRD	10/21/09	Conductivity	µS/cm	931	900, 700[4]	Narrative	YES
UCBRD	11/19/09	Conductivity	µS/cm	1107	900, 700[4]	Narrative	YES
UCBRD	12/15/09	Conductivity	µS/cm	799	900, 700[4]	Narrative	YES
UCBRD	2/16/10	Conductivity	µS/cm	1018	900, 700[4]	Narrative	YES
UCBRD	3/16/10	Conductivity	µS/cm	971	900, 700[4]	Narrative	YES
UCBRD	4/20/10	Conductivity	µS/cm	856	900, 700[4]	Narrative	YES
UCBRD	5/18/10	Conductivity	µS/cm	904	900, 700[4]	Narrative	YES
UCBRD	7/20/10	Conductivity	µS/cm	787	900, 700[4]	Narrative	YES
UCBRD	8/17/10	Conductivity	µS/cm	761	900, 700[4]	Narrative	YES
UCBRD	9/21/10	Conductivity	µS/cm	707	900, 700[4]	Narrative	YES
WLSPL	10/22/09	Conductivity	µS/cm	1615	900, 700[4]	Narrative	YES
WLSPL	11/19/09	Conductivity	µS/cm	1650	900, 700[4]	Narrative	YES
WLSPL	12/15/09	Conductivity	µS/cm	1671	900, 700[4]	Narrative	YES
WLSPL	2/16/10	Conductivity	µS/cm	1132	900, 700[4]	Narrative	YES
WLSPL	3/16/10	Conductivity	µS/cm	1107	900, 700[4]	Narrative	YES
WLSPL	4/20/10	Conductivity	µS/cm	1262	900, 700[4]	Narrative	YES

Site ID	Sample Date	Analyte	Units	Result	Trigger Limit[1]	Basis for Limit[2]	Mgt Plan[3]
WLSPL	6/15/10	Conductivity	µS/cm	763	900, 700[4]	Narrative	YES
WLSPL	7/20/10	Conductivity	µS/cm	970	900, 700[4]	Narrative	YES
WLSPL	9/21/10	Conductivity	µS/cm	730	900, 700[4]	Narrative	YES
ZDDIX	4/20/10	Conductivity	µS/cm	1159	900, 700[4]	Narrative	YES
ZDDIX	5/18/10	Conductivity	µS/cm	752	900, 700[4]	Narrative	YES
COLDR	10/20/09	Dissolved Oxygen	mg/L	5.71	7 (COLD), 5 (WARM)	BP	YES
COLDR	5/18/10	Dissolved Oxygen	mg/L	4.75	7 (COLD), 5 (WARM)	BP	YES
COLDR	7/20/10	Dissolved Oxygen	mg/L	3.54	7 (COLD), 5 (WARM)	BP	YES
COLDR	8/24/10	Dissolved Oxygen	mg/L	6.37	7 (COLD), 5 (WARM)	BP	YES
CRTWN	10/21/09	Dissolved Oxygen	mg/L	1.77	7 (COLD), 5 (WARM)	BP	YES
CRTWN	11/18/09	Dissolved Oxygen	mg/L	4.59	7 (COLD), 5 (WARM)	BP	YES
GIDLR	8/17/10	Dissolved Oxygen	mg/L	4.45	7 (COLD), 5 (WARM)	BP	YES
LHNCT	10/20/09	Dissolved Oxygen	mg/L	2.95	7 (COLD), 5 (WARM)	BP	YES
UCBRD	9/21/10	Dissolved Oxygen	mg/L	3.9	7 (COLD), 5 (WARM)	BP	YES
WLSPL	10/22/09	Dissolved Oxygen	mg/L	5.43	7 (COLD), 5 (WARM)	BP	YES
ACACR	10/21/09	*E. coli*	MPN/100mL	270	235	BPA	YES
ACACR	11/18/09	*E. coli*	MPN/100mL	440	235	BPA	YES
ACACR	1/21/10	*E. coli*	MPN/100mL	1600	235	BPA	YES
ACACR	4/22/10	*E. coli*	MPN/100mL	270	235	BPA	YES
ACACR	5/20/10	*E. coli*	MPN/100mL	1000	235	BPA	YES
ACACR	6/16/10	*E. coli*	MPN/100mL	690	235	BPA	YES
ACACR	7/21/10	*E. coli*	MPN/100mL	240	235	BPA	YES
ACACR	8/18/10	*E. coli*	MPN/100mL	690	235	BPA	YES
ACACR	9/23/10	*E. coli*	MPN/100mL	280	235	BPA	YES
CCBRW	4/21/10	*E. coli*	MPN/100mL	>2400	235	BPA	YES
CCDOW	1/20/10	*E. coli*	MPN/100mL	>2400	235	BPA	YES
COLDR	1/20/10	*E. coli*	MPN/100mL	2400	235	BPA	YES
CRTWN	10/21/09	*E. coli*	MPN/100mL	260	235	BPA	YES
CRTWN	7/20/10	*E. coli*	MPN/100mL	290	235	BPA	YES
FRSHC	12/17/09	*E. coli*	MPN/100mL	360	235	BPA	YES
FRSHC	1/21/10	*E. coli*	MPN/100mL	>2400	235	BPA	YES
FRSHC	1/21/10	*E. coli*	MPN/100mL	>2400	235	BPA	YES

