SVWQC

March 1, 2013

Pamela Creedon, Executive Director
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive
Rancho Cordova, CA 95670-6114

RE: 2012 Annual Monitoring Report

Dear Ms. Creedon:

Attached is the Sacramento Valley Water Quality Coalition's (SVWQC) 2012 Annual Monitoring Report (AMR) for the SVWQC Monitoring and Reporting Program (MRP). The SVWQC has developed and implemented the monitoring to meet the MRP 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, R5-2009-0875). The scope of the monitoring program and the sampling and analytical methods used in the Coalition and subwatershed 2012 monitoring have been approved by the Central Valley Regional Water Quality Control Board (Regional Board).

The AMR summarizes the sampling results and analysis, interpretation of the data, as well as documenting the outreach to SVWQC landowners.

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

Should you or your staff have questions on the 2012 AMR, please contact me or Bruce Houdesheldt.

Sincerely,

David J. Guy
President
Northern California Water Association

Cc: Joe Karkoski
Susan Fregien
Mark Cady
Claus Suverkropp
Bruce Houdesheldt

M A R C H 2 0 1 3

S A C R A M E N T O V A L L E Y
W A T E R Q U A L I T Y C O A L I T I O N

Monitoring and Reporting Program

Annual Monitoring Report 2012

Prepared by:

LARRY WALKER ASSOCIATES

Table of Contents

List of Appendices

List of Tables

List of Figures

Executive Summary

SUMMARY OF MONITORING PROGRAM

The Sacramento Valley Water Quality Coalition (Coalition) has developed and implemented a Monitoring and Reporting Program (MRP) to meet the requirements of the original *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, R5-2009-0875). The scope of the MRP and the sampling and analytical methods used in 2012 Coalition 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 MRP 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 2012 Coalition Monitoring 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. Monitoring in the Upper Feather River and Pit River subwatersheds was conducted in coordination the California's Surface Water Ambient Monitoring Program (SWAMP) beginning in 2012. The Coalition is also continues to coordinate with the California Rice Commission (CRC) under the December 2004 Coalition-CRC Memorandum of Understanding.

The parameters monitored in 2012 by the Coalition to achieve these objectives are as specified in the current MRP (*R5-2009-0875*), including the following:

- 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 2012 Coalition Monitoring are listed in **Table 2**.

A total of 41 regular sampling sites were monitored by the Coalition and coordinating subwatershed monitoring programs during 2012 (**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 2012 Coalition Monitoring are summarized in **Table 4**. This *Annual Monitoring Report 2012* (AMR) includes results for October 2011 through September 2012.

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:

- Napa County Resource Conservation District staff conducts sampling for the two Napa subwatershed sites;
- The Northeastern California Water Association conducts sampling for the Pit River subwatershed site;
- Balance Hydrologics, Inc., conducts sampling for the Placer-Nevada-South Sutter-North Sacramento subwatershed;
- Caltest Analytical Laboratory (Napa, California) and Basic Lab (Redding, California), conduct all conventional and microbiological analyses; and
- APPL (Fresno, California) and Physis Environmental Laboratories (Anaheim, California) conduct pesticide analyses.

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 the most recent Management Plan Progress Report (MPPR) to the Water Board in April 2012. The MPPR that documents the status and progress toward Management Plan requirements for 2012 will be provided to the Water Board at the end of March 2013. Activities conducted in 2012 to implement the Coalition's Management Plan included addressing exceedances of objectives for registered pesticides, completion of source evaluations for pesticides and toxicity, development of management practice implementation goals, and monitoring required for toxicity and pesticide management plans and TMDLs.

Implementation completed specifically for registered pesticides and toxicity 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 have been 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 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.

CONCLUSIONS AND RECOMMENDATIONS

The Coalition submits this *2012 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 2012 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 2011 through September 2012. To date, a total of 79 Coalition storm and irrigation season events have been completed, with additional events collected by coordinating programs and for follow-up evaluations. For the period of record in this AMR (October 2011 through September 2012), samples were collected for 10 scheduled monthly events and 2 wet weather ("storm") events.

Pesticides were infrequently detected (~2.5% of 2012 pesticide results), and, when detected, rarely exceeded applicable objectives. Five registered pesticides (chlorpyrifos, diuron, malathion, methyl parathion, and simazine) exceeded applicable water quality objectives or ILRP trigger limits in ten out of 148 total Coalition monitoring samples in 2012 (including exceedances in two field duplicate samples).

Many of the pesticides specifically required to be monitored in the past 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. Coalition monitoring of pesticides for the *ILRP* for 2012 was conducted based on management plan requirements, and the reported pesticide use and relative toxicity risks for these pesticides in the subwatersheds. Similarly, the Coalition conducted more focused monitoring of most trace elements (arsenic, cadmium, lead, molybdenum, nickel, selenium, and zinc) informed by the Coalition's past monitoring results, which have demonstrated that these metals typically 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. This more focused strategy for monitoring pesticides and trace metals was implemented in 2010 in accordance with the Coalition's 2009 MRP (Order No. R5-2009-0875, CVRWQCB 2009[1]).

The majority of exceedances of adopted numeric objectives continue to consist of conductivity, dissolved oxygen, and *E. coli*. Agricultural runoff and irrigation return flows may contribute to exceedances of these objectives, but these parameters are largely controlled or significantly affected by natural processes and sources that are not controllable by agricultural management practices.

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 initial 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 the Coalition's program and implemented through the Coalition's ongoing *ILRP* monitoring efforts. The Coalition also 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 required 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 AMR 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 (MRP). 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, R5-2009-0875).

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; 42
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	42
11. Electronic data submitted in a SWAMP comparable format	Submitted quarterly; Appendix C	CD
12. Sampling and analytical methods used	Sampling and Analytical Methods	17
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	26

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	55; 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	76
21. Status update on preparation and implementation of all Management Plans and other special projects	Management Practices and Actions Taken	76
22. Conclusions and recommendations	Conclusions and Recommendations	78

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 city of Redding at its northern terminus, the Sacramento Valley stretches approximately 180 miles to the southeast where it merges into the Sacramento-San Joaquin River Delta south of the Sacramento metropolitan area at Rio Vista. The valley is 30 to 45 miles wide in the southern to central parts but narrows to about 5 miles wide near Redding. 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 monitoring program 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 MRP 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 in 2012 to achieve these objectives are as specified in the current MRP (R5-2009-0875):

- 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 for the 2012 Monitoring Year

Analyte	Quantitation Limit[a]	Reporting Unit
Physical Parameters		
Flow	NA	CFS (Ft^3/Sec)
pH	0.1 [b]	$-\log[H^+]$
Conductivity	0.1 [b]	µmhos/cm
Dissolved Oxygen	0.1 [b]	mg/L
Temperature	0.1 [b]	˚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
Sediment Toxicity		
Hyalella, 10-day short-term chronic	NA	% Survival
Pesticides		
Benzophenyls	(c)	µg/L
Carbamates	(c)	µg/L
Herbicides	(c)	µg/L
Organochlorine	(c)	µg/L
Organophosphorus	(c)	µg/L
Pyrethroids and chlorpyrifos	(c)	ng/g, d.w.
Triazines	(c)	ng/g
Trace Elements		
Arsenic	0.5	µg/L
Boron	10	µg/L
Copper	0.5	µg/L
Lead	0.25	µg/L
Molybdenum	1	µg/L
Selenium	1.0	µg/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) 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.

(b) Detection and reporting limits are not strictly defined. Value is required reporting precision.

(c) 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 (now 12) 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 an updated MRPP responsive to a revised ILRP MRP (*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 MRPP, including the following significant revisions in monitoring approach:

- Monitoring conducted at sites in drainages representative of larger regions based on shared agricultural and geographic characteristics
- A cycle of one year of “Assessment” monitoring for the broader suite of ILRP analytes and two years of “Core” monitoring of a reduced set of analytes, plus sampling needed for Management Plan implementation.
- Customization of monitoring schedules and the analytes monitored based on the characteristics of individual subwatersheds.

These modifications were retained in the current MRP (pages 7-10 of R5-2009-0875) and are addressed with the Coalition’s approved 2012 ILRP Monitoring Plan. Monitoring sites for 2012 were continued from previously monitored locations and included ongoing representative sites and sites monitored only for management plans or TMDLs. A total of 17 representative sites were monitored for Assessment and Core monitoring analytes. Additionally, Management Plan sampling was conducted at all 17 of the representative monitoring sites and at 20 additional sites.

SAMPLING SITE LOCATIONS AND LAND USES

The water and sediment sites monitored by the Coalition in 2012 are listed in **Table 3**. All sites monitored in 2012 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, 2012

Subwatershed	Site Name	Latitude	Longitude	Implementing Agency	Site ID (Fig. 1)
ButteYubaSutter	Butte Slough at Pass Road	39.1873	-121.90847	SVWQC	BTTSL
ButteYubaSutter	Gilsizer Slough at George Washington Road	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 Road	39.78114	-121.98771	SVWQC	PNCGR
ButteYubaSutter	Sacramento Slough bridge near Karnak	38.785	-121.6533	SVWQC	SSKNK
ColusaGlenn	Colusa Basin Drain above KL	38.8121	-121.7741	SVWQC	COLDR
ColusaGlenn	Freshwater Creek at Gibson Rd	39.17664	-122.18915	SVWQC	FRSHC
ColusaGlenn	Lurline Creek at 99W	39.21215	-122.18331	SVWQC	LRLNC
ColusaGlenn	Rough and Ready Pumping Plant (RD 108)	38.86209	-121.7927	SVWQC	RARPP
ColusaGlenn	Stone Corral Creek near Maxwell Road	39.2751	-122.1043	SVWQC	SCCMR
ColusaGlenn	Stony Creek on Hwy 45 near Rd 24	39.71005	-122.00404	SVWQC	STYHY
ColusaGlenn	Walker Creek near 99W and CR33	39.62423	-122.19652	SVWQC	WLKCH
ElDorado	Coon Hollow Creek	38.75335	-120.72404	SVWQC	COONH
ElDorado	North Canyon Creek	38.76242	-120.70996	SVWQC	NRTCN
Lake	McGaugh Slough at Finley Road East	39.00417	-122.86233	SVWQC	MGSLU
Lake	Middle Creek u/s from Highway 20	39.17641	-122.91271	SVWQC	MDLCR
Napa	Burton Creek at Pope Canyon Road	38.61665	-122.39466	PCWG	BCPCR
Napa	Maxwell Creek at Pope Valley Road	38.57396	-122.39737	PCWG	MCPVR
Napa	Pope Creek upstream from Lake Berryessa	38.64637	-122.36424	PCWG	PCULB
Napa	Swartz Creek at Aetna Springs Road	38.65333	-122.47642	PCWG	SCAET
Napa	Upper Pope Creek at Pope Valley Road	38.65851	-122.45391	PCWG	PCPVR
PitRiver	Fall River at Fall River Ranch Bridge	41.0351	-121.4864	NECWA	FRRRB
PitRiver	Pit River at Canby Bridge	41.4017	-120.931	NECWA	PRCAN
PitRiver	Pit River at Pittville	41.0454	-121.3317	NECWA	PRPIT
PNSSNS	Coon Creek at Brewer Road	38.93399	-121.45184	PNSSNS	CCBRW
PNSSNS	Coon Creek at Striplin Road	38.8661	-121.5803	PNSSNS	CCSTR
SacramentoAmador	Cosumnes River at Twin Cities Rd	38.29098	-121.38044	SVWQC	CRTWN
SacramentoAmador	Dry Creek at Alta Mesa Road	38.248	-121.226	SVWQC	DCGLT
SacramentoAmador	Grand Island Drain near Leary Road	38.2399	-121.5649	SVWQC	GIDLR
SacramentoAmador	Laguna Creek at Alta Mesa Rd	38.31102	-121.2263	SVWQC	LAGAM
ShastaTehama	Anderson Creek at Ash Creek Road	40.418	-122.2136	SVWQC	ACACR
ShastaTehama	Coyote Creek at Tyler Road	40.09261	-122.15898	SVWQC	COYTR
Solano	Shag Slough at Liberty Island Bridge	38.30677	-121.69337	SVWQC	SSLIB

Subwatershed	Site Name	Latitude	Longitude	Implementing Agency	Site ID (Fig. 1)
Solano	Ulatis Creek at Brown Road	38.307	-121.794	SVWQC	UCBRD
Solano	Z-Drain	38.45215	-121.6752	SVWQC	ZDDIX
Solano	Z-Drain Sediment Site	38.4524	-121.6752	SVWQC	ZDDSS
UpperFeatherRiver	Middle Fork Feather River above Grizzly Cr	39.816	-120.426	UFRW	MFFGR
Yolo	Cache Creek at Capay Diversion Dam	38.7137	-122.0851	SVWQC	CCCPY
Yolo	Tule Canal at I-80	38.5728	-121.5827	SVWQC	TCHWY
Yolo	Willow Slough Bypass at Pole Line	38.59015	-121.73058	SVWQC	WLSPL

Note:

1. Sediment chemistry monitoring was conducted at UCBRD, WLSPL, ZDDIX, and ZDDSS.

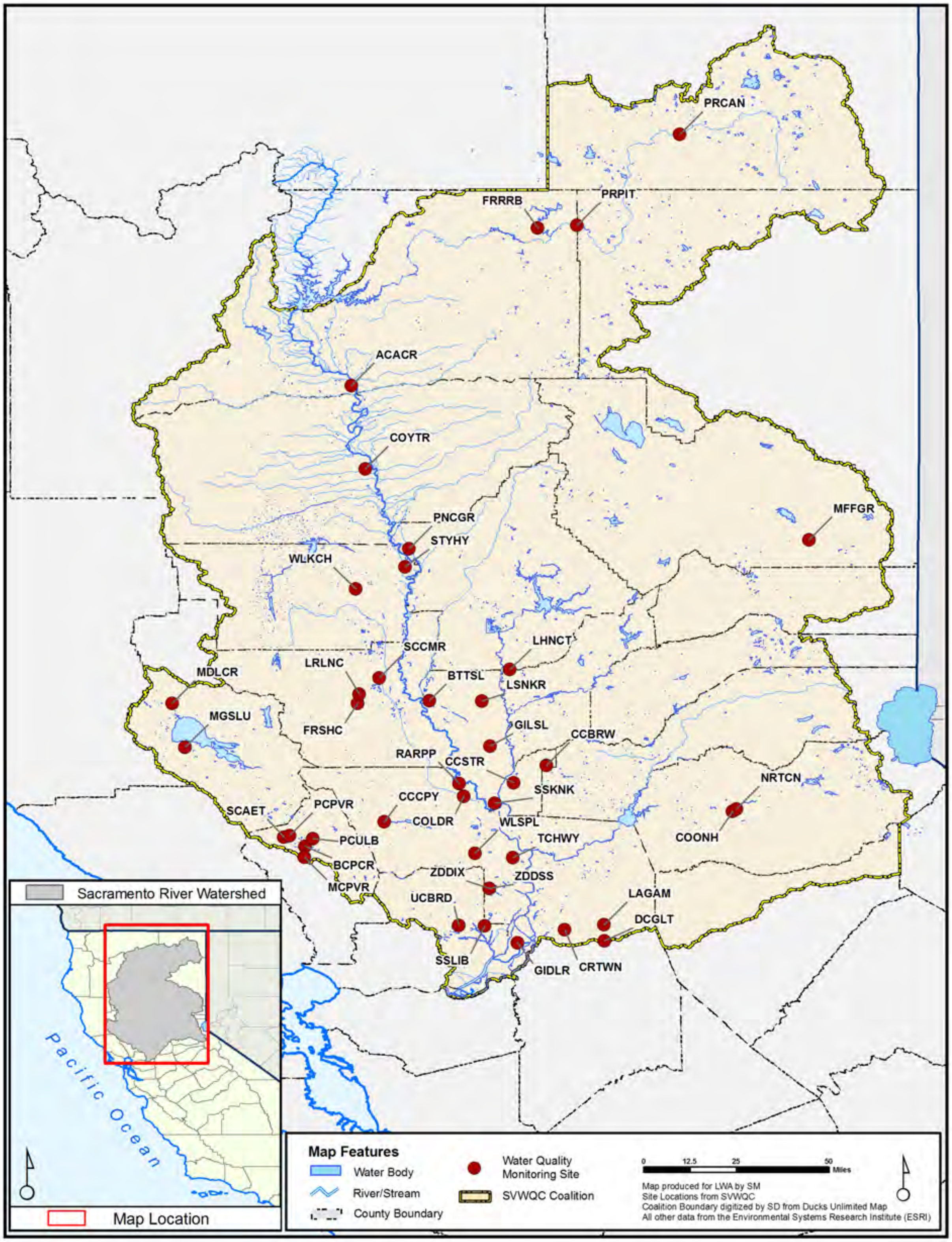

Figure 1. Coalition Monitoring Sites

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.

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.

Lurline Creek at 99W (LRLNC)

The Lurline Creek drainage includes approximately 55,000 total acres. Irrigated acreage (excluding rice acreage) is approximately 19,000 acres. Predominant crops in the drainage are rice, idle acreage, pasture, managed wetland, grain, melons, and squash.

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.

Stone Corral Creek at Maxwell Road (SCCMR)

This site captures drainage from approximately 10,000 irrigated acres in the Stone Corral Creek drainage area as indicated on the Colusa Basin Subwatershed map. The primary crops include pasture, wheat, rice and safflower.

Stony Creek on Hwy 45 near Rd 24 (STYHY)

This site characterizes water from the contributing area downstream of Black Butte Reservoir just north of the town of Orland and includes approximately 20,000 acres of irrigated lands. The major irrigated crops in the Lower Stony Creek drainage are pasture, almonds, prunes, and wheat.

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 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.

Coon Hollow Creek (COONH)

This site is located in the Apple Hill area of Camino, approximately 1 mile north of the intersection of North Canyon Road and Carson Road and 1/2 mile south of the confluence with South Canyon Creek. Agricultural operations within the drainage include silviculture, apples, wine grapes, cherries, and blueberries. Coon Hollow Creek is considered a low-flow perennial stream.

Lake 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 approximately 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.

McGaugh Slough at Finley Road East (MGSLU)

McGaugh Slough captures irrigated agricultural drainage from about 10,300 acres of orchard and vineyard crops in Lake County. This site characterizes the most prevalent drain for the Big Valley, which is the most intensive area for agricultural operations in Lake County.

Napa Subwatershed

Pope Creek above Lake Berryessa (PCULB)

The site on Pope Creek in Napa County is downstream of major storm runoff and above Lake Berryessa. Primary crops in the drainage include vineyards and olive orchards. Additional tributaries in the Pope Creek area (Burton Creek, Swartz Creek, Maxwell Creek, and upper Pope Creek) have been sampled to help establish regional characteristics for management plan source evaluations.

Pit River Subwatershed

Monitoring in this subwatershed has been conducted in coordination with the Northeastern California Watershed Association (NECWA) and the California's Surface Water Ambient Monitoring Program (SWAMP).

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.

Fall River at Fall River Ranch Bridge (FRRRB)

This site is located at the lower end of Fall River before the river is partially diverted for hydroelectric uses at the Pit 1 Power House. The majority of Fall River flow is spring-fed water that emerges in the northern portions of the valley (e.g., Lava Creek Springs, Spring Creek Springs, Crystal Springs, Mallard Springs, Big Lake Springs, Thousand Springs, Hideaway Spring, Rainbow Spring). These springs form the Little Tule River, Tule River, Spring Creek, Lava Creek, Mallard Creek, and Ja She Creek. A major tributary to Fall River (Bear Creek) captures flow mostly from private timberland comprising approximately 27 square miles of watershed. Bear Creek joins the Fall River near Thousand Springs. Finally, small amounts of water enter the Fall River from overland flow during winter and from irrigated lands during the growing season. Pasture, wild rice, and alfalfa are the primary agriculture crops in the northern portion of the valley. Total irrigated acreage draining to this site is approximately 12,000 acres.

Pit River at Canby (PRCAN)

This site captures drainage from the Alturas and Canby drainage areas, as well as drainage from the North and South Fork of Pit River and Hot Springs Valley. Land-uses are primarily pasture and grain and hay crops. Approximate irrigated acreage is 50,000.

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.

Coon Creek at Striplin Road (CCSTR)

This site captures drainage from the Middle and Lower Coon Creek drainage areas. The sampling site is on Coon Creek about one mile downstream of the confluence with Ping Slough. The site drains approximately 25,000 irrigated acres of orchards, pasture, and wheat. There may also be some urban runoff contributions at this site.

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 includes 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.

Dry Creek at Alta Mesa Road (DCGLT)

Dry Creek originates in the eastern foothills and flows through considerable agricultural acreage. The drainage includes the southern portion of Amador County, the southeast corner of Sacramento County and the northeast corner of San Joaquin County. Amador County agriculture includes grain and irrigated pasture in the Dry Creek Valley and row crops, irrigated pasture, grain, vineyard, and orchard in the Jackson Valley. Sacramento County agriculture includes vineyard, irrigated pasture, grain, and scattered dairies. Dry Creek drains approximately 329 square miles (n.b., the number of irrigated acres is still being determined).

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.

Laguna Creek at Alta Mesa Road (LAGAM)

Laguna Creek is a tributary to the Cosumnes River. Laguna Creek originates in Amador County and flows south-west into Sacramento County, draining Willow, Hadselville, Brown and Griffith Creeks, among others. The primary agricultural uses are vineyards, field crops, grain and hay crops and pasture.

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.

Coyote Creek at Tyler Road (COYTR)

The Coyote Creek drainage includes approximately 37,000 total acres. Irrigated acreage (excluding rice acreage) is approximately 6,700 acres. Predominant crops in the drainage are pasture, walnuts, prunes, almonds, and olives.

Solano 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.

Z-Drain (ZDDIX)

The Z-Drain is a tributary draining 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. A secondary site (ZDDSS) is located immediately downstream of ZDDIX and is occasionally sampled for follow-up source evaluations.

Yolo Subwatershed

Cache Creek at Capay Diversion Dam (CCCPY)

The diversion dam on Cache Creek near Capay is the main diversion point for irrigation water in the 190,000 acre Yolo County Flood Control and Water Conservation District. The Diversion Dam is located 1.9 miles west of the town of Capay. During the summer irrigation season, the water at this site is released from storage approximately 50-60 miles upstream, from the Clear Lake and Indian Valley Reservoirs. There is no snow pack in this coastal watershed, therefore winter flows are very flashy (rising and falling quickly). Major crops in this drainage include tomatoes, alfalfa, corn, wheat, grapes, and orchards.

Tule Canal at North East corner of I-80 (TCHWY))

This site is near the USGS Gauging Station in the Upper Yolo Bypass and is located just South of Interstate 80. This site characterizes the East Side Canal in the bypass and serves as a major drain for croplands in the North Yolo Bypass drainage as indicated on the Yolo Solano Subwatershed map. This drainage area includes corn, wheat, tomatoes, safflower and pasture.

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.

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 and the California's Surface Water Ambient Monitoring Program (SWAMP).

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 filling 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 sampling sites on an approximately 50 meter reach of the waterbody near the water sampling 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 2012 Coalition Monitoring are summarized in **Table 4**. The Coalition's monitoring strategy for 2012 was designed to characterize high priority drainages that are representative of a 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. 2012 Coalition Monitoring Year: Planned Samples, October 2011 – September 2012

Subwatershed and Site	Water Column Events	Sediment Events	Field Measures, Physical, Conventional	Nutrients	Pathogen Indicators	Trace Metals	OP Pesticides	Carbamates, Urea Pesticides, Diflubenzuron	Hexazinone	Oxyfluorfen	Simazine	Legacy OCLs	*Ceriodaphnia* Toxicity	*Pimephales* Toxicity	*Selenastrum* Toxicity	*Hyallela* Toxicity, Grain Size	Sediment Pyrethroids, Chlorpyrifos, TOC
ButteYubaSutter																	
Butte Slough at Pass Road	2	0	2	0	0	0	0	0	0	6	0	0	0	0	6	0	0
Gilsizer Slough at George Washington Road	2	0	2	0	0	0	7	0	0	0	0	2	0	0	0	0	0
Lower Honcut Creek at Hwy 70	12	0	12	12	12	3	5	2	0	2	2	0	0	0	2	0	0
Lower Snake R. at Nuestro Rd	12	0	12	12	12	3	8	2	0	2	2	0	5	0	2	0	0
Pine Creek at Nord Gianella Road	12	0	12	12	12	3	7	2	0	2	2	0	0	0	2	0	0
Sacramento Slough Bridge near Karnak	12	0	12	12	12	3	6	2	0	2	2	0	0	0	2	0	0
ColusaGlenn																	
Colusa Basin Drain above KL	10	0	10	10	10	0	7	2	0	2	2	0	0	0	2	0	0
Freshwater Creek at Gibson Rd	10	0	10	10	10	0	0	2	0	2	2	2	0	0	2	0	0
Lurline Creek at 99W	2	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Rough and Ready Pumping Plant (RD 108)	2	0	2	0	0	0	7	0	0	0	0	2	0	0	0	0	0
Stone Corral Creek near Maxwell Road	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stony Creek on Hwy 45 near Rd 24	1	2	1	0	0	0	2	0	0	0	0	0	2	0	0	2	0
Walker Creek near 99W and CR33	10	0	10	10	10	0	5	2	0	2	2	0	8	0	2	0	0
ElDorado																	
Coon Hollow Creek	2	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
North Canyon Creek	2	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Lake																	
McGaugh Slough at Finley Road East	6	0	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
Middle Creek u/s from Highway 20	7	0	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0
Napa																	
Burton Creek at Pope Canyon Rd	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maxwell Creek at Pope Valley Rd	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pope Creek upstream from Lake Berryessa	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Swartz Creek at Aetna Springs Rd	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Pope Creek at Pope Valley Rd	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Subwatershed and Site	Water Column Events	Sediment Events	Field Measures, Physical, Conventional	Nutrients	Pathogen Indicators	Trace Metals	OP Pesticides	Carbamates, Urea Pesticides, Diflubenzuron	Hexazinone	Oxyfluorfen	Simazine	Legacy OCLs	*Ceriodaphnia* Toxicity	*Pimephales* Toxicity	*Selenastrum* Toxicity	*Hyallela* Toxicity, Grain Size	Sediment Pyrethroids, Chlorpyrifos, TOC
PitRiver																	
Fall River at Fall River Ranch Bridge	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pit River at Canby Bridge	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pit River at Pittville	6	0	6	6	6	0	0	1	0	0	0	0	0	0	1	0	0
PNSSNS																	
Coon Creek at Brewer Road	8	0	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0
Coon Creek at Striplin Road	5	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0
SacramentoAmador																	
Cosumnes River at Twin Cities Rd	12	2	12	12	12	2	4	2	0	2	2	0	1	1	2	2	0
Dry Creek at Alta Mesa Road	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Island Drain near Leary Road	12	0	12	12	12	2	5	2	0	2	2	2	1	1	2	0	0
Laguna Creek at Alta Mesa Rd	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ShastaTehama																	
Anderson Creek at Ash Creek Road	12	0	12	12	12	0	1	0	0	2	0	0	0	0	2	0	0
Coyote Creek at Tyler Road	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solano																	
Shag Slough at Liberty Island Bridge	10	0	10	10	10	1	6	1	1	2	2	0	0	0	2	0	0
Ulatis Creek at Brown Road	11	0	11	11	11	1	6	3	1	2	2	0	0	0	4	0	0
Z-Drain	2	3	2	0	0	0	0	0	0	0	0	0	0	0	0	2	1
Z-Drain downstream site	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Yolo																	
Cache Creek at Capay Diversion Dam	4	0	0	0	0	0	4	0	0	0	0	0	4	0	0	0	0
Tule Canal at I-80	4	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0
Willow Slough Bypass at Pole Line	10	2	10	10	10	5	7	3	1	2	2	2	7	0	9	0	2
UpperFeatherRiver																	
Middle Fork Feather River above Grizzly Cr	5	0	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0

ANALYTICAL METHODS

Water chemistry samples were analyzed for filtered and unfiltered 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) Data Quality Objectives for Analyses of Surface Water

Method	Analyte	Fraction	Units	MDL	QL	Note
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/100mL	2	2	
Organophosphorus Pesticides						
EPA 625(m)	Chlorpyrifos	Unfiltered	µg/L	0.001	0.002	
EPA 625(m)	Demeton-S	Unfiltered	µg/L	0.001	0.002	
EPA 625(m)	Diazinon	Unfiltered	µg/L	0.002	0.004	
EPA 625(m)	Dichlorvos	Unfiltered	µg/L	0.003	0.006	
EPA 625(m)	Disulfoton	Unfiltered	µg/L	0.003	0.006	
EPA 625(m)	Ethoprop	Unfiltered	µg/L	0.001	0.002	
EPA 625(m)	Fenchlorphos	Unfiltered	µg/L	0.002	0.004	
EPA 625(m)	Fensulfothion	Unfiltered	µg/L	0.001	0.002	
EPA 625(m)	Fenthion	Unfiltered	µg/L	0.002	0.004	
EPA 625(m)	Malathion	Unfiltered	µg/L	0.003	0.006	
EPA 625(m)	Mevinphos	Unfiltered	µg/L	0.008	0.0016	(a)
EPA 625(m)	Parathion, Methyl	Unfiltered	µg/L	0.001	0.002	
EPA 625(m)	Phorate	Unfiltered	µg/L	0.001	0.002	
EPA 625(m)	Sulprofos	Unfiltered	µg/L	0.001	0.002	
EPA 625(m)	Tetrachlorvinphos	Unfiltered	µg/L	0.002	0.004	
EPA 625(m)	Tokuthion	Unfiltered	µg/L	0.003	0.006	
EPA 625(m)	Trichloronate	Unfiltered	µg/L	0.001	0.002	
Organochlorine Pesticides						
EPA 625(m)	4,4’-DDT (o,p’ and p,p’)	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	4,4’-DDE (o,p’ and p,p’)	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	4,4’-DDD (o,p’ and p,p’)	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Aldrin	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Chlordane	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Dacthal	Unfiltered	µg/L	0.008	0.05	
EPA 625(m)	Dicofol	Unfiltered	µg/L	0.05	0.1	
EPA 625(m)	Dieldrin	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Endosulfan I	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Endosulfan II	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Endosulfan sulfate	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Endrin	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Endrin Aldehyde	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Endrin Ketone	Unfiltered	µg/L	0.001	0.005	