Site ID	Sample Date	Analyte	Units	Result	Trigger Limit[1]	Basis for Limit[2]	Mgt Plan[3]
FRSHC	4/21/10	*E. coli*	MPN/100mL	410	235	BPA	YES
GIDLR	11/18/09	*E. coli*	MPN/100mL	340	235	BPA	YES
GIDLR	1/19/10	*E. coli*	MPN/100mL	770	235	BPA	YES
GIDLR	5/18/10	*E. coli*	MPN/100mL	770	235	BPA	YES
GIDLR	7/20/10	*E. coli*	MPN/100mL	250	235	BPA	YES
GIDLR	9/23/10	*E. coli*	MPN/100mL	390	235	BPA	YES
LHNCT	1/21/10	*E. coli*	MPN/100mL	460	235	BPA	YES
LHNCT	4/21/10	*E. coli*	MPN/100mL	580	235	BPA	YES
LSNKR	1/20/10	*E. coli*	MPN/100mL	>2400	235	BPA	YES
LSNKR	4/21/10	*E. coli*	MPN/100mL	2400	235	BPA	YES
LSNKR	6/16/10	*E. coli*	MPN/100mL	460	235	BPA	YES
LSNKR	6/16/10	*E. coli*	MPN/100mL	490	235	BPA	YES
LSNKR	7/21/10	*E. coli*	MPN/100mL	290	235	BPA	YES
LSNKR	8/18/10	*E. coli*	MPN/100mL	>2400	235	BPA	YES
MDLCR	5/20/10	*E. coli*	MPN/100mL	690	235	BPA	YES
PNCGR	12/17/09	*E. coli*	MPN/100mL	690	235	BPA	YES
PNCGR	3/18/10	*E. coli*	MPN/100mL	330	235	BPA	YES
PRPIT	7/28/10	*E. coli*	MPN/100mL	>2420	235	BPA	YES
SSLIB	4/20/10	*E. coli*	MPN/100mL	1000	235	BPA	YES
SSLIB	5/18/10	*E. coli*	MPN/100mL	490	235	BPA	YES
UCBRD	1/19/10	*E. coli*	MPN/100mL	>2400	235	BPA	YES
UCBRD	5/18/10	*E. coli*	MPN/100mL	>2000	235	BPA	YES
UCBRD	6/15/10	*E. coli*	MPN/100mL	>2400	235	BPA	YES
WLKCH	10/21/09	*E. coli*	MPN/100mL	490	235	BPA	YES
WLKCH	12/17/09	*E. coli*	MPN/100mL	1600	235	BPA	YES
WLKCH	1/21/10	*E. coli*	MPN/100mL	>2400	235	BPA	YES
WLKCH	3/18/10	*E. coli*	MPN/100mL	240	235	BPA	YES
WLKCH	4/22/10	*E. coli*	MPN/100mL	290	235	BPA	YES
WLKCH	6/16/10	*E. coli*	MPN/100mL	550	235	BPA	YES
WLKCH	9/23/10	*E. coli*	MPN/100mL	550	235	BPA	YES
WLSPL	1/19/10	*E. coli*	MPN/100mL	>2400	235	BPA	YES
WLSPL	7/20/10	*E. coli*	MPN/100mL	>2400	235	BPA	YES
WLSPL	9/21/10	*E. coli*	MPN/100mL	460	235	BPA	YES
UCBRD	11/19/09	Nitrate+Nitrite, as N	mg/L	16	$10^{(5)}$	BP	YES
PCULB	12/1/09	pH	-log[H+]	8.61	6.5-8.5	BP	NO
PCULB	3/1/10	pH	-log[H+]	8.55	6.5-8.5	BP	NO
PRPIT	4/26/10	pH	-log[H+]	8.65	6.5-8.5	BP	YES

Site ID	Sample Date	Analyte	Units	Result	Trigger Limit[1]	Basis for Limit[2]	Mgt Plan[3]
PRPIT	6/24/10	pH	-log[H+]	8.78	6.5-8.5	BP	YES
PRPIT	9/27/10	pH	-log[H+]	8.85	6.5-8.5	BP	YES
ZDDIX	4/20/10	pH	-log[H+]	8.52	6.5-8.5	BP	YES

\Notes:

1. Water Quality Objective or Narrative Interpretation Limits for ILRP.
2. Water Quality Objective Basis: BP = Central Valley Basin Plan; BPA = Basin Plan Amendment; CTR = California Toxics Rule; Narrative = unadopted limits used to interpret Basin Plan narrative objectives by the Central Valley Regional Board.
3. Indicates whether sites and parameter are currently being addressed by an ongoing management plan, study, or TMDL
4. Conductivity exceeded the unadopted UN Agricultural Goal (700 uS/cm) and/or the California recommended 2˚ MCL (900 uS/cm) for drinking water.
5. Site-specific Basin Plan objective (150 µS/cm as a 90th percentile) for the Middle Fork Feather River
6. California 1˚ MCL (10 mg/L as N) for drinking water.

Management Practices and Actions Taken

RESPONSE TO EXCEEDANCES

To address specific water quality exceedances, the Coalition and its partners developed a Management Plan in 2008, subsequently approved by the Water Board. The Coalition also previously developed a *Landowner Outreach and Management Practices Implementation Communications Process for Monitoring Results (Management Practices Process)* to address exceedances. Implementation of the approved management plan is the primary mechanism for addressing exceedances observed in the Coalition's *ILRP* monitoring.

Management Plan Status Update

The Coalition submitted an annual Management Plan Progress Report (MPPR) to the Regional Water Board in March 2010. The MPPR that documenting the status and progress toward Management Plan requirements for 2010 will be provided to the Water Board at the end of March 2011. Activities conducted in 2010 to implement the Coalition's Management Plan included addressing exceedances of objectives for registered pesticides, completion of source evaluations for pesticides and toxicity, surveys for pathogen identification source evaluations, and monitoring required for toxicity and pesticide management plans and TMDLs.

Implementation completed specifically for registered pesticides included review and evaluation of pesticide application data, identification of potential sources, and determination of likely agricultural sources. These evaluations were documented in Source Evaluation Reports for each water body and management plan element. For registered pesticides and identified causes of toxicity, surveys of Coalition members operating on high priority parcels were conducted to determine the degree of implementation of relevant management practices. These survey results will be used to establish goals for additional management practice implementation needed to address exceedances of Basin Plan water quality objectives and *ILRP* trigger limits.

LANDOWNER OUTREACH EFFORTS

The Coalition and its subwatersheds, working with the Coalition for Urban/Rural Environmental Stewardship (CURES), stand committed to working with the Regional Water Board and its staff to implement the *Management Practices Process* and the Coalition's approved Management Plan to address water quality problems identified in the Sacramento Valley. The primary strategic approach taken by the Coalition is to notify and educate the subwatershed landowners, farm operators, and/or wetland managers about the cause(s) of toxicity and/or exceedance(s) of water quality standards. Notifications are focused on (but not limited to) growers who operate directly adjacent to or within close proximity to the waterway. The broader outreach program, which includes both grower meetings and the notifications distributed through direct mailings, encourages the adoption of BMPs and modification of the uses of specific farm and wetland inputs to prevent movement of constituents of concern into Sacramento Valley surface waters.

Targeted Outreach Efforts

The Coalition's targeted outreach approach is to focus on the growers with fields directly adjacent to or near the actual waterway of concern. To identify those landowners operating in high priority lands, the Coalition identifies the assessor parcels and subsequently the owners of

agricultural operations nearest the water bodies of interest. From the list of assessor parcel numbers, the Coalition identifies its members and mails to them an advisory notice along with information on how to address the specific exceedances using BMPs. This same approach has been used to conduct management practice surveys in areas targeted by the Management Plan.

General Outreach Efforts

Highlights of outreach efforts conducted by the Coalition and its partners for specific subwatersheds from October 2009 through September 2010 are listed in **Table 22**. When available, outreach materials are included in **Appendix F**. Some materials were not available at the time of this report submittal; they will be provided at a later date.

Table 22. Summary of Landowner Outreach Efforts, October 2009 – September 2010

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
Butte-Yuba-Sutter	10/1/2009	Sutter County RCD	Newsletter – NRCS AWEP/WQ BMPs	Yuba City	Mailed to Over 1,000 members	Newsletter	
Butte-Yuba-Sutter	11/29/2009	Sutter County RCD	BYSWQC Board of Trustees Annual Meeting	Yuba City	11	Minutes	x
Butte-Yuba-Sutter	12/1/2009	Sutter County RCD	Conducted interviews regarding BMPs use among Coalition members in Pine Creek; Butte and Gilsizer Sloughs	Yuba City	16 Interviews completed	None	
Butte-Yuba-Sutter	1/24/2010	Sutter County RCD	CVWQC Conference Call: Long-term ILRP	Yuba City	15	Agenda	
Butte-Yuba-Sutter	4/7/2010	Sutter County RCD	NCWA Meeting: Long-term ILRP	Sacramento	5	None	
Butte-Yuba-Sutter	4/14/2010	Sutter County RCD	CVWQC Meeting: Long-term ILRP	Sacramento	15	None	
Butte-Yuba-Sutter	5/11/2010	Sutter County RCD	Regional Board Meeting: Long-term ILRP	Rancho Cordova	25	None	
Butte-Yuba-Sutter	5/15/2010	Sutter County RCD	CVWQC Meeting: Long-term ILRP	Sacramento	Mailed to Over 1,000 members	Newsletter	x
Butte-Yuba-Sutter	6/17/2010	Sutter County RCD	Regional Board Meeting: Long-term ILRP	Rancho Cordova	25	None	
Butte-Yuba-Sutter	7/8/2010	Sutter County RCD	NCWA Meeting: Long-term ILRP	Sacramento	5	None	
Butte-Yuba-Sutter	8/20/2010	Sutter County RCD	Distributed a 14-page Summary of the Water Board's ILRP Draft Program Environmental Impact Report	Yuba City	Sent to 12 BYSWQC Trustees	Summary Document	x
Butte-Yuba-Sutter	8/20/2010	Sutter County RCD	Distributed an 8-page Summary of the Water Board's ILRP Ground Water Study	Yuba City	Sent to 12 BYSWQC Trustees	Summary Document	
Butte-Yuba-Sutter	9/10/2010	Sutter County RCD	CVWQC Meeting: Long-term ILRP	Sacramento	15	None	
Butte-Yuba-Sutter	9/22/2010	Sutter County RCD	Regional Board Meeting: Long-term ILRP	Rancho Cordova	25	None	

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
Butte-Yuba-Sutter	9/27/2010	Sutter County RCD	Distributed a 2-page Response to the Water Board regarding the ILRP Draft Program Environmental Impact Report	Yuba City	Sent to the Regional Water Board	Response Document	x
Colusa Glenn	11/1/2009	Landowner	Septic tanks and irrigated lands	Colusa County	3	None	
Colusa Glenn	11/13/2009	Colusa Glenn Subwatershed Program	Director reports, finances, assessor data for additional outreach, MOU with Glenn County RCD, Colusa County transformation to GIS, outreach and education report, draft procedure manual, monitoring results, special presentation by UCCE "General Order of Waste Discharge Requirements for Existing Milk Cow Dairies", annual meeting	Willows USDA Service Center, City of Willows	11	Agenda	x
Colusa Glenn	11/23/2009	Colusa Glenn Subwatershed	Management Plan Notice in Stony Creek Watershed for Sediment Toxicity: Hayalella (amphipods in sediment)	Glenn County	13	Management Plan Notice Letter, Survey	x
Colusa Glenn	11/25/2009	Colusa Glenn Subwatershed Program	Annual Newsletter	Colusa & Glenn County irrigated landowner participants	1557	Newsletter	x
Colusa Glenn	12/2/2009	County of Glenn Department of Agriculture	Grower Meeting	Ord Bend Community Hall, Glenn	89	Agenda, PowerPoint Presentation	x
Colusa Glenn	12/3/2009	County of Colusa Department of Agriculture	Grower Meeting	Colusa Industrial Conference Room, City of Colusa	50	PowerPoint Presentation	x
Colusa Glenn	12/14/2009	Colusa Glenn Subwatershed Program	Annual Meeting	Willows USDA Service Center, City of Willows	16	Agenda	x
Colusa Glenn	12/18/2009	Willow Creek Mutual Water District Members	Membership status and ILRP information	Colusa County	70	Letter	x