Method	Analyte	Fraction	Units	MDL	QL	Note
EPA 625(m)	HCH	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Heptachlor	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Heptachlor epoxide	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Hexachlorobenzene	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Methoxychlor	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Mirex	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Nonachlor	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Oxychlordane	Unfiltered	µg/L	0.001	0.005	
EPA 625(m)	Perthane	Unfiltered	µg/L	0.001	0.005	
Carbamate and Urea Pesticides						
EPA 8321	Aldicarb	Unfiltered	µg/L	0.2	0.4	
EPA 8321	Aminocarb	Unfiltered	µg/L	0.2	0.4	
EPA 8321	Barban	Unfiltered	µg/L	1.75	3.5	
EPA 8321	Benomyl/Carbendazim	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	Chlorpropham	Unfiltered	µg/L	0.4	0.8	
EPA 8321	Methiocarb	Unfiltered	µg/L	0.2	0.4	
EPA 8321	Methomyl	Unfiltered	µg/L	0.05	0.07	
EPA 8321	Mexacarbate	Unfiltered	µg/L	0.4	0.8	
EPA 8321	Oxamyl	Unfiltered	µg/L	0.2	0.4	
EPA 8321	Propham	Unfiltered	µg/L	1.75	3.5	
EPA 8321	Propoxur	Unfiltered	µg/L	0.2	0.4	
Pyrethroid Pesticides						
GCMS-NCI	Allethrin	Unfiltered	µg/L	0.0001	0.0015	
GCMS-NCI	Bifenthrin	Unfiltered	µg/L	0.0001	0.0015	
GCMS-NCI	Cyfluthrin	Unfiltered	µg/L	0.0002	0.0015	
GCMS-NCI	Cypermethrin	Unfiltered	µg/L	0.0002	0.0015	
GCMS-NCI	Deltamethrin/Tralomethrin	Unfiltered	µg/L	0.0002	0.003	
GCMS-NCI	Esfenvalerate/Fenvalerate	Unfiltered	µg/L	0.0002	0.003	
GCMS-NCI	Fenpropathrin	Unfiltered	µg/L	0.0002	0.0015	
GCMS-NCI	Fluvalinate	Unfiltered	µg/L	0.0002	0.0015	
GCMS-NCI	Lambda-Cyhalothrin	Unfiltered	µg/L	0.0002	0.0015	
GCMS-NCI	Permethrin	Unfiltered	µg/L	0.002	0.015	
GCMS-NCI	Tetramethrin	Unfiltered	µg/L	0.0002	0.0015	
Other Herbicides						
EPA 8321	Bromacil	Unfiltered	µg/L	0.2	0.4	(a)
EPA 8321	Chloroxuron	Unfiltered	µg/L	0.2	0.4	
EPA 8081A	Dacthal	Unfiltered	µg/L	0.008	0.05	
EPA 8321	Diuron	Unfiltered	µg/L	0.2	0.4	
EPA 8321	Diuron	Unfiltered	µg/L	2	4	(a)
EPA 8321	Diuron	Unfiltered	µg/L	4	8	(a)
EPA 8321	Fenuron	Unfiltered	µg/L	0.2	0.4	

Method	Analyte	Fraction	Units	MDL	QL	Note
EPA 8321	Fluometuron	Unfiltered	µg/L	0.2	0.4	
EPA 8321	Linuron	Unfiltered	µg/L	0.2	0.4	
EPA 625	Merphos	Unfiltered	µg/L	0.001	0.002	(a)
EPA 8321	Monuron	Unfiltered	µg/L	0.2	0.4	
EPA 8321	Neburon	Unfiltered	µg/L	0.2	0.4	
EPA 8321	Oryzalin	Unfiltered	µg/L	0.2	0.4	
EPA 8081A	Oxyfluorfen	Unfiltered	µg/L	0.008	0.05	
EPA 8321	Propachlor	Unfiltered	µg/L	0.2	0.4	(a)
EPA 8321	Siduron	Unfiltered	µg/L	0.2	0.4	
EPA 8321	Tebuthiuron	Unfiltered	µg/L	0.2	0.4	
Benzophenyls						
EPA 8321	Diflubenzuron	Unfiltered	µg/L	0.2	0.4	
Triazines						
EPA 8141A	Hexazinone	Unfiltered	µg/L	0.1	0.5	
EPA 8141A	Simazine	Unfiltered	µg/L	0.08	0.5	
Trace Elements						
EPA 200.8	Arsenic	Unfiltered	µg/L	0.08	0.5	
EPA 2008	Boron	Unfiltered	µg/L	1	10	
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	Unfiltered	µg/L	0.01	0.1	
EPA 200.8	Selenium	Unfiltered	µg/L	0.5	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	

Note:
(a) No QL target has been established for this analyte.

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

Method	Analyte	Fraction	Units	MDL	QL
Physical and Conventional Parameters					
SM 2560D	Grain Size Analysis	NA	% fraction	NA	1
EPA 160.3	Solids (TS)	Total	%	NA	0.1
EPA 9060	Organic Carbon, Total (TOC)	Total	mg/kg d.w.	50	200
Pyrethroids					
EPA 8270C(m)	Allethrin	Total	ng/g d.w.	0.1	1
EPA 8270C(m)	Bifenthrin	Total	ng/g d.w.	0.1	1
EPA 8270C(m)	Cyfluthrin	Total	ng/g d.w.	0.1	1
EPA 8270C(m)	Cypermethrin	Total	ng/g d.w.	0.1	1
EPA 8270C(m)	Deltamethrin/Tralomethrin	Total	ng/g d.w.	0.15	1
EPA 8270C(m)	Esfenvalerate/Fenvalerate	Total	ng/g d.w.	0.15	1
EPA 8270C(m)	Fenpropathrin	Total	ng/g d.w.	0.15	1
EPA 8270C(m)	Fluvalinate	Total	ng/g d.w.	0.1	1
EPA 8270C(m)	Lambda-Cyhalothrin	Total	ng/g d.w.	0.1	1
EPA 8270C(m)	Permethrin	Total	ng/g d.w.	0.1	1
EPA 8270C(m)	Tetramethrin	Total	ng/g d.w.	0.1	1
Organochlorine Pesticides					
EPA 8270C(m)	Chlorpyrifos	Total	ng/g d.w.	0.1	3
EPA 8270C(m)	Diazinon	Total	ng/g d.w.	5	40

Monitoring Results

The following sections summarize the monitoring conducted by the Coalition and its Subwatershed partners in 2012 (October 2011 through September 2012).

SUMMARY OF SAMPLE EVENTS CONDUCTED

This report presents monitoring results from twelve Coalition sampling events (Events 068-079), as well as data for events conducted by coordinating Subwatershed monitoring programs between October 2011 and September 2012. Samples collected for all of these events are listed in **Table 7**.

The Coalition and Subwatershed monitoring events were conducted throughout the year. Event monitoring analyses included water chemistry and toxicity. During 2012 monitoring, pesticides were monitored during months when higher use is typical. Sediment toxicity testing and/or chemistry analyses were also conducted by the Coalition at 5 sites as part of the assessment and 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 2011 through September 2012 events, as well as associated site photographs, are provided in **Appendix A**.

Table 7. Sampling for the 2012 Coalition Monitoring Year

Subwatershed (Agency)	Site ID	Sample Count: Planned	Sample Count: Collected	68 OCT	69 NOV	70 DEC	71 JAN	72 FEB	73 MAR	74 APR	75 MAY	76 JUN	77 JUL	78 AUG	79 SEP
ButteYubaSutter (SVWQC)	BTTSL	8	8	-	W	W	W	W	W	W	-	W	-	W	-
	GILSL	7	7	-	-	-	W	W	-	W	W	W	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	9	W	W	W	W	W	W	W	W	W	D	D	D
	SSKNK	12	12	W	W	W	W	W	W	W	W	W	W	W	W
ColusaGlenn (SVWQC)	COLDR	10	10	-	W	W	W	W	W	W	W	W	W	W	-
	FRSHC	10	10	-	W	W	W	W	W	W	W	W	W	W	-
	LRLNC	4	4	-	-	-	-	W	-	W	-	W	-	W	-
	RARPP	6	6	-	-	-	-	W	W	W	W	-	W	W	-
	SCCMR	4	4	-	-	-	-	W	-	W	-	W	-	W	-
	STYHY	5	4	-	-	-	-	W	W	W S	-	W	-	D	-
	WLKCH	10	10	-	W	W	W	W	W	W	W	W	W	W	-
ElDorado (SVWQC)	COONH	3	2	-	-	-	-	-	-	NC	W	-	-	W	-
	NRTCN	2	2	-	-	-	-	-	-	W	-	-	-	W	-
Lake (SVWQC)	MDLCR	7	7	-	-	-	W	W	W	W	W	W	-	W	-
	MGSLU	6	5	-	-	-	-	W	W	W	W	W	-	D	-
Napa (PCWG)	BCPCR	2	2	-	-	-	-	W	-	W	-	-	-	-	-
	MCPVR	2	2	-	-	-	-	W	-	W	-	-	-	-	-
	PCPVR	2	2	-	-	-	-	W	-	W	-	-	-	-	-
	PCULB	2	2	-	-	-	-	W	-	W	-	-	-	-	-
	SCAET	2	2	-	-	-	-	W	-	W	-	-	-	-	-
PitRiver (NECWA)	FRRRB	4	4	-	-	-	-	-	-	-	W	W	W	W	-
	PRCAN	4	4	-	-	-	-	-	-	-	W	W	W	W	-
	PRPIT	6	6	-	-	W	-	-	W	-	W	W	W	W	-
PlacerNevadaSSutter	CCBRW	8	8	-	-	-	-	W	W	W	W	W	W	W	W
NSacramento (PNSSNS)	CCSTR	7	7	-	-	-	W	-	W	W	W	-	W	W	W
SacramentoAmador	CRTWN	12	9	W	W	W	W	W	W	W S	W	W	D	D	D
(SVWQC)	DCGLT	4	4	-	-	-	-	W	-	W	-	W	-	W	-
	GIDLR	12	12	W	W	W	W	W	W	W	W	W	W	W	W
	LAGAM	4	4	-	-	-	-	W	-	W	-	W	-	W	-
ShastaTehama (SVWQC)	ACACR	12	12	W	W	W	W	W	W	W	W	W	W	W	W
	COYTR	4	4	-	-	-	-	W	-	W	-	W	-	W	-
Solano (SVWQC)	SSLIB	11	11	-	W	W	W	W	W	W	W	W	W	W	W
	UCBRD	11	11	-	W	W	W	W	W	W	W	W	W	W	W
	ZDDIX	4	4	S	-	-	-	W	-	S	-	W	-	S	-
	ZDDSS	1	1	-	-	-	-	-	-	S	-	-	-	-	-
Yolo (SVWQC)	CCCPY	4	4	-	-	-	-	W	-	W	-	W	-	W	-
	TCHWY	6	6	-	-	-	-	W	-	W	W	W	W	W	-
	WLSPL	10	10	-	W S	W S	W	W	W	W	W	W	W	W	-
UpperFeatherRiver (UFRW)	MFFGR	5	4	-	-	-	-	-	-	-	W	W	W	W	Δ

NECWA = Northeastern California Watershed Association
PCWG = Putah Creek Watershed Group
PNSSNS = PlacerNevadaSSutterNSacramento
SVWQC = Sacramento Valley Water Quality Coalition
UFRW = Upper Feather River Watershed Group

Notes:
W = Water sample collected
S = Sediment sample collected
D = Site was dry; no samples collected.

NC = Not Collected due to accessibility issues
Δ = Not Collected due to schedule modification
"-" = no samples planned

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 2011 through September 2012 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 QA/QC Analyses

Quality Assurance/Quality Control (QA/QC) data are summarized in **Table 8** through **Table 16** and discussed below. All program QA/QC results are included with the lab reports in **Appendix B** of this document, and any qualifications of the data are presented with the tabulated monitoring data. All program monitoring results discussed are tabulated in **Appendix C**.

Hold Times

Results were evaluated for compliance with required preparation and analytical hold times. With the exceptions discussed below, analyses met the target data quality objectives:

- 3 of 885 carbamate pesticide, benzophenyl and other herbicide results by EPA method 8321A were analyzed outside of their 14 day hold times due to a laboratory oversight. The results were below detection and the qualifications were considered unlikely to affect the outcome of assessment of exceedances.
- 2 of 189 *E. coli* results were analyzed slightly outside of their 24-hour hold times. These qualifications were considered unlikely to affect the outcome of assessment of exceedances.

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:

- 2 of 885 carbamate pesticides, benzophenyls and other herbicides results had MDLs and QLs greater than the project DQO due to dilution required to analyze the samples.
- 7 of 194 total Nitrate+Nitrite as N results had MDLs and QLs greater than the project DQO due to dilution required to analyze the samples. Assessment of compliance was not affected for any results.
- 2 of 4 organophosphate pesticide results in sediment had QLs greater than the project DQO due to dilution required to analyze the samples.
- 1 of 235 orthophosphate and phosphorus as P result had QLs greater than the project DQO due to dilution required to analyze the sample.
- 22 of 55 pyrethroid pesticide in sediment results had QLs greater than the project DQO due to dilution required to analyze the samples.
- 12 of 83 trace metal results had QLs greater than the project DQO due to dilution required to analyze the samples.
- 1 of 42 triazine pesticide result had MDLs greater than the project DQO due to dilution required to analyze the sample.
- 58 of 189 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**). The data quality objective for field blanks is no detectible concentrations of the analyte of interest above the QL. With the exceptions discussed below, analytes of interest were generally not detected in field blanks:

- Carbaryl was detected above the QL in one field blank analysis. No environmental results required qualification.
- Diazinon was detected above the QL in one field blank analysis. One environmental result required qualification. Assessment of exceedances was not affected.
- *E. coli* was detected above the QL in one field blank analysis. No environmental results required qualification.
- Total phosphorus was detected above the QL in three field blank analyses. One environmental result required qualification.
- Total organic carbon was detected above the QL in four field blank analyses. Four environmental results were qualified.
- Total suspended solids were detected above the QL in one field blank analysis. No environmental samples were qualified.
- Turbidity was detected above the QL in one field blank analysis. No environmental samples were qualified.

Field Duplicates

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

- Field duplicate RPD results exceeded the DQO for one Nitrate + Nitrite as N analysis. One environmental result was qualified as *estimated* on this basis. The qualification did not affect assessment of any exceedances.
- Field duplicate RPD results exceeded the DQO for one diazinon analysis. 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 total phosphorus analysis. 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 seven total suspended solids analyses. Seven environmental results were qualified as *estimated* on this basis.
- Field duplicate RPD results exceeded the DQO for one turbidity test. One environmental result was qualified as *estimated* on this basis.

Method Blanks

Method Blanks were analyzed for all parameters (**Table 10**). The data quality objective for method blanks is no detectible concentrations of the analyte of interest above the QL. All method blanks met this data quality objective:

Laboratory Duplicates

Laboratory Duplicates were analyzed for Nitrate + Nitrite as N, TOC, TSS, turbidity, and pesticides (**Table 11**). The data quality objective for laboratory duplicates is a Relative Percent difference (RPD) not exceeding 25%. With the exceptions discussed below, all field replicates met this data quality objective:

- Laboratory duplicate results exceeded the DQO for ten organophosphate pesticide tests. Five environmental results were qualified as estimated on this basis. The qualification did not affect assessment of any exceedances.

Laboratory Control Spikes

Laboratory Control Spike (LCS) recoveries were analyzed for TSS, TOC, hardness, turbidity, trace metals, nutrients, and pesticides (**Table 12**). The data quality objective for Laboratory Control Spikes (LCS) is 80-120% recovery of the analyte of interest for most analytes. The data quality objectives for Laboratory Control Sample recoveries of pesticides vary by analyte and surrogate and are based on the standard deviation of actual recoveries for the method. In accordance with SWAMP data reporting protocols, the data were not specifically qualified as being high- or low-biased, but these terms are used below for the purpose of discussion. With the exceptions discussed below, all analyses met their specific data quality objective:

- The results of one LCS recovery analysis for carbamate pesticides, benzophenyls and other herbicides were outside the acceptable recovery DQO. The recovery was high biased, but no analytical results required qualification.
- The results of two LCS recovery analyses for organochlorine pesticides were outside the acceptable recovery DQO. The two recoveries were high biased, but no analytical results were qualified.
- The results of two LCS recovery analyses for organophosphate pesticides were outside the acceptable recovery DQO. The two recoveries were high biased, but no analytical results were qualified.
- The results of two LCS recovery analyses for pyrethroid pesticides were outside the acceptable recovery DQO. The two recoveries were high biased and two analytical results were qualified.

Laboratory Control Spike RPDs

Laboratory Control Spike and Laboratory Control Spike Duplicate Recoveries and their associated Relative Percent Differences (RPDs) were analyzed for trace metals, TSS, turbidity, nutrients, and pesticides (**Table 13**). The data quality objective for matrix spike duplicates is a RPD not exceeding 25%. With the exceptions discussed below, all analyses met these data quality objectives:

- Laboratory control spike duplicate results exceeded the DQO for four organochlorine pesticide RPD results. Twelve results were qualified as estimated on this basis. The qualifications did not affect assessment of any exceedances.
- Laboratory control spike duplicate results exceeded the DQO for four organophosphate pesticide RPD results. Twenty-nine results were qualified as estimated on this basis. The qualifications did not affect assessment of any exceedances.
- Laboratory control spike duplicate results exceeded the DQO for one pyrethroid pesticide in sediment RPD results. No environmental results were qualified as estimated on this basis.