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
Colusa Glenn	1/25/2010	Colusa County Farm Bureau	Colusa Glenn Subwatershed Program and Long-Term Irrigated Lands Regulatory Program	Colusa County Farm Bureau, City of Colusa	32	Agenda, PowerPoint Presentation	x
Colusa Glenn	2/10/2010	Glenn County Farm Bureau	Colusa Glenn Subwatershed Program and Long-Term Irrigated Lands Regulatory Program	Glenn County Farm Bureau, City of Orland	19	Agenda, PowerPoint Presentation	x
Colusa Glenn	2/28/2010	Glenn County Resource Conservation District	Water Quality Monitoring on Stony Creek - Present and Future	Stony Creek Watershed Glenn County	500	Newsletter	x
Colusa Glenn	3/2/2010	Colusa Glenn Subwatershed Program	Event 46: Exceedance of Simazine on Walker Creek near 99W and CR33, December 17, 2009; BMPs	Willows USDA Service Center, City of Willows	4	None	
Colusa Glenn	3/9/2010	Glenn County Water Advisory Committee	Colusa Glenn Subwatershed Program and Long-Term Irrigated Lands Regulatory Program	Glenn-Colusa Irrigation District, City of Willows	33	Agenda & Minutes	x
Colusa Glenn	3/11/2010	Colusa County Farm Bureau	Pesticide Application and Respirator Training	Colusa County Farm Bureau, City of Colusa	40	None	
Colusa Glenn	4/5/2010	Natural Resources Conservation Service / Farm Service Agency / Resource Conservation Districts	History, Organization, Monitoring Program and Results, Management Plans, Long-Term Irrigated Lands Regulatory Program	Willows USDA Service Center, City of Willows	37	Power Point	x
Colusa Glenn	4/21/2010	Colusa County Resource Conservation District	Colusa Basin Management Plan	Colusa Industrial Conference Room, City of Colusa	32	None	
Colusa Glenn	4/26/2010	Central Valley Salinity Coalition	CV SALTS	Yolo County Farm Bureau, City of Woodland	45	None	
Colusa Glenn	5/6/2010	Colusa Glenn Subwatershed Program Director John Garner	Article published on "Farmers use less water than people think"	Capital Weekly	12,000	Article	
Colusa Glenn	5/6/2010	University California Cooperative Extension	Water runoff and threat of toxin runoff in Almond Orchards	Arbuckle	200 Almond Growers	Agenda	

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
Colusa Glenn	5/13/2010	California Agricultural Leadership Program	RWQCB, Central Valley Region Water Quality Fee	San Luis Obispo	10	None	
Colusa Glenn	5/25/2010	Colusa Glenn Subwatershed Program	Draft minutes, finances, SVWQC advisory council, Long-Term Irrigated Lands Regulatory Program, outreach and education report and update, outreach regarding Chlorpyrifos at Walker Creek, management plan update, AWEP, monitoring results, Malathion exceedance at Rough and Ready Pumping Plant, participant map, Director Reports	Colusa County Farm Bureau, City of Colusa	10	Agenda	x
Colusa Glenn	6/15/2010	Colusa Glenn Subwatershed Program	PRESS RELEASE: Avoid More Water Quality Exceedances: Use Best Management Practices For Chlorpyrifos	Colusa & Glenn County's Farm Bureau, Family Water Alliance, plus distribution list	6,150	Press Release	x
Colusa Glenn	7/13/2010	Colusa Glenn Subwatershed Program	PRESS RELEASE: CGSP and NRCS receive almost $6 million to assist local producers in water quality and conservation efforts	Tri-Counties, The Sacramento Valley Mirror & Chico Enterprise-Record Newspaper	Unknown	Press Release	x
Colusa Glenn	7/13/2010	Colusa Glenn Subwatershed Program	PRESS RELEASE: CGSP and NRCS receive almost $6 million to assist local producers in water quality and conservation efforts	Colusa & Glenn County's Farm Bureau, Family Water Alliance, plus distribution list	6,150	Press Release	x
Colusa Glenn	7/14/2010	Young Farmers & Ranchers	Agricultural Water Enhancement Program (AWEP); water quality and water conservation assistance	Glenn County Farm Bureau, City of Orland	6	None	
Colusa Glenn	7/16/2010	Golden State Risk Management Authority	Irrigated Lands Regulatory Program history and future	Willows USDA Service Center, City of Willows	1	None	
Colusa Glenn	7/19/2010	Willows USDA Service Center "Open House"	Irrigated Lands Regulatory Program history and future	Willows USDA Service Center, City of Willows	36	None	

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
Colusa Glenn	7/21/2010	Colusa Glenn Subwatershed Program	LETTER: Stewardship of Chlorpyrifos to Avoid Water Quality Issues	Walker Creek Watershed Landowners & Ag Dealers, PCA's, Operators	131	Letter (Landowner & Ag Service Providers)	x
Colusa Glenn	8/26/2010	Colusa Glenn Subwatershed Program	Draft Minutes, finances, outreach and education report and update, management plan update, AWEP, monitoring results, election of Colusa County Director seats, Long-Term Irrigated Lands Regulatory Program, accounting services, Director Reports		10	Agenda	x
Colusa Glenn	9/1/2010	Colusa Glenn Subwatershed Program	Long-Term Irrigated Lands Regulatory Program	Colusa & Glenn County irrigated landowner participants	1739	Action Alert Newsletter	x
Colusa Glenn	9/7/2010	Sacramento River Conservation Area Forum - Technical Advisory Committee (TAC)	Fall 2010 Newsletter, Long Term Irrigated Lands Regulatory Program, AWEP	Willows City Hall, City of Willows	15	TAC Meeting Notes	
Colusa Glenn	9/30/2010	Kelly Kampschmidt Payroll & Accounting Services	General Irrigated Lands Regulatory Program Information	Kelly Kampschmidt Payroll & Accounting Services Office, City of Willows	2	Verbal phone conversations only	
Colusa Glenn	2/18-19/2010	FMC Agricultural Products, RiceCo LLC, Valent USA Corp., Wilbur-Ellis Co.	Rice Herbicide Stewardship Seminars, Ag Commissioner update	Maxwell and Willows	100	Agenda	
Colusa Glenn	6/23/2010 - 9/30/2010	Colusa Glenn Subwatershed Program & Natural Resources Conservation Service	Agricultural Water Enhancement Program (AWEP); water quality and water conservation assistance	Willows USDA Service Center, City of Willows	50	Program Information	
Colusa Glenn	6/23/2010 - 9/30/2010	Colusa Glenn Subwatershed Program & Natural Resources Conservation Service	Agricultural Water Enhancement Program (AWEP); water quality and water conservation assistance	Colusa USDA Service Center, City of Colusa	25	Program Information	

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
Colusa Glenn	Monthly	Glenn County Farm Bureau	Program elements, monitoring results/exceedances, Q&A	Glenn County Farm Bureau, City of Orland	20 - 30 each month	Verbal reports only	
Colusa Glenn	Monthly	Glenn County Resource Conservation District	Program elements, monitoring results/exceedances, Q&A	Willows USDA Service Center, City of Willows	10 - 20 each month	Verbal reports mainly, agenda attached when appropriate	x
Colusa Glenn	Multiple	Colusa Glenn Subwatershed Program	General Irrigated Lands Regulatory Program Information	Willows USDA Service Center, City of Willows	94	Verbal phone conversations only	
Colusa Glenn	Multiple	Colusa Glenn Subwatershed Program Director John Garner	General Irrigated Lands Regulatory Program Information	Multiple	12	Verbal conversations only	
El Dorado	10/27/2009	El Dorado County Farm Bureau	Ag Water Committee- status report	El Dorado Agriculture Dept., Placerville	15 to 20	None	
El Dorado	11/18/2009	El Dorado Wine Grape Growers Association	ILRP - status report/updates	El Dorado Agriculture Dept., Placerville	16 to 30	None	
El Dorado	12/1/2009	El Dorado County Farm Bureau	Ag Water Committee- status report	El Dorado Agriculture Dept., Placerville	15 to 20	None	
El Dorado	1/26/2010	El Dorado County Farm Bureau	Ag Water Committee- status report	El Dorado Agriculture Dept., Placerville	15 to 20	None	
El Dorado	2/1/2010	UCCE/RCD/AWQ	Soils Management Workshop (field meeting)	Placerville, CA	30	None	
El Dorado	2/17/2010	El Dorado Wine Grape Growers Association	ILRP - status report/updates	El Dorado Agriculture Dept., Placerville	16 to 30	None	
El Dorado	2/24/2010	El Dorado County Farm Bureau	Ag Water Committee- status report	El Dorado Agriculture Dept., Placerville	15 to 20	None	
El Dorado	3/17/2010	El Dorado Wine Grape Growers Association	ILRP - status report/updates	Veteran's Memorial Hall, Placerville	16 to 30	None	
El Dorado	3/24/2010	El Dorado County Farm Bureau	Ag Water Committee- status report	El Dorado Agriculture Dept., Placerville	15 to 20	None	
El Dorado	4/1/2010	El Dorado County Agricultural Water Quality Management Corp.	Ag Water Quality issues/updates	Watershed Connection newsletter	325 members	Newsletter	x

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
El Dorado	4/19/2010	El Dorado Wine Grape Growers Association	ILRP - status report/updates	Veteran's Memorial Hall, Placerville	16 to 30	None	
El Dorado	4/21/2010	El Dorado County Farm Bureau	Ag Water Committee- status report	El Dorado Agriculture Dept., Placerville	15 to 20	None	
El Dorado	5/17/2010	El Dorado Wine Grape Growers Association	ILRP - status report/updates	Veteran's Memorial Hall, Placerville	16 to 30	None	
El Dorado	5/26/2010	El Dorado County Farm Bureau	Ag Water Committee- status report	El Dorado Agriculture Dept., Placerville	15 to 20	None	
El Dorado	6/21/2010	El Dorado Wine Grape Growers Association	ILRP - status report/updates	Veteran's Memorial Hall, Placerville	16 to 30	None	
El Dorado	6/23/2010	El Dorado County Farm Bureau	Ag Water Committee- status report	El Dorado Agriculture Dept., Placerville	15 to 20	None	
El Dorado	Fall 2009	El Dorado County Agricultural Water Quality Management Corp.	Ag Water Quality issues/updates	Watershed Connection newsletter	325 members	Newsletter	
El Dorado	October 2009 - June 2010	EDC Agriculture Department	Pesticide trainings	Placerville, CA	24	None	
El Dorado	October 2009 - June 2010	EDC Agriculture Department	Restricted Materials Permits or Operator Identification Numbers	Placerville, CA	450	None	
El Dorado	Winter 2009	El Dorado County Agricultural Water Quality Management Corp.	Ag Water Quality issues/updates	Watershed Connection newsletter	325 members	Newsletter	x
Lake County	11/20/2009	Mendocino College Annual Integraded Pest Management Seminar	Controlling various pests in vineyards	Blue Lakes Lodge, Upper Lake	100	None	
Lake County	12/18/2009	Lake County Farm Bureau	2009 Annual Laws & Regulations Grower Meeting	Lakeport, CA	Unknown	Agenda	x
Lake County	2/11/2010	UC Extension	2010 North Coast Pear Research Meeting	Big Valley Grange, Lakeport	44	Agenda	x
Lake County	2/17/2010	UC Extension	Irrigating Orchards Efficiently	Big Valley Grange, Lakeport	25	Agenda	x

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
Lake County	3/5/2010	Lake County Winegrape Commission	Sustainable Winegrowing (Utilizing the sustainable handbook)	Lake County	13	None	
Lake County	3/10/2010	UC Extension	2010 Lake County Walnut Update	Mendo-Lake Credit Union, Lakeport	37	Agenda	x
Lake County	3/31/2010	Lake County Winegrape Commission	Pest management (how agriculture effects the water quality of Clear Lake - Erica Lundguist)	Lake County	31	None	
Lake County	8/1/2010	Lake County Farm Bureau Newsletter	Community Leaders Selected for Inaugural AgVenture Class	County Wide to FB Members	776	None	
Lake County	8/1/2010	Lake County Farm Bureau Newsletter	New Groundwater Quality Program unveiled	County Wide to FB Members	776	None	
Lake County	9/10/2010	CWA (Ag Venture)	Water Quality panel discussion	Umpqua Bank, Lakeport	12	Agenda	x
Lake County	Mar/Apr 2010	Lake County Farm Bureau Newsletter	Farmers and Ranchers Mount opposition to Water Quality Fees	County Wide to FB Members	766	None	
Lake County		UC Extension	Impacts of Illicit Cannabis production on Forest resources/watersheds	Lakeport, CA; Various Venues Board of Supervisors, Television	unknown	PDF	
Lake County	Jan/Feb 2010	Lake County Farm Bureau Newsletter	Protection of the Big Valley Wetlands	County Wide to FB Members	754	None	
Napa Putah Ck	10/19/2009	Putah Ck Watershed Steering Com. Mtg	Membership & Financial Reports, Program planning for 2009/10 year, BMPs & tools to achieve ILP goals; update on LTILP	Napa Farm Bureau	8	None	
Napa Putah Ck	2/5/2010	Putah Ck Watershed Annual Members Mtg	Grower Membership Report, Financial Report, Water Quality Report, BMP discussion, Pilot Plan concept & LTILP	Pope Valley Farm Center	45	None	
Napa Putah Ck	4/2/2010	Ag Worker Safety & Health Training	Pesticide safety training, Pest Education, Heat Illness, Tractor Safety	Napa Valley College, Upper Campus	97	None	
Napa Putah Ck	4/12/2010	Putah Ck Watershed Steering Com. Mtg	Membership & late fee policy, Financial update, Water Quality Testing Results, LTILP, Pilot Plan submittal	Napa Farm Bureau	9	None	