Surrogate Spike Recoveries

Surrogate recoveries were analyzed for pesticide analyses (**Table 14**). The data quality objectives for surrogate recoveries of pesticides vary by surrogate and are based on the standard deviation of actual recoveries for the method. In accordance with SWAMP data reporting protocols, the data were not specifically qualified as being high- or low-biased, but these terms are used below for the purpose of discussion. With the exceptions discussed below, all analyses met their specific data quality objective:

- The results of six surrogate recovery analyses for pesticides by EPA 8270 (GCMS-NCI-SIM) were outside the acceptable recovery DQO. Two surrogate recoveries were high and four were low biased. No environmental sample results required qualification.

Matrix Spikes

Matrix Spikes and Matrix Spike Duplicates were analyzed for trace metals, nutrients, TOC and pesticides (**Table 15**). 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. The data were not specifically qualified as being high- or low-biased, but these terms are used below for the purpose of discussion. With the exceptions discussed below, all analyses met their specific data quality objectives:

- Matrix Spike recoveries for five carbamate pesticides, benzophenyls and other herbicides were outside their respective DQOs. Two results were high-biased, but none required qualification. Three associated results required qualification as low-biased. Assessment of exceedances was not affected.
- Matrix Spike recoveries for six Nitrate+Nitrite as N analyses were outside the DQO. Two associated environmental results required qualification as high-biased and one required qualification as low-biased. Assessment of exceedances was not affected.
- Matrix Spike recoveries for two organochlorine pesticide analysis were outside the DQO. The two results were low-biased and required qualification. Assessment of exceedances was not affected.
- Matrix Spike recoveries for 25 organophosphate pesticide analyses were outside the DQO. 14 results were high-biased and required no qualification of environmental results. 11 results were low-biased and six of these required qualification of environmental results. Assessment of exceedances was not affected.
- Matrix Spike recoveries for one pyrethroid pesticide analysis was outside the DQO. One environmental result associated with high recoveries was below detection, and therefore did not require qualification.
- Matrix Spike recoveries for six total organic carbon analyses were outside the DQO. Two environmental results associated with high recoveries required qualification. One environmental result required qualification as low-biased.

Matrix Spike RPDs

Matrix Spike and Matrix Spike Duplicate Recoveries and their associated Relative Percent Differences (RPDs) were analyzed for trace metals, nutrients, TOC and pesticides (**Table 16**). 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 for one carbamate pesticides, benzophenyls and other herbicides RPD result. One environmental result was qualified as estimated on this basis. The qualification did not affect assessment of any exceedances.
- Matrix spike duplicate results exceeded the DQO for one organochlorine pesticide RPD results. One result was qualified as estimated on this basis. The qualifications did not affect assessment of any exceedances.

- Matrix spike duplicate results exceeded the DQO for six organophosphate pesticide RPD results. Six 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 two pyrethroid pesticide RPD results. Two environmental results were qualified as estimated on this basis.
- Matrix spike duplicate results exceeded the DQO for one pyrethroid pesticides in sediment RPD result. One environmental result was qualified as estimated on this basis.

Summary of Precision and Accuracy

Based on the QA/QC data for the 2012 Coalition Monitoring discussed above, the precision and accuracy of the majority of monitoring results met the DQOs adopted for the monitoring program, 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 94 total qualified environmental data, 68 results were qualified as *estimated* due to high variability in lab or field replicate analyses, 17 results were qualified as *high-biased* or *low-biased* due to analyte recoveries outside of DQOs, and six (6) results were potentially affected by contamination and qualified as an *upper limit* of its true concentration. All QC sample types showed success rates in excess of 95%. Of the results assigned a qualification of *upper limit*, none were detected above the QL, and none of the data qualified as *upper limit* showed an exceedance of a water quality standard. Of the 5,762 environmental analytical results generated from October 2011 through September 2012, 5,668 results required no qualification, resulting in 98% of samples having no restrictions on their use.

Completeness

The objectives for completeness are intended to apply to the monitoring program as a whole. As summarized in **Table 7**, 259 of the 269 initial water column and toxicity sample events planned by the Coalition and coordinating programs were conducted, for an overall sample event success rate of 96.3%. Planned sample collection at five locations did not occur because the monitoring sites were dry or inaccessible. Planned sampling that was not completed successfully is summarized below:

- Samples for one event planned for Coon Hollow Creek (COONH) were not collected because the sampling site was inaccessible.
- Samples for three events planned for Cosumnes River (CRTWN) were not collected because the sampling site was dry.
- Samples for one event planned for McGaugh Slough (MGSLU) were not collected because the sampling site was dry.
- Samples for three events planned for Pine Creek (PNCGR) were not collected because the sampling site was dry.
- Samples for one event planned for Stony Creek (STYHY) were not collected because the sampling site was dry.

- Samples for one event planned for Middle Fork Feather River (MFFGR) were not collected due to a schedule modification.

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. Sample containers that were received broken are summarized below:

- One of 24 bottles (collected in July 2012 for Event 77) to be analyzed for OP pesticides was received broken at PHYSIS. There was sufficient sample remaining to complete the scheduled environmental and QA analyses.

In addition, sample containers occasionally arrive at the analytical laboratory at a temperature that is above the recommended maximum for Coalition samples. This may occur when samples do not have sufficient time to cool down to the target temperature or when extended shipping times and higher external temperatures cause sample temperatures to increase above 6˚C. This has proven to be a challenge for toxicity samples because the sample volumes are large (1 gallon containers), require additional shipping protection (bubble wrap), and take longer to cool, particularly when ambient water temperatures exceed 25˚C. However, because toxicity tests are typically conducted at ~20˚C over four days, sample temperatures slightly elevated above 6˚C on receipt are not expected to have a significant impact on the toxicity test results. However, all samples received above recommended temperatures are qualified as required (*BY; Sample received at improper temperature*). In each case, the sampling crews are notified and the conditions and shipping procedures were reviewed to attempt to determine the cause of the elevated temperatures.

Sample shipments received at temperatures above 6˚C are summarized below:

- The samples collected by PER at COONH and NRTCN, were received by APPL at 9˚C, which was above the recommended maximum temperature (6˚C). Chemistry analysis was performed according to the original sampling plan and the results were qualified (BY).

All samples collected were analyzed, for an analytical success rate of 100%.

As summarized in **Table 7**, all eight sediment samples planned by the Coalition were collected, for an overall sediment sample event success rate of 100%. In addition, all analyses planned for these sediment samples were completed, for an analytical success rate of 100%.

Table 8. Summary of Field Blank Quality Control Sample Evaluations for 2012 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
SM20-4500-NH3 C	Ammonia, Total as N	< PQL	3	3	100%
EPA 625/8321A/8081A	Carbamate Pesticides, Benzophenyls and other Herbicides	< PQL	111	110	99%
SM20-9223	E. coli	< PQL	14	13	93%
SM20-2340C	Hardness as CaCO3	< PQL	2	2	100%
EPA 353.2	Nitrate+Nitrite, as N	< PQL	15	15	100%
EPA 625 / 8081A	Organochlorine Pesticides	< PQL	87	87	100%
EPA 625 / GCMS-NCI-SIM	Organophosphate Pesticides	< PQL	170	169	99%
SM20-4500-P E	Orthophosphate/Phosphorus, as P	< PQL	18	15	83%
EPA 351.2 / SM20-4500-NH3 C	Total Kjeldahl Nitrogen	< PQL	3	3	100%
SM20-5310 B/ SM5310C	Total Organic Carbon	< PQL	14	10	71%
SM20-2540D	Total Suspended Solids	< PQL	15	14	93%
EPA 200.8	Trace Metals	< PQL	13	13	100%
EPA 8141A	Triazine Pesticides	< PQL	3	3	100%
EPA 180.1 / SM 2130B	Turbidity	< PQL	15	14	93%
Totals			**483**	**471**	**97.5%**

Table 9. Summary of Field Duplicate Quality Control Sample Results for 2012 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
SM20-4500-NH3 C	Ammonia, Total as N	RPD ≤25%	3	3	100%
EPA 625/8321A/8081A	Carbamate Pesticides, Benzophenyls and other Herbicides	RPD ≤25%	110	110	100%
SM20-9223	E. coli	RPD ≤25%	14	14	100%
SM20-2340C	Hardness as CaCO3	RPD ≤25%	3	3	100%
EPA 353.2	Nitrate+Nitrite, as N	RPD ≤25%	13	12	92%
EPA 625 / 8081A	Organochlorine Pesticides	RPD ≤25%	87	87	100%
EPA 625 / GCMS-NCI-SIM	Organophosphate Pesticides	RPD ≤25%	170	169	99%
SM20-4500-P E	Orthophosphate/Phosphorus, as P	RPD ≤25%	16	15	94%
EPA 351.2 / SM20-4500-NH3 C	Total Kjeldahl Nitrogen	RPD ≤25%	3	3	100%
SM20-5310 B/ SM5310C	Total Organic Carbon	RPD ≤25%	13	13	100%
SM20-2540D	Total Suspended Solids	RPD ≤25%	14	7	50%
EPA 200.8	Trace Metals	RPD ≤25%	13	13	100%
EPA 8141A	Triazine Pesticides	RPD ≤25%	3	3	100%
EPA 600/R-99-064M, EPA 821/R-02-013, EPA 821/R-02-012	Toxicity	RPD ≤25%	20	20	100%
EPA 180.1 / SM 2130B	Turbidity	RPD ≤25%	14	13	93%
Totals			**496**	**490**	**98.8%**

Table 10. Summary of Method Blank Results for 2012 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
SM20-2540 B	% Solids	< QL	5	5	100%
SM20-4500-NH3 C	Ammonia, Total as N	< QL	12	12	100%
EPA 625/8321A/8081A	Carbamate Pesticides, Benzophenyls and other Herbicides	< QL	171	171	100%
SM20-9223	E. coli	< QL	34	34	100%
SM20-2340C	Hardness as CaCO3	< QL	7	7	100%
EPA 353.2	Nitrate+Nitrite, as N	< QL	47	47	100%
EPA 625 / 8081A	Organochlorine Pesticides	< QL	212	212	100%
EPA 625 / GCMS-NCI-SIM	Organophosphate Pesticides	< QL	250	250	100%
GCMS-NCI-SIM	Organophosphate Pesticides, in Sediment	< QL	4	4	100%
SM20-4500-P E	Orthophosphate/Phosphorus, as P	< QL	51	51	100%
GCMS-NCI-SIM	Pyrethroid Pesticides	< QL	66	66	100%
GCMS-NCI-SIM	Pyrethroid Pesticides in Sediment	< QL	40	40	100%
EPA 351.2 / SM20-4500-NH3 C	Total Kjeldahl Nitrogen	< QL	11	11	100%
SM20-5310 B/ SM5310C	Total Organic Carbon	< QL	55	55	100%
SM20-2540D	Total Suspended Solids	< QL	40	40	100%
EPA 200.8	Trace Metals	< QL	30	30	100%
EPA 8141A	Triazine Pesticides	< QL	4	4	100%
EPA 180.1 / SM 2130B	Turbidity	< QL	43	43	100%
Totals			**1084**	**1084**	**100%**

Table 11. Summary of Lab Duplicate Results for 2012 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
EPA 625/8321A/8081A	Carbamate Pesticides, Benzophenyls and other Herbicides	RPD ≤25%	2	2	100%
EPA 353.2	Nitrate+Nitrite, as N	RPD ≤25%	1	1	100%
EPA 625 / 8081A	Organochlorine Pesticides	RPD ≤25%	87	87	100%
EPA 625 / GCMS-NCI-SIM	Organophosphate Pesticides	RPD ≤25%	187	182	97%
SM20-5310 B/ SM5310C	Total Organic Carbon	RPD ≤25%	1	1	100%
SM20-2540D	Total Suspended Solids	RPD ≤25%	8	8	100%
EPA 180.1 / SM 2130B	Turbidity	RPD ≤25%	23	23	100%
Totals			**309**	**304**	**98.4%**

Table 12. Summary of Lab Control Spike Results for 2012 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
SM20-4500-NH3 C	Ammonia, Total as N	90 - 110%	13	13	100%
EPA 625/8321A/8081A	Carbamate Pesticides, Benzophenyls and other Herbicides	[1]	175	174	99%
SM20-2340C	Hardness as CaCO3	80 - 120%	7	7	100%
EPA 353.2	Nitrate+Nitrite, as N	90 - 110%	48	48	100%
EPA 625 / 8081A	Organochlorine Pesticides	[1]	328	326	99%
EPA 625 / GCMS-NCI-SIM	Organophosphate Pesticides	[1]	492	490	99.6%
GCMS-NCI-SIM	Organophosphate Pesticides, in Sediment	[1]	4	4	100%
SM20-4500-P E	Orthophosphate/Phosphorus, as P	90 - 110%	51	51	100%
GCMS-NCI-SIM	Pyrethroid Pesticides	[1]	88	86	98%
GCMS-NCI-SIM	Pyrethroid Pesticides in Sediment	[1]	64	64	100%
EPA 351.2 / SM20-4500-NH3 C	Total Kjeldahl Nitrogen	90 - 110%	12	12	100%
SM20-5310 B/ SM5310C	Total Organic Carbon	80 - 120%	56	56	100%
SM20-2540D	Total Suspended Solids	80 - 120%	42	42	100%
EPA 200.8	Trace Metals	85 - 115%	31	31	100%
EPA 8141A	Triazine Pesticides	[1]	4	4	100%
EPA 180.1 / SM 2130B	Turbidity	90 - 110%	43	43	100%
Totals			**1458**	**1451**	**99.5%**

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 13. Summary of Lab Control Spike Duplicate Precision Results for 2012 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
SM20-4500-NH3 C	Ammonia, Total as N	RPD ≤25%	1	1	100%
EPA 625/8321A/8081A	Carbamate Pesticides, Benzophenyls and other Herbicides	RPD ≤25%	2	2	100%
EPA 353.2	Nitrate+Nitrite, as N	RPD ≤25%	1	1	100%
EPA 625 / 8081A	Organochlorine Pesticides	RPD ≤25%	116	112	97%
EPA 625 / GCMS-NCI-SIM	Organophosphate Pesticides	RPD ≤25%	242	238	98%
SM20-4500-P E	Orthophosphate/Phosphorus, as P	RPD ≤25%	1	1	100%
GCMS-NCI-SIM	Pyrethroid Pesticides	RPD ≤25%	22	22	100%
GCMS-NCI-SIM	Pyrethroid Pesticides in Sediment	RPD ≤25%	24	23	96%
EPA 351.2 / SM20-4500-NH3 C	Total Kjeldahl Nitrogen	RPD ≤25%	1	1	100%
SM20-2540D	Total Suspended Solids	RPD ≤25%	2	2	100%
EPA 180.1 / SM 2130B	Turbidity	RPD ≤25%	1	1	100%
Totals			**413**	**404**	**97.8%**

Table 14. Summary of Surrogate Recovery Results for 2012 Coalition Monitoring

Method	Analytes	DQO	Number of Analyses	Number Passing	% Success
EPA 625	Organophosphorus, Organochlorine, Carbamate, Triazine, Benzophenyls and other Pesticides	[1]	612	612	99.3%
EPA 8081		[1]	164	164	99.3%
EPA 8141		[1]	76	76	99.3%
EPA 8321		[1]	57	57	99.3%
SW846 8270 Mod (GCMS-NCI-SIM)	Pyrethroid Pesticides	[1]	92	87	99.3%
Totals			**1001**	**996**	**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 15. Summary of Matrix Spike Recovery Results for 2012 Coalition Monitoring