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
Napa Putah Ck	6/2/2010	Putah Ck Watershed Steering Com. Mtg	Membership, Financial & Water Quality Reports; Grower Survey compilation & analysis; Pilot Plan implementation	Napa Farm Bureau	8	None	
NECWA	12/2/2009	NECWA	Board Meeting	McArthur, CA	11	Agenda	x
NECWA	1/4/2010	UC Davis/NECWA	Water Management Survey	NECWA Membership Mailing	172	Survey	x
NECWA	1/19/2010	NECWA	Board Meeting	McArthur, CA	11	Agenda	x
NECWA	2/25/2010	NECWA	Board Meeting	McArthur, CA	15	Agenda	x
NECWA	3/10/2010	NECWA	Annual Meeting	Alturas, CA	68	Invitation/ Agenda	x
NECWA	4/20/2010	NECWA	Board Meeting	McArthur, CA	12	Agenda	x
NECWA	6/9/2010	CE and NRCS	Irrigation Workshops	Susanville, CA	25	None	
NECWA	6/10/2010	CE and NRCS	Irrigation Workshops	Adin, CA	30	None	
NECWA	7/20/2010	NECWA	Board Meeting	McArthur, CA	14	Agenda	x
NECWA	8/19/2010	NECWA	Upper Pit River IRWM Planning Grant Meeting	McArthur, CA	12	None	
NECWA	9/20/2010	NECWA	Upper Pit River IRWM Planning Grant Meeting	McArthur, CA	10	None	
NECWA	Summer 2010	NECWA	Watershed Coalition News Summer 2010 Recap	NECWA Membership Mailing	172	Watershed Coalition News	x
PNSSNS	10/1/2009	Membership Kick-off	Farmland Self Assessment Workbooks; Renewal notice		850	None	
PNSSNS	12/2/2009	Ag Comm, NRCD	Low Impact Monitoring Plan – proposed	Western Placer Waste Mgmt Authority	8	None	
PNSSNS	1/13/2010	Board Mtg.	LT ILRP, Low Impact Groups	WPWMA	10	None	
PNSSNS	2/5/2010	LIMP into ILRP; Annual Mtg. Prep.	UC Davis Coop Ext. Cow Pat Study, LIMP, LT ILRP	Placer Co. Water Agency	11	None	
PNSSNS	2/10/2010	Annual Membership Mtg.	ILRP and Low Impact Concerns; BMP on Cattle; Cost Reduction Projects, What next w/ILRP	PCWA	50	None	
PNSSNS	2/26/2010	Board Mtg.		WPWMA	10	None	
PNSSNS	3/19/2010	Special LIMP fit into ILRP Mtg. w/ag comm., upperwatersheds,	How to get low impact concerns voiced. Letters from counties, senators, etc. to RWB. Where LIMP fits into ILRP?	WPWMA	16	None	

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
PNSSNS	3/24/2010	Special Mtg. in Williams	SVWQC Governance	Williams	Frank Correia; Bonnie Ferreira	None	
PNSSNS	4/14/2010	SVWQC Qtrly Mtg.; Pre-Mtg re: Governance	SVWQC Governance, ILRP, EIR, TIC	WPWMA	25; Ed Sills, Tom Aguilar, Alan Lauppe, Linda Watanabe	None	
PNSSNS	4/30/2010	Board Mtg.	E. Coli surveys, ILRP, low impact letters to RWB	WPWMA	8	None	
PNSSNS	5/28/2010	Board Mtg.	SVWQC Governance, ILRP, EIR	WPWMA	8	None	
PNSSNS	6/2/2010	Governance Mtg.	SVWQC Advisory/governance/budget		Jim Gates	None	
PNSSNS	6/25/2010	Board Mtg.	Invoice, Budget, ILRP, EIR	WPWMA	8	None	
PNSSNS	7/8/2010	Quarterly SVWQC Mgmt Plan Mtg. w/RWB	Technical/Science; PNSSNS frequency sampling reduction	NCWA	Lesa Osterholm	None	
PNSSNS	7/22/2010	Quarterly SVWQC Mtg.; Advisory/Governance Council	Recommended ILRP, Draft EIR	Yuba Sutter Farm Bureau	Jim Gates; Lesa Osterholm	None	
PNSSNS	8/6/2010	Board Meeting	Tier 1 vs. Tier 2; Placer Co. funding for PNSSNS water monitoring costs	WPWMA	10	None	
PNSSNS	9/1/2010	Special Newsflyer	Grassroots effort to convince legislator to say NO to fee hikes; sway RWB to include farm friendly considerations in Recommended ILRP, Draft EIR.	Distribution, website; email	800	None	
PNSSNS	9/24/2010	Board Meeting	Assessment Plan; fee structure; grassroots effort to sway legislator to keep fees same	WPWMA	14	None	
PNSSNS	Fall 2009	Newsletter	BMP for Cattle, pH problems		850	None	
Sacramento Amador	1/21/2010	Amador RCD	sediment toxicity MP, outreach	Jackson, CA	6	Monthly report	
Sacramento Amador	1/27/2010	Ag Commissioners	General overview	Walnut Grove, CA	35	Power point	
Sacramento Amador	2/4/2010	SAWQA	General overview	Jackson, CA	20	Agenda, power point	

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
Sacramento Amador	2/5/2010	SAWQA	Monitoring update	mailing list	693	Monitoring report	
Sacramento Amador	3/8/2010	SAWQA	General overview	Wilton, CA	20	Agenda, power point	
Sacramento Amador	3/18/2010	Amador RCD		Jackson, CA	6	Monthly report	
Sacramento Amador	4/15/2010	Amador RCD	EIR, Chlorosulfuron, general info	Jackson, Ca	6	Monthly Report	
Sacramento Amador	5/20/2010	Amador RCD	E. coli survey, Dimethoate exceeedance	Jackson, CA	6	Monthly Report	
Sacramento Amador	6/17/2010	Amador RCD		Jackson, CA	6	Monthly Report	
Sacramento Amador	6/28/2010	Lower Cos RCD		Walnut Grove, CA	5	Qtly Report	
Sacramento Amador	8/17/2010	Amador RCD	EIR, CV SALTS, E. coli	Jackson, CA	6	Monthly Report	
Sacramento Amador	9/15/2010	Amador RCD	EIR comment letter	Jackson, CA	6	Monthly Report	
Shasta-Tehama	1/29/2010	UC Extension	Walnut Day: Irrigation water quality	Red Bluff	80	None	
Shasta-Tehama	2/5/2010	UC Extension	Prune Day: water quality	Red Bluff	50	None	
Shasta-Tehama	3/1/2010	STWEC	Newsletter: ILRP update	Mail	1200	Newsletter	
Shasta-Tehama	5/5/2010	STWEC	Annual Meeting	Red Bluff	20	None	
Shasta-Tehama	9/1/2010	STWEC	Newsletter: ILRP update	Mail	1200	Newsletter	
Shasta-Tehama	9/15/2010	Deer Creek Watershed	STWEC & ILRP	Vina	15	None	
Shasta-Tehama	Monthly	Cattleman's Assoc	STWEC & ILRP	Redding	20	None	
Solano-Yolo	10/20/2009	Dixon Solano Water Quality Coalition	Pyrethroid information for Coalition members	Sent with membership bills by mail	675	Two documents	x
Solano-Yolo	11/18/2009	Yolo County Farm Bureau Education Corporation	Seminar for Realtors, Lenders and Title Companies	Woodland	106 Invited 17 Attended	Flyer	x
Solano-Yolo	12/1/2009	Dixon Resource Conservation District	Best Management Practices Interest Survey for Dixon RCD members	Sent with ditch fee billing by mail	250	Survey	x
Solano-Yolo	12/1/2009	Solano County Resource Conservation District	Article for SRCD newsletter	Sent by mail to SRCD mailing list	1700	Article	

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
Solano-Yolo	12/1/2009	Dixon Solano Water Quality Coalition	Monitoring Results & Program Requirements presentation for Solano growers	Solano County Ag Commissioner's Pesticide Applicator Training	48	PowerPoint Presentation	x
Solano-Yolo	1/1/2010	Dixon Solano Water Quality Coalition	Monitoring Results & Program Requirements presentation for Solano growers	Solano County Ag Commissioner's Pesticide Applicator Training	56	PowerPoint Presentation	x
Solano-Yolo	6/23/2010	Yolo County Farm Bureau Education Corporation	Spray Safe Seminar	Woodland	1658 Invited 225 Attended	Flyer	x
Solano-Yolo	6/23/2010	Yolo/Solano County Farm Bureaus, Ag Commissioners & Dixon/Solano Water Quality Coalition	SPRAY SAFE meeting presentation of local pesticide exceedances & recommendations	Yolo County Fairgrounds	200 +	None	
Solano-Yolo	8/1/2010	Dixon Solano Water Quality Coalition	Annual Newsletter for Coalition Members	Sent to membership by mail	580	Newsletter Invoice	x
Solano-Yolo	1/12/2010, 1/13/2010, 1/13/2010, 1/14/2010	Yolo County Farm Bureau Education Corporation	Irrigated Lands Seminar	Woodland, Clarksburg, Winters	1650 Invited 137 Attended	Y	
Solano-Yolo	Fall 2010	Yolo County Farm Bureau Education Corporation	Irrigated Lands Waiver Newsletter "Volume 3 Issue 1" - Action Alert	Woodland	1650	Newsletter	x
Solano-Yolo	May 2010	Yolo County Farm Bureau Education Corporation	Irrigated Lands Waiver Newsletter Volume 3 Issue 1	Woodland	1650	Newsletter	x
UFRWG	10/16/2009	UFRWG Annual Membership Mtg	DO/pH and E.coli BMPs DO/pH Special Study Report completion Surveys for IV and AV members	Community Ctr Blairsden, CA	15	Agenda	x
UFRWG	2/1/2010	Newsletter	Grazing BMPs, General Information	Watershed wide	105 Membership	May Newsletter	x
UFRWG	2/24/2010	Sierra County Water Committee	Irrigated Lands Agenda Item	Sierraville, CA	20	None	
UFRWG	2/26/2010	UFRWG Board Mtg	ILRP topics - open to membership		12	None	
UFRWG	3/3/2010	Sierra Valley RCD Mtg	Watershed & ILRP Update Reports	Sierraville, CA	10	None	