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
EPA 625/8321A/8081A	Carbamate Pesticides, Benzophenyls and other Herbicides	[1]	228	223	98%
EPA 353.2	Nitrate+Nitrite, as N	90 - 110%	25	19	76%
EPA 625 / 8081A	Organochlorine Pesticides	[1]	222	220	99%
EPA 625 / GCMS-NCI-SIM	Organophosphate Pesticides	[1]	352	327	93%
GCMS-NCI-SIM	Organophosphate Pesticides, in Sediment	[1]	4	4	100%
SM20-4500-P E	Orthophosphate/Phosphorus, as P	90 - 110%	28	28	100%
GCMS-NCI-SIM	Pyrethroid Pesticides	[1]	66	65	98%
GCMS-NCI-SIM	Pyrethroid Pesticides in Sediment	[1]	32	32	100%
SM20-5310 B/ SM5310C	Total Organic Carbon	80 - 120%	42	36	86%
EPA 200.8	Trace Metals	85 - 115%	22	22	100%
EPA 8141A	Triazine Pesticides	[1]	6	6	100%
Totals			**1027**	**982**	**95.6%**

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 16. Summary of Matrix Spike Duplicate Precision Results for 2012 Coalition Monitoring

Method	Analyte	DQO	Number of Pairs Analyzed	Number Passing	% Success
EPA 625/8321A/8081A	Carbamate Pesticides, Benzophenyls and other Herbicides	RPD ≤25%	114	113	99%
EPA 353.2	Nitrate+Nitrite, as N	RPD ≤25%	12	12	100%
EPA 625 / 8081A	Organochlorine Pesticides	RPD ≤25%	111	111	100%
EPA 625 / GCMS-NCI-SIM	Organophosphate Pesticides	RPD ≤25%	193	187	97%
GCMS-NCI-SIM	Organophosphate Pesticides, in Sediment	RPD ≤25%	2	2	100%
SM20-4500-P E	Orthophosphate/Phosphorus, as P	RPD ≤25%	12	12	100%
GCMS-NCI-SIM	Pyrethroid Pesticides	RPD ≤25%	33	31	94%
GCMS-NCI-SIM	Pyrethroid Pesticides in Sediment	RPD ≤25%	16	15	94%
SM20-5310 B/ SM5310C	Total Organic Carbon	RPD ≤25%	20	20	100%
EPA 200.8	Trace Metals	RPD ≤25%	11	11	100%
EPA 8141A	Triazine Pesticides	RPD ≤25%	3	3	100%
Totals			**533**	**522**	**97.9%**

TABULATED RESULTS OF LABORATORY ANALYSES

Copies of final laboratory reports and all reported QA/QC 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 previously submitted as part of the quarterly data submittals.

Data Interpretation

SUMMARY OF SAMPLING CONDITIONS

Samples were collected throughout the year for the Coalition (see **Table 7**, Sampling for the 2012 Coalition Monitoring Year). Sample collection for the October 2011 – March 2012 monitoring period was characterized by above-average precipitation during the months of October, March, and April, and below-average precipitation during the months of November, December, January, February, and June.[2] The overall 2012 water year was classified as "below normal" for the Sacramento Valley by the California Department of Water Resources, with an estimated 65% of average total runoff.[3]

Sample collection for the April 2012 – September 2012 Coalition Irrigation Season was characterized by predominantly dry weather, with the exception of April, and mean temperatures were generally warmer than historical averages, with the exception of July. During the 2012 Water Year, temperatures were half a degree (ºF) warmer than historical mean temperatures (1949-2005).

After two consecutive water years with above average precipitation and runoff for the Sacramento Valley, the 2012 Water Year (October – September) was the driest year since the 2007-2009 drought.[4] At the end of the 2012 Water Year, precipitation was 75 percent of average and reservoir storage was 95 percent of average.

Regional precipitation patterns for October 2011 – September 2012 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.

Based on climate data available for the Sacramento Executive Airport weather station, with the exception of the month of April, there was less than average rainfall during the April – September 2012 irrigation season (**Table 17**). Only trace amounts of precipitation occurred May through September. Precipitation was below normal during the months of November, December, January, February, and June. The maximum temperature exceeded 90 degrees Fahrenheit on two days in April, seven days in May, 11 days in June, 20 days in July, 26 days in August, and 17 days in September.

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

[3] http://cdec.water.ca.gov/cgi-progs/iodir/WSIHIST

[4] http://www.water.ca.gov/waterconditions/

Table 17. Summary of Climate Data[5] at Sacramento Executive Airport, October 2011 – September 2012

Month	Departure from Normal Mean Temperature	Days with Maximum Temperature ≥ 90°F	Precipitation Total (Inches)	Departure from Normal Precipitation
October 2011	0.6	0	1.33	0.38
November 2011	-1.8	0	0.74	-1.34
December 2011	-0.6	0	0.27	-2.98
January 2012	1.5	0	2.43	-1.21
February 2012	0.5	0	0.92	-2.55
March 2012	-1.7	0	4.06	1.31
April 2012	0.7	2	2.42	1.27
May 2012	1.4	7	Trace	-0.68
June 2012	-0.3	11	0.03	-0.18
July 2012	-0.7	20	0.03	0.03
August 2012	1.3	26	Trace	-0.05
September 2012	1.5	17	Trace	-0.29

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

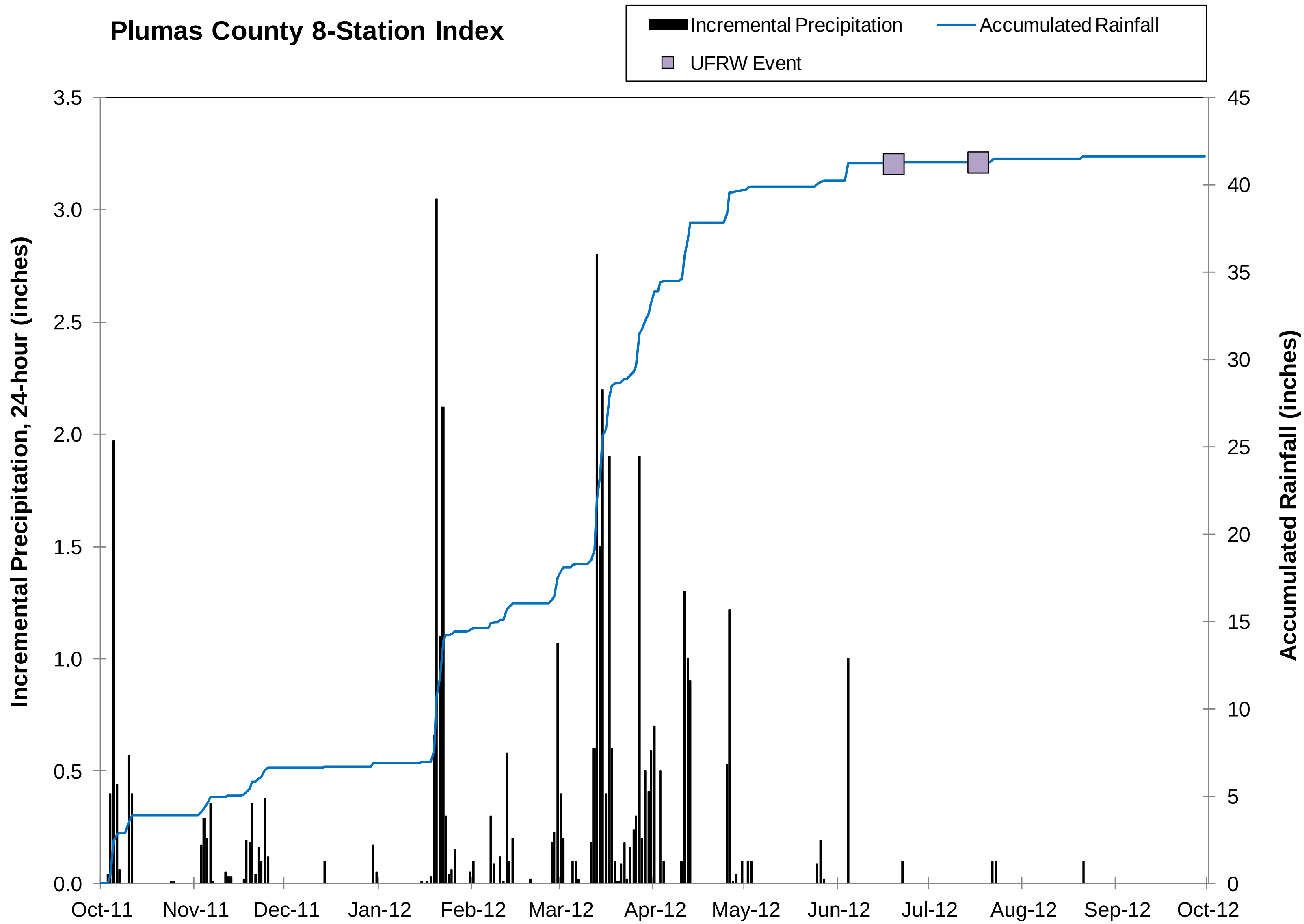

Figure 2-a. Precipitation during 2012 Coalition Monitoring: Plumas County

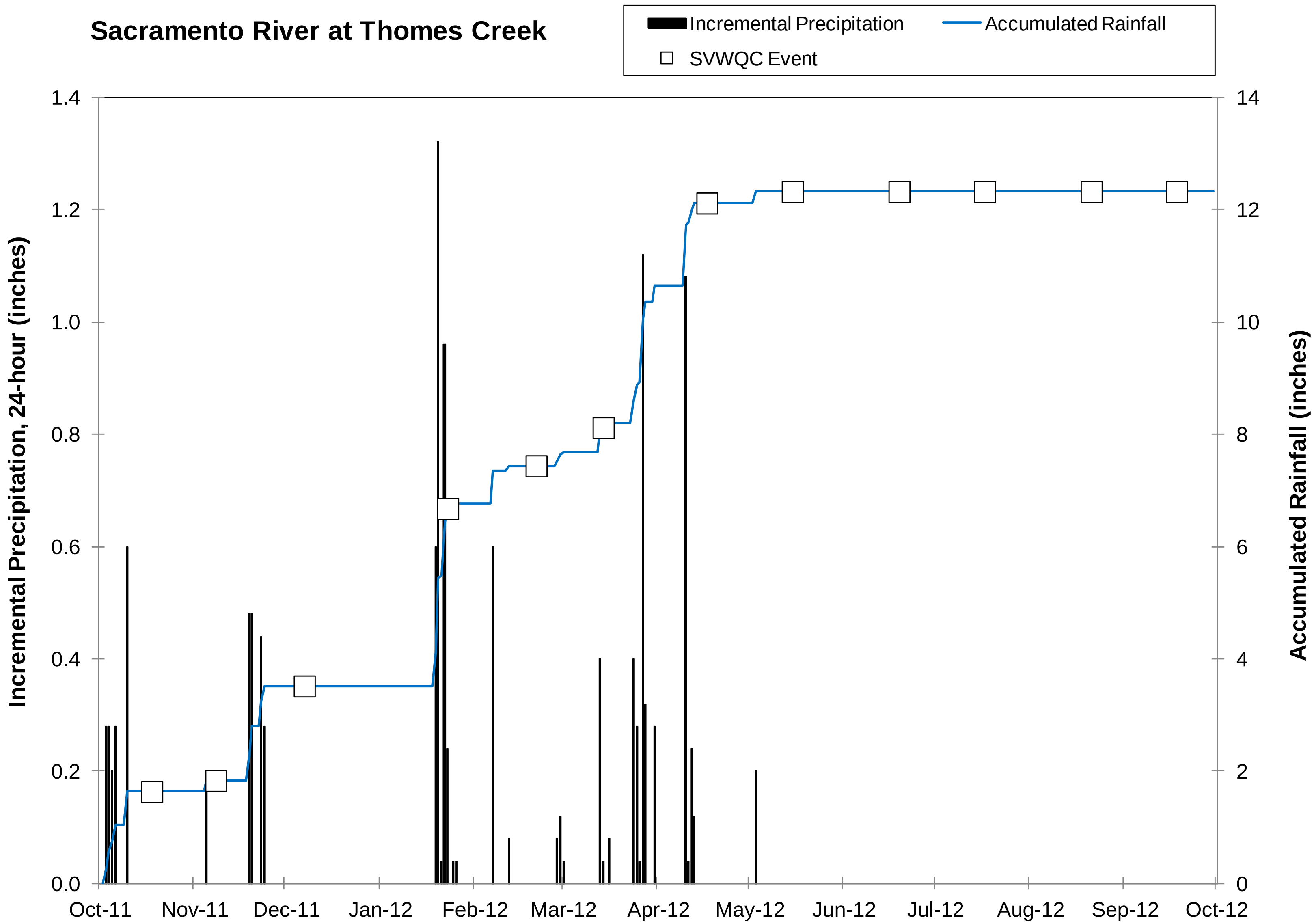

Figure 2-b. Precipitation during 2012 Coalition Monitoring: Upper Sacramento Valley

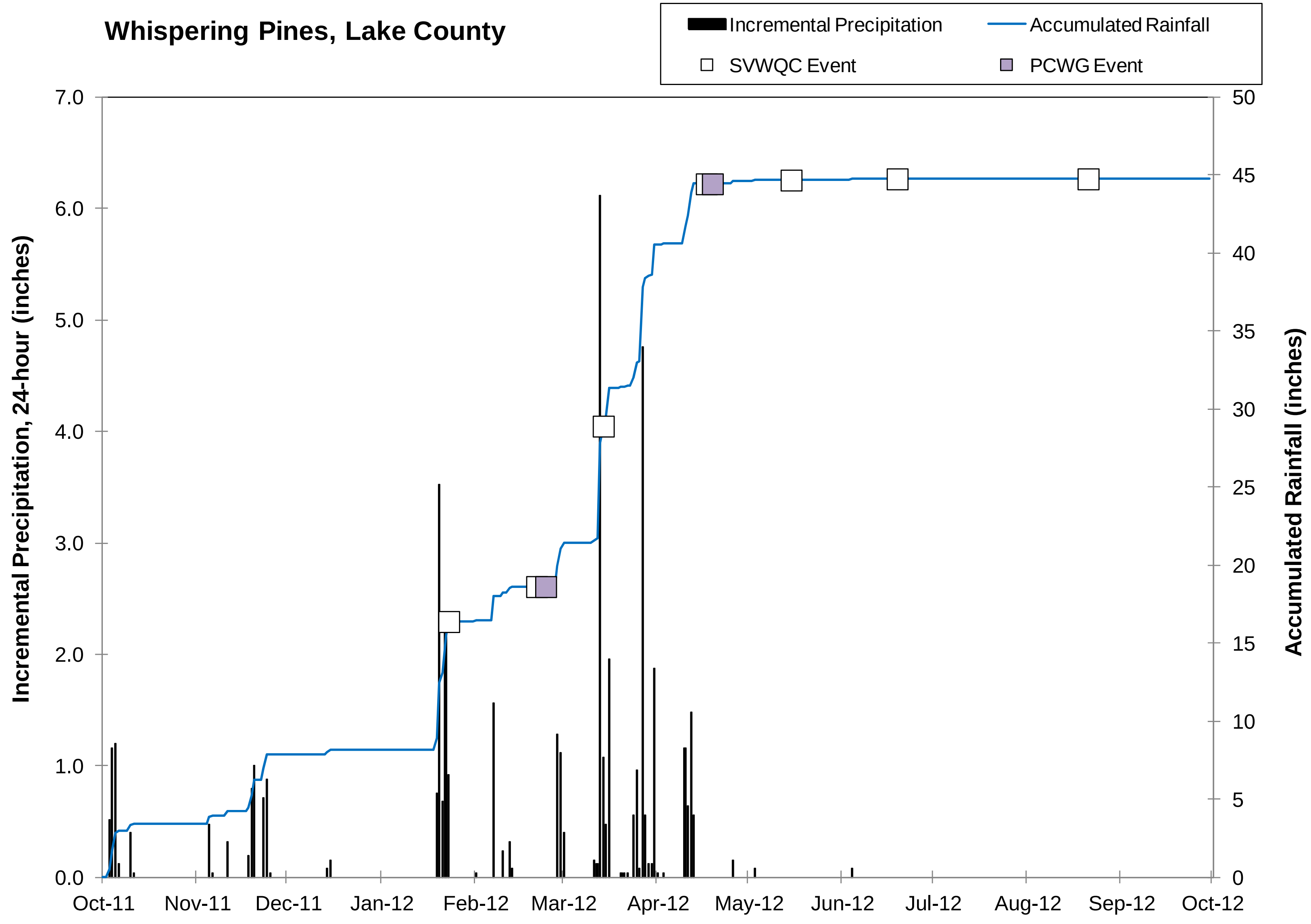

Figure 2-c. Precipitation during 2012 Coalition Monitoring: Lake County

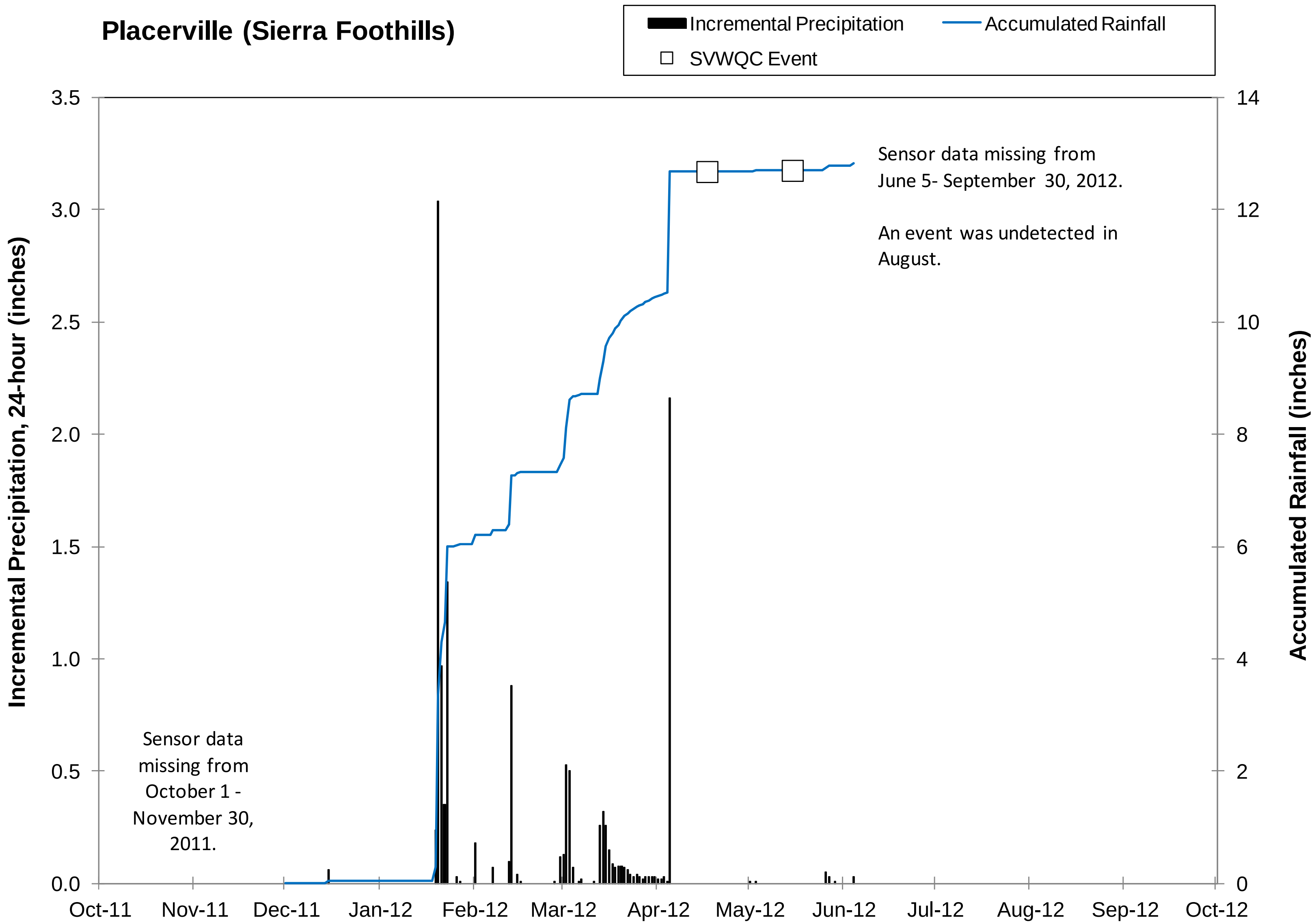

Figure 2-d. Precipitation during 2012 Coalition Monitoring: Sierra Foothills

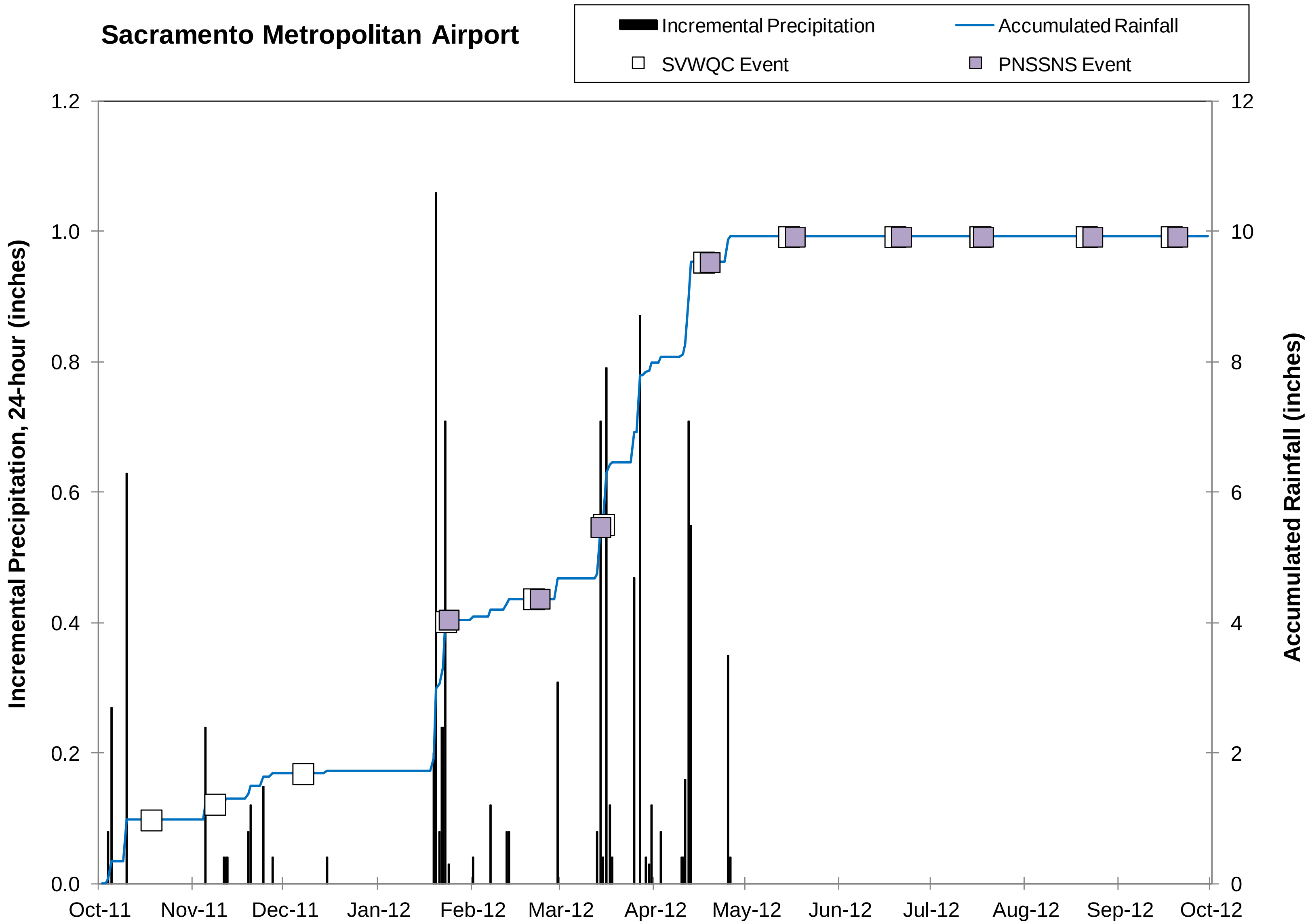

Figure 2-e. Precipitation during 2012 Coalition Monitoring: Lower Sacramento Valley