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Enclosed?
UFRWG	4/6/2010	Sierra Co Board of Supervisors Mtg	Support Letter UFRWG & Low-Impact Tier in ILRP by Plumas & Sierra County Board of Supervisors	Downieville, CA	10	Support Letter	
UFRWG	5/4/2010	UFRWG, Pacific EcoRisk	QAPP Water Sampling Training	creekside Artois, CA	2 UFRWG sampling team members	None	
UFRWG	5/17/2010	UCCE Field Visits	Grazing BMPs & ranch water quality implementation projects	Sierra Valley Member Ranches	20	None	
UFRWG	5/18/2010	UCCE Field Visits	Grazing BMPs & ranch water quality implementation projects	Indian Valley Member Ranches	12	None	
UFRWG	5/19/2010	UCCE Field Visits	Grazing BMPs & ranch water quality implementation projects	American Valley Member Ranches	10	None	
UFRWG	7/27/2010	Plumas-Sierra Farm Bureau	Ag Water Topics: ILRP update; Water Diversion Reporting regs. D. Merkley CFBF speaker	Fairgrounds Quincy, CA	45	Agenda	
UFRWG	8/12/2010	UFRWG Board Mtg	ILRP Updates & general information	Reid Ranch Quincy, CA	12	Agenda	x
UFRWG	9/1/2010	Sierra Valley RCD Mtg	Watershed & ILRP Update Reports	Sierraville, CA	10	None	
UFRWG	9/1/2010	UFRWG Newsletter	General ILRP Information	Watershed wide	105 Membership	Fall Newsletter	x
UFRWG	Aug 11-14, 2010	UFRWG	Agric. Water Quality Information	Plumas-Sierra County Fair Quincy, CA	County wide	None	

Conclusions and Recommendations

The Coalition submits this *2010 Annual Monitoring Report* (AMR) as required under the Water Board's Irrigated Lands Regulatory Program (*ILRP*). The AMR provides a detailed description of our monitoring results as part of our ongoing efforts to characterize irrigated agricultural and wetlands related water quality in the Sacramento River Basin.

To summarize, the results from the ILRP monitoring in 2010 continue to indicate that with few exceptions, there are no major water quality problems with agricultural and managed wetlands discharges in the Sacramento River Basin.

This AMR characterizes potential water quality impacts of agricultural drainage from a broad geographic area in the Sacramento Valley from October 2009 through September 2010. To date, a total of 55 Coalition storm and irrigation season events have been completed, with additional events collected by coordinating programs. For the period of record in this AMR (October 2009 through September 2010), samples were collected during 10 scheduled monthly events and 2 storm events.

Pesticides were infrequently detected (<3.4% of 2010 pesticide results), and when detected, rarely exceeded applicable objectives. Five registered pesticides (chlorpyrifos, dimethoate, diuron, malathion, simazine) exceeded applicable water quality objectives in a total of nine samples in 2010 Coalition monitoring.

Many of the pesticides specifically required to be monitored by the *ILRP* have rarely been detected in Coalition water samples, including glyphosate, paraquat, and all of the pyrethroid pesticides. Glyphosate, one of the most widely used agricultural pesticides, has been detected in only seven Coalition samples to date, and has never approached concentrations likely to cause toxicity to sensitive test species. Over 98.5% of all pesticide analyses performed to date for the Coalition have been below detection. This indicates that monitoring for many of these pesticides in water is unlikely to provide meaningful results regarding sources or needs for changes in management practices. Based on these results, the Coalition proposed that monitoring of pesticides for the ILRP be conducted based on pesticide use in the subwatersheds. Similarly, the Coalition proposed to conduct more focused monitoring of most trace elements (arsenic, cadmium, lead, molybdenum, nickel, selenium, and zinc); the Coalition's monitoring has demonstrated that these metals do not exceed objectives and are not likely to cause adverse impacts to aquatic life or human health in waters receiving agricultural runoff in the Coalition watershed. A more focused strategy for monitoring pesticides and trace metals has been implemented in 2011 with the Coalition's 2009 MRP (Order No. R5-2009-0875, CVRWQCB 2009[5]).

The majority of exceedances of adopted numeric objectives consisted of conductivity and *E. coli*. Although agricultural runoff and irrigation return flows may contribute to exceedances of these objectives, all of these parameters are controlled or significantly affected by natural processes and sources that are not controllable by agricultural management practices. Sources of *E. coli*

[5] CVRWQCB 2009. Monitoring and Reporting Program Order No. R5-2009-0875 for Sacramento Valley Water Quality Coalition under Amended Order No. R5-2006-0053, Coalition Group Conditional Waiver Of Waste Discharge Requirements For Discharges From Irrigated Lands. California Regional Water Quality Control Board, Central Valley Region.

exceedances have been investigated through a region-wide pilot study conducted by the Coalition. The Coalition also continues to participate in the *ILRP* Technical Issues Committee (TIC) workgroups to develop procedures and guidelines for *ILRP* monitoring and evaluation of exceedances. The TIC has worked with Water Board *ILRP* staff to develop recommendations incorporated into the revised *ILRP* Monitoring and Reporting Program requirements and procedures adopted by the Water Board in 2008 (*Order No. R5-2008-0005*) and 2009 (*Order No. R5-2009-0875*). The Coalition has also been an active participant in the Water Board's stakeholder process to develop a Long-Term *ILRP*.

The Coalition has implemented the required elements of the *ILRP* since 2004. The Coalition developed a Watershed Evaluation Report (WER) that set the priorities for development and implementation of the Monitoring and Reporting Program Plan (MRPP). The Coalition successfully developed the MRPP, QAPP, and Management Plan as required by the *ILRP* and these documents have been approved by the Water Board. Subsequent revisions requested by the Water Board have been incorporated into these documents and were implemented during the 2006 Irrigation Season monitoring, and continued through the Coalition's 2009 and 2010 *ILRP* monitoring efforts. The Coalition continues to adapt and improve elements of the monitoring program based on the knowledge gained through *ILRP* monitoring efforts.

The Coalition has implemented the approved monitoring program in coordination with its subwatershed partners, has initiated follow-up activities to address observed exceedances, and is continuing implementation of the approved Management Plan. Throughout this process, the Coalition has kept an open line of communication with the Water Board and has made every effort to fulfill the requirements of the *ILRP* in a cost-effective and scientifically defensible manner. This annual monitoring report is documentation of the success and continued progress of the Coalition in achieving these objectives.

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Appendices

The following appendices are available in electronic form on the CD provided.

Appendix A: Field Log Copies

Appendix B: Lab Reports and Chains-of-Custody

Appendix C: Tabulated Monitoring Results

Appendix D: Exceedance Reports

Appendix E: Site-Specific Drainage Maps

Appendix F: SVWQC Outreach Materials