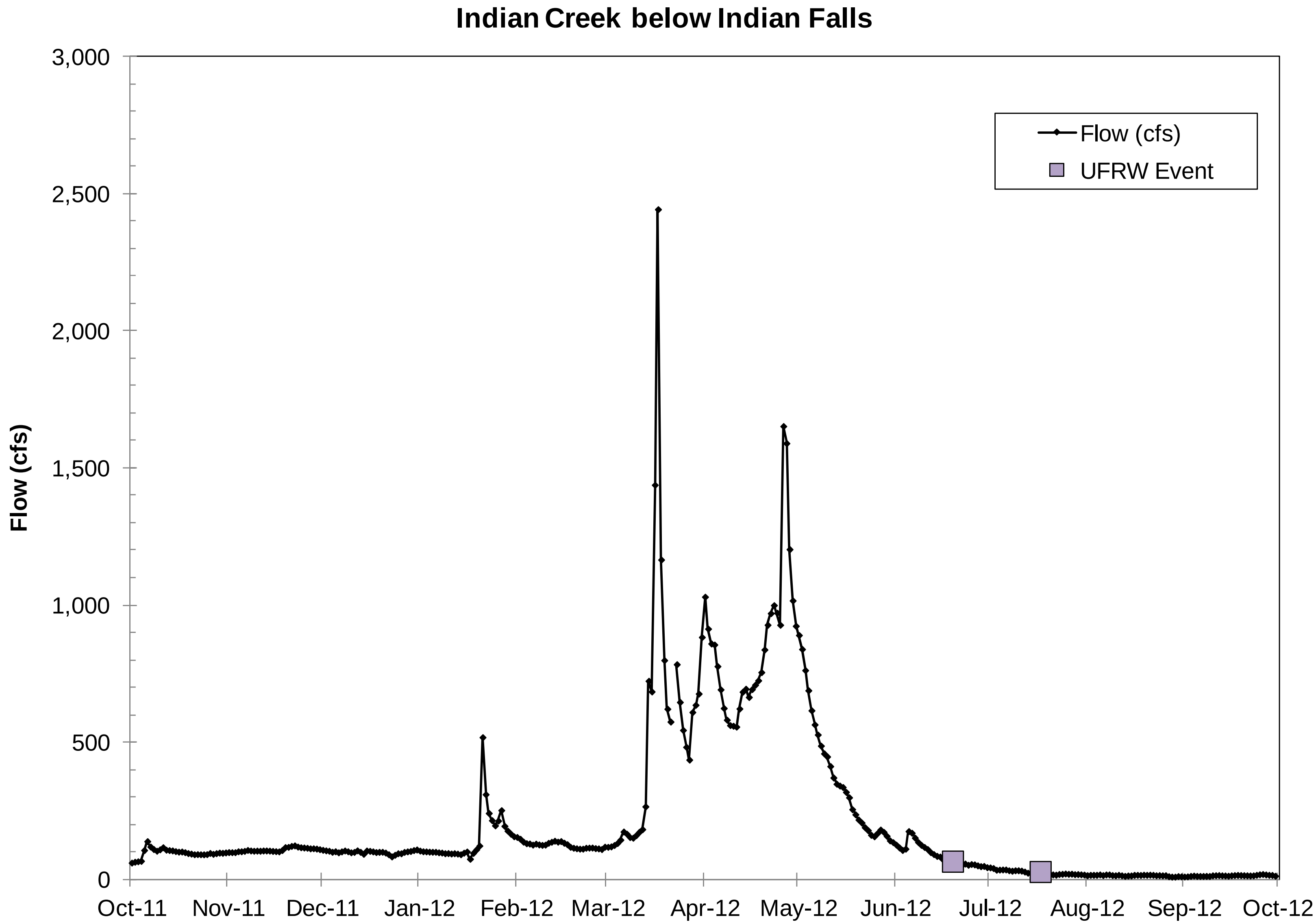

Figure 3-a. Flows during 2012 Coalition Monitoring: Plumas County

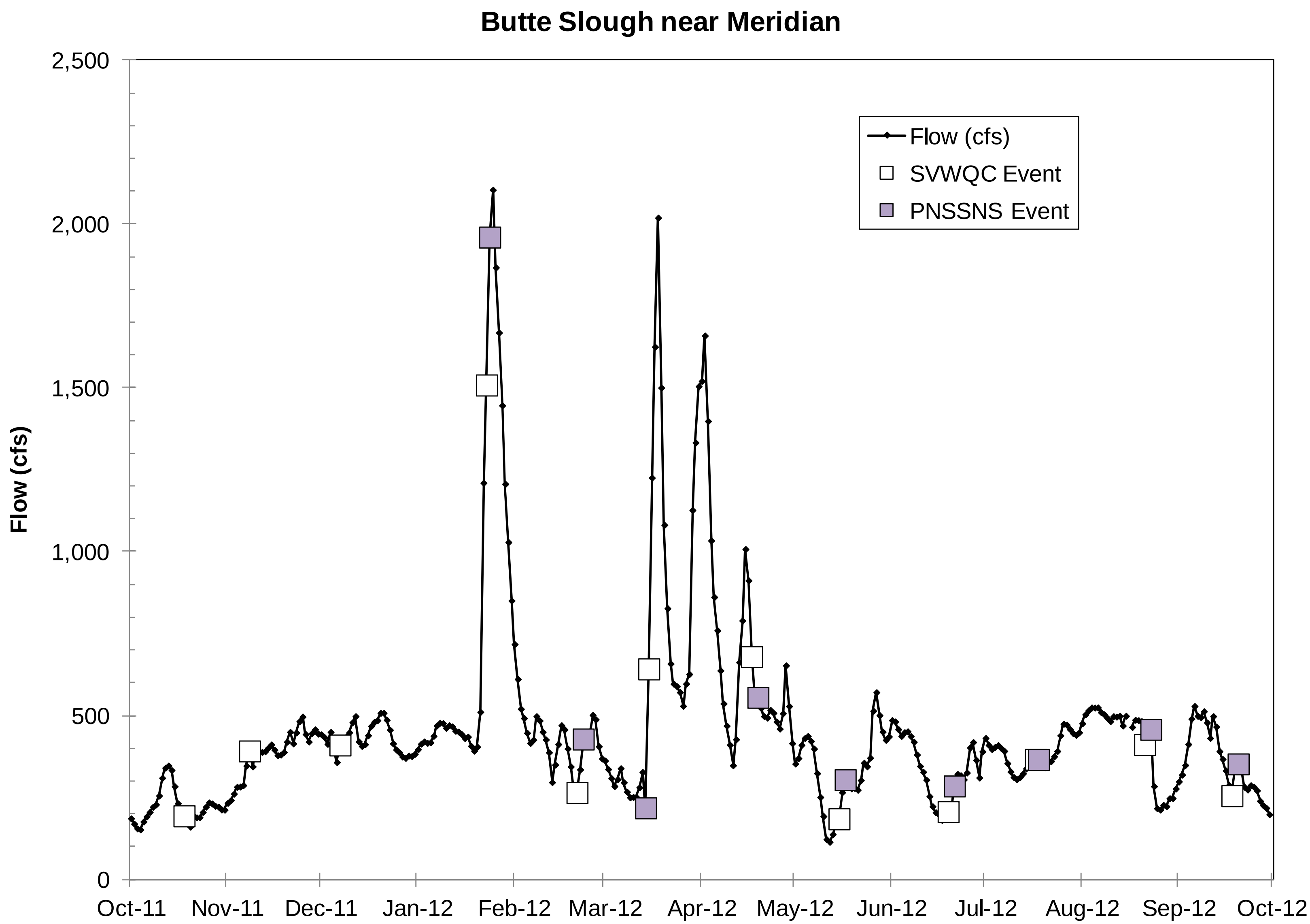

Figure 3-b. Flows during 2012 Coalition Monitoring: East Sacramento Valley

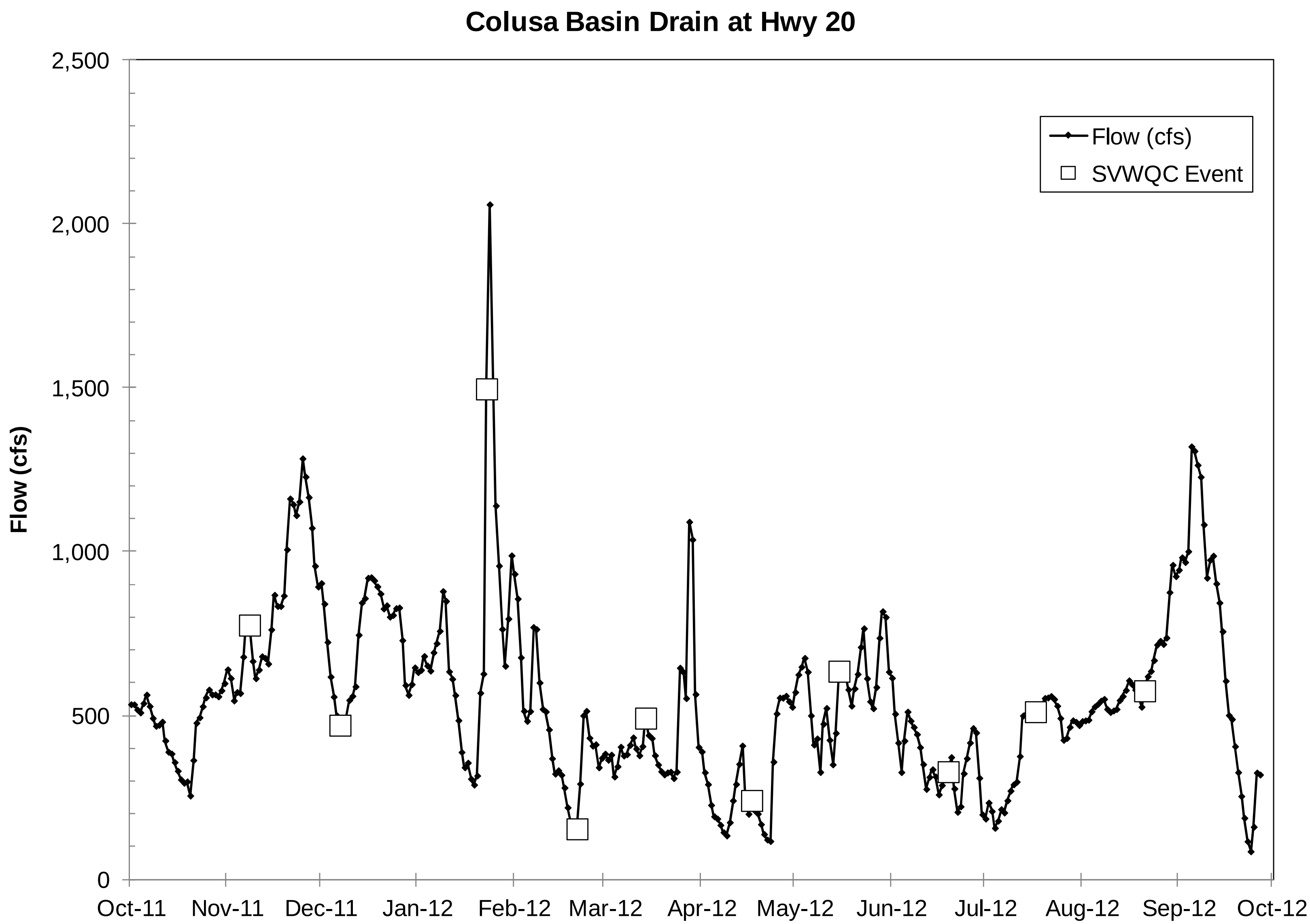

Figure 3-c. Flows during 2012 Coalition Monitoring: West Sacramento Valley

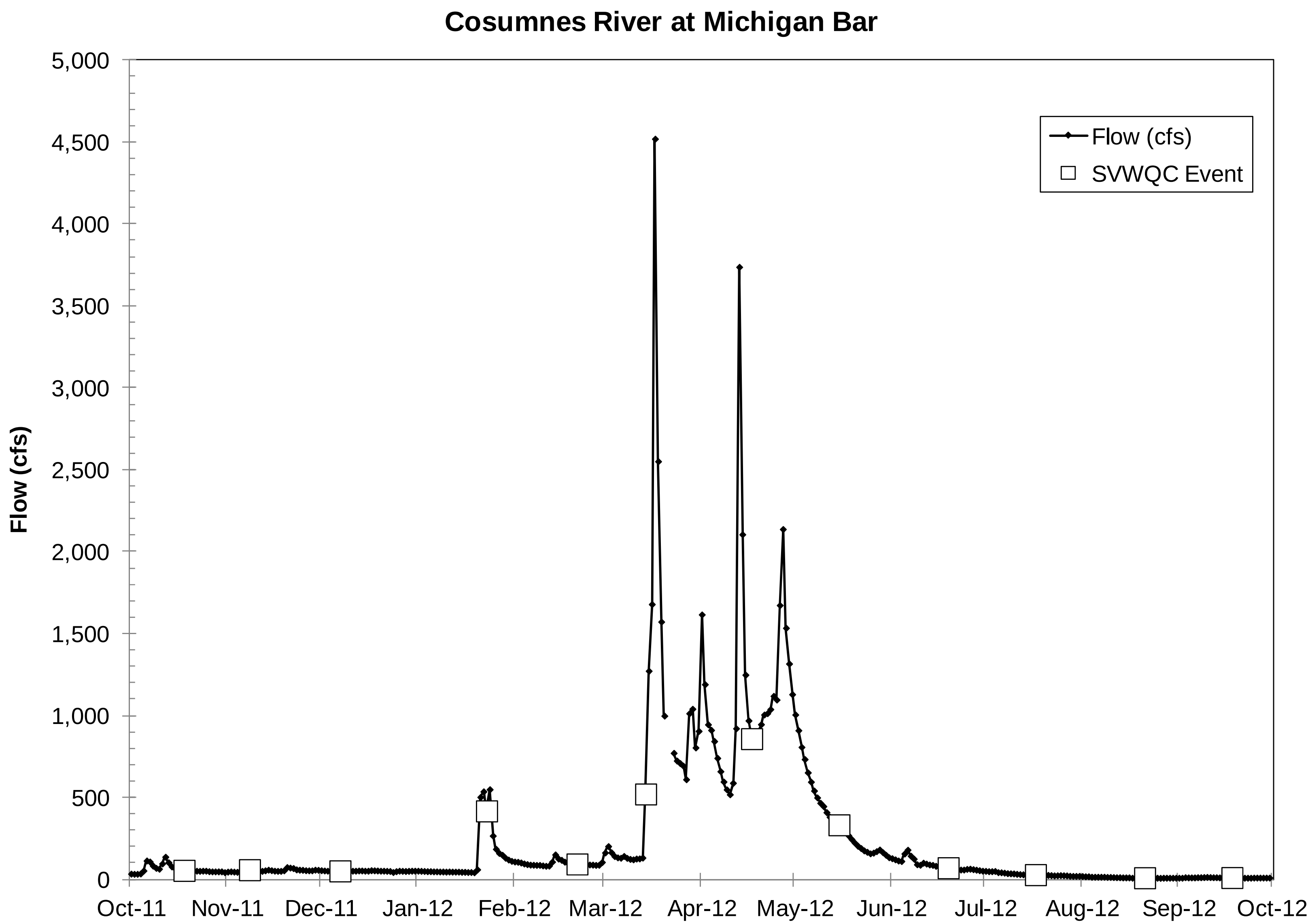

Figure 3-d. Flows during 2012 Coalition Monitoring: Lower Sacramento Valley

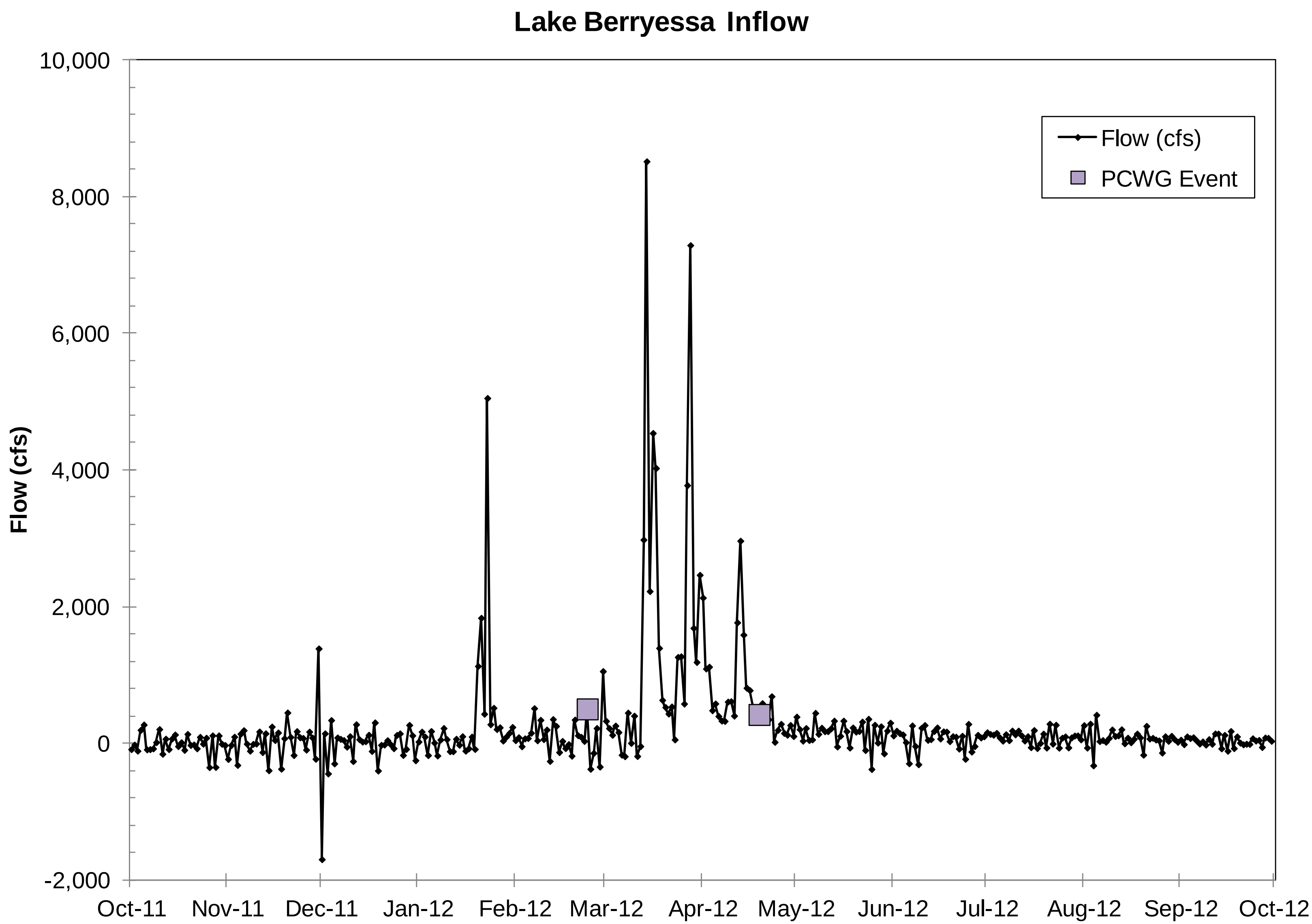

Figure 3-e. Flows during 2012 Coalition Monitoring: Lake Berryessa (Reservoir Inflow)

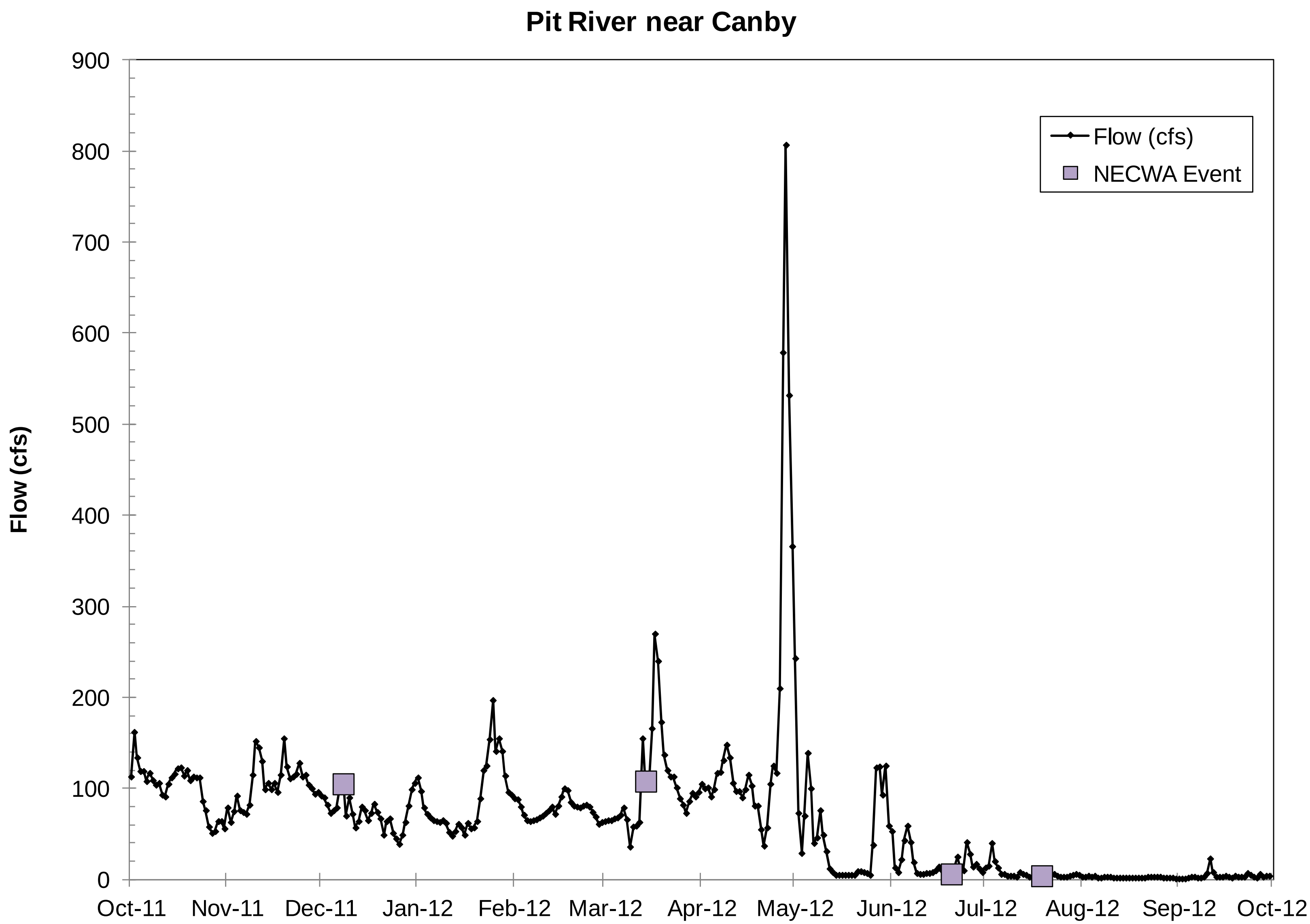

Figure 3-f. Flows during 2012 Coalition Monitoring: Pit River near Canby

ASSESSMENT OF DATA QUALITY OBJECTIVES

The QA/QC data for the Coalition's monitoring program have been evaluated and discussed previously in this document (Quality Assurance Results, beginning **page 25**). 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 16**.

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 18** and **Table 19**. Monitored analytes without relevant water quality objectives or trigger limits are listed in **Table 20**.

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 18. Adopted Basin Plan and California Toxics Rule Objectives for Analytes Monitored for 2012 Coalition Monitoring

Analyte	Most Stringent Objective[1]	Units	Objective Source[2]
Aldicarb	3	µg/L	CA 1˚ MCL
Aldrin	0.00013	µg/L	CTR
Ammonia, Total as N	narrative	mg/L	Basin Plan
Arsenic, dissolved	150	µg/L	CTR
Arsenic, total	50	µg/L	CA 1˚ MCL
Chlordane, cis	0.00057	µg/L	CTR
Chlordane, trans	0.00057	µg/L	CTR
Chlorpyrifos	0.015	µg/L	Basin Plan
Copper, dissolved	hardness dependent[3]	µg/L	CTR
DDD (o,p' and p,p')	0.00083	µg/L	CTR
DDE (o,p' and p,p')	0.00059	µg/L	CTR
DDT (o,p' and p,p')	0.00059	µg/L	CTR
Diazinon	0.10	µg/L	Basin Plan
Dieldrin	0.00014	µg/L	CTR
Dissolved Oxygen	5	mg/L	Basin Plan
Endosulfan I	110	µg/L	CTR
Endosulfan II	110	µg/L	CTR
Endrin	0.036	µg/L	CTR
Fecal coliform	400	MPN/100mL	Basin Plan
HCH	0.0039	µg/L	CTR
Heptachlor	0.00021	µg/L	CTR
Heptachlor epoxide	0.0001	µg/L	CTR
Lead, dissolved	hardness dependent[3]	µg/L	CTR
Malathion	0.1[4]	µg/L	Basin Plan
Methoxychlor	30	µg/L	CA 1˚ MCL
Molybdenum	15	µg/L	Basin Plan
Nickel, dissolved	hardness dependent[3]	µg/L	CTR
Nitrate, as N	10	mg/L	CA 1˚ MCL
Oxamyl	50	µg/L	CA 1˚ MCL
Parathion, Methyl	0.13[4]	µg/L	Basin Plan
pH	6.5-8.5	-log[H+]	Basin Plan
Selenium, total	5	µg/L	CTR
Simazine	4	µg/L	CA 1˚ MCL
Temperature	narrative	µg/L	Basin Plan
Toxicity, Algae (*Selenastrum*) Cell Density	narrative	µg/L	Basin Plan
Toxicity, Fathead Minnow (*Pimephales*) Survival	narrative	µg/L	Basin Plan
Toxicity, Water Flea (*Ceriodaphnia*) Survival	narrative	µg/L	Basin Plan
Turbidity	narrative	µg/L	Basin Plan

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. Objective varies with the hardness of the water.
4. These values are Basin Plan performance goals. 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).

Table 19. Unadopted Water Quality Limits Used to Interpret Narrative Water Quality Objectives for Analytes Monitored for 2012 Coalition Monitoring

Analyte	Unadopted Limit(1)	Units	Limit Source
Boron, total	700	µg/L	Ayers and Westcott 1988
Conductivity	900	µS/cm	CA Recommended 2˚ MCL
E. coli (1)	235	MPN/100mL	Basin Plan Amendment
Conductivity	700	µS/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
Azinphos methyl	0.01	µg/L	USEPA NAWQC[2]
Carbaryl	2.53	µg/L	USEPA NAWQC
Dichlorvos	0.085	µg/L	Cal/EPA Cancer Potency Factor
Dimethoate	1	µg/L	CDPH Notification Level
Disulfoton	.05	µg/L	USEPA NAWQC
Diuron	2	µg/L	USEPA Health Advisory
Linuron	1.4	µg/L	USEPA IRIS Reference Dose
Methamidophos	0.35	µg/L	USEPA IRIS Reference Dose
Methidathion	0.7	µg/L	USEPA IRIS Reference Dose
Methomyl	0.52	µg/L	USEPA NAWQC
Phorate	0.7	µg/L	NAS Health Advisory
Phosmet	140	µg/L	USEPA IRIS Reference Dose

Note:

1. Adopted by the Water Board but not approved by State Water Resources Control Board
2. USEPA National Ambient Water Quality Criteria
3. Notification levels (formerly called "action levels") are published by the California Department of Public Health (CDPH) for chemicals for which there is no drinking water MCL.

Table 20. Analytes Monitored for 2012 Coalition Monitoring without Applicable Adopted or Unadopted Limits

Analytes		
Allethrin	Fenthion	Permethrin
Aminocarb	Fenuron	Perthane
Barban	Fluometuron	Phosphorus as P
Benomyl/Carbendazim	Fluvalinate	Phosphorus as P, Total
Bifenthrin	Hardness as CaCO3	Propachlor
Bromacil	Hexachlorobenzene	Propham
Chloroxuron	Hexazinone	Propoxur
Chlorpropham	L-Cyhalothrin	Siduron
Cyfluthrin	Methiocarb	Sulprofos
Cypermethrin	Merphos	Tebuthiuron
Dacthal	Mevinphos	Tetrachlorvinphos
Deltamethrin/Tralomethrin	Mexacarbate	Tetramethrin
Demeton	Mirex	Tetrachlorvinphos
Dicofol	Monuron	Tokuthion
Diflubenzuron	Neburon	Total Kjeldahl Nitrogen
Discharge (flow)	Nitrate+Nitrite, as N	Total Organic Carbon
Endosulfan sulfate	Nonachlor, cis-	Total Suspended Solids
Endrin	Nonachlor, trans-	Trichloronate
Esfenvalerate/Fenvalerate	Orthophosphate, as P	
Ethoprop	Oryzalin	
Fenchlorphos	Oxychlordane	
Fensulfothion	Oxyfluorfen	

Toxicity and Pesticide Results

A summary of the toxicity and pesticide results from 2012 Coalition Monitoring is provided in this section.

Toxicity Exceedances in Coalition Monitoring

There were 99 individual toxicity results (including 20 field duplicates) analyzed in water column and sediment samples collected from 19 different sites during 2012 Coalition Monitoring. Analyses were conducted for *Selenastrum capricornutum, Pimephales promelas, Ceriodaphnia dubia,* and *Hyalella azteca.* Within these categories, there were six toxicity exceedances. The observations of toxicity to the algae *Selenastrum* and sediment toxicity to *Hyalella* were considered exceedances of the Basin Plan narrative objective for toxicity ("*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*.").

All statistically significant results for samples collected during 2012 Coalition Monitoring were reported to the Water Board by the Coalition in "Exceedance Reports" as required by the *ILRP* and the Coalition's MRP. The Exceedance Reports detailing these results are provided in **Appendix D**.

Of the 92 individual toxicity results analyzed in water column samples in 2012 Coalition Monitoring (73 results plus 19 field duplicates), two had observed toxicity. Significant toxicity to *Selenastrum capricornutum* was observed in two samples at two different sites. Samples exhibiting statistically significant toxicity are summarized in **Table 21**.

Table 21. Toxicity Exceedances in 2012 Coalition Monitoring

Site ID	Water Body	Sample Date	Analyte	% of Control
PNCGR	Pine Creek	12/8/2011	*Selenastrum capricornutum* Cell Growth	12%
UCBRD	Ulatis Creek	1/23/2012	*Selenastrum capricornutum* Cell Growth	49%

There were a total of seven sediment toxicity samples (including one duplicate sample) in 2012 Coalition Monitoring. Four of these samples (including one field duplicate) exhibited statistically significant toxicity to *Hyalella azteca*. The significant toxicity to *Hyalella Azteca* was observed at two sites (Z-Drain and Z-Drain Downstream) in April and in August at one site (Z-Drain). Samples exhibiting statistically significant sediment toxicity are summarized in **Table 22.**

Table 22. Toxicity Exceedances in Sediment in 2012 Coalition Monitoring

Site ID	Water Body	Sample Date	Analyte	% of Control Survival
ZDDIX	Z-Drain	4/17/2012	*Hyalella azteca* Survival	82%
ZDDSS	Z-Drain Downstream	4/17/2012	*Hyalella azteca* Survival	78.2%
ZDDIX	Z-Drain	8/21/2012	*Hyalella azteca* Survival	27.8%
ZDDIX	Z-Drain (duplicate)	8/21/2012	*Hyalella azteca* Survival	22.8%

Significantly toxic results and any follow-up evaluations or testing conducted on the samples are summarized by event below.

Event 70, December 2011 – Pine Creek at Nord Gianella Road, Selenastrum toxicity

In toxicity tests conducted with *Selenastrum*, the Coalition observed reductions in cell density of 88% compared to the control. In the PNCGR sample, diuron was detected at a concentration that explained the observed *Selenastrum* toxicity (14 µg/L; *Selenastrum* four-day EC50 = 2.4 µg/L).

In the Pine Creek drainage, there were 26 separate diuron applications reported in the month preceding the event, all to walnuts. A total of 573 acres were treated, and all were ground applications. There was no measurable flow at the sample site, and only ponded water was present. A total of 1.2 inches of rain fell for the month locally, with the last significant rain on November 24 (≤0.5 in.), about 2 weeks before the sample event. It is likely that some of the diuron applications were to walnut orchards directly adjacent to the creek (based on the township-range-section data) and immediately before or possibly between the rain events on November 19, 20 and 24.

One other minor potential contributor to the toxicity was oxyfluorfen (detected at 0.022 µg/L), which was applied to 844 acres of walnut, almond, and prunes. Oxyfluorfen is toxic to *Selenastrum* at low concentrations (LC50=0.08 µg/L) and has a >30-day half-life in soil but low mobility in soil and water.

Other herbicides were applied to extensive acreage (glyphosate [not analyzed], simazine [detected at 5.4 µg/L]) but, based on their chemical and toxicity characteristics, were unlikely to have caused the algae toxicity. A couple of other herbicides were applied to only a few acres (pendimethalin, rimsulfuron) and were not analyzed in the samples.

It can be concluded that diuron was the source of the toxicity, and the diuron source was clearly applications to walnut orchards. Based on the relatively low rainfall amounts and low flows in the creek, the diuron applications responsible for the toxicity were probably made very close to the sample site, since there were several applications within ~1.5 mile of the sample location for the month preceding the event.

Event 71, January 2012 – Ulatis Creek at Brown Road, Selenastrum toxicity

In toxicity tests conducted with *Selenastrum*, the Coalition observed reductions in cell density of 51% compared to the control. In the UCBRD sample and field duplicate, diuron was detected at concentrations that explained the observed *Selenastrum* toxicity (8.1 and 8 µg/L; *Selenastrum* four-day EC50 = 2.4 µg/L).

In the Ulatis Creek drainage, there were 22 separate diuron applications to alfalfa reported in the month preceding the event. A total of 1639 acres were treated, and all were ground applications.

Event 74, April 2012 – Z-Drain, Hyalella toxicity

In a sediment toxicity test conducted with *Hyalella*, the Coalition observed reductions in survival of 18% and 21.8 compared to the control at Z-Drain and at the site Z-Drain downstream site. Toxicity was marginal (near 80% of control survival) but was statistically significant. The low level of toxicity observed in the primary Z-Drain sample (<20% reduction compared to control) did not trigger any follow-up evaluations or analyses. Pyrethroid pesticides were analyzed and not detected in the downstream sample, and were therefore not considered a likely cause of toxicity. No other potential causes of the toxicity were investigated.

Event 78, August 2012 – Z-Drain, Hyalella toxicity

In a sediment toxicity test conducted with *Hyalella*, the Coalition observed a reduction in survival of 72.2% at Z-Drain and 77.2% in the duplicate sample. The toxicity observed in the sample (≥20% reduction compared to control) triggered follow-up sediment analyses for pyrethroid pesticides.

Based on preliminary verbal laboratory results, the apparent cause of the toxicity was initially believed to be deltamethrin, which is a pyrethroid that had no reported use by irrigated agriculture in the drainage and is commonly found in formulations available as retail products for home consumer use. However, the subsequent, final laboratory report indicated that the majority of the detected pyrethroid concentration was esfenvalerate (not deltamethrin), and a total of 0.82 TUs of agricultural use pyrethroids were likely responsible for the toxicity.

Pesticides Detected in Coalition Monitoring

There were 2,977 individual pesticide results analyzed in 148 water column samples (including 18 duplicates) collected from 23 different sites during 2012 Coalition Monitoring. Analyses were conducted for organophosphates, carbamates, organochlorines, benzophenyls, triazines, pyrethroids, and a variety of other herbicides. Within these categories, 15 different pesticides were detected in 48 of the 148 separate samples (including field duplicates) collected for Coalition monitoring. Approximately 68% of samples had no detected pesticides and more than 97.5% of all pesticide results were below detection.

There were also 59 individual pesticide results analyzed in seven sediment samples collected from three different sites during 2012 Coalition Monitoring. Analyses were conducted for organophosphate and pyrethroid pesticides. Within these categories, four different pesticides were detected in three separate samples (out of seven samples) collected for Coalition monitoring. More than 86% of the results were below detection in sediment samples.

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

Discussion of Pesticides Detected in Water Column in Coalition Monitoring

All detected pesticide concentrations in water column samples for 2012 Coalition Monitoring are listed in **Table 23**. 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 2011)*. A discussion of these detections and exceedances follow below.

- The herbicide bromacil was detected in two samples, including one field duplicate, from the Walker Creek site. The concentrations in these samples (0.39 and 0.45 µg/L) were well below concentrations predicted to cause toxicity to sensitive invertebrates (121,000 µg/L *Daphnia magna* 2-day EC50, USEPA ECOTOX database) or algae (6.8 µg/L 5-day *Selenastrum* EC50, USEPA ECOTOX database).

- The insecticide chlorpyrifos was detected in 25 samples, including two field duplicates, from 11 different sites. Chlorpyrifos exceeded the Basin Plan Amendment objective (0.015 µg/L) in three of these samples from two sites (Pine Creek and Ulatis Creek).
    - Chlorpyrifos was applied to approximately 82.5 acres of walnuts in the Pine Creek drainage in the month prior to the October 19, 2011 exceedance and to approximately 432 acres of walnuts in the prior two months. Approximately 2.75 inches of rain fell between October 4 and 12 in two separate events, but there was no evidence of recent flow in the channel, and the detected chlorpyrifos in this sample was likely the residual of concentrations detected in prior samples at this site (rather than new deposition).
    - Chlorpyrifos was applied to 4822 acres of alfalfa (134 applications) in the Ulatis Creek drainage in the month prior to the March 14, 2012 exceedance. There were only 4 applications of chlorpyrifos in the Ulatis Creek drainage in the month prior to the May 15, 2012 exceedance: one to 96 acres of walnuts and three to 0.9 acres of outdoor nursery plants. Chlorpyrifos was also applied to an additional 687 acres of alfalfa (12 applications) from March 15 – April 15, 2012.
- The insecticide demeton was detected in one sample from the Ulatis Creek site. The concentration in this sample (0.0021 µg/L) did not exceed or approach concentrations predicted to cause toxicity to sensitive invertebrates (5.0 µg/L *Daphnia magna* 1.1-day LC50, USEPA ECOTOX database).
- The insecticide diazinon was detected in 23 samples from 11 different sites; three of these samples were field duplicates. None of these detections exceeded the Basin Plan chronic objective (0.1 µg/L).
- The insecticide dichlorvos was detected in two samples from two sites (Gilsizer Slough and Ulatis Creek). Neither of these detections (0.0034 and 0.0054 µg/L) exceeded or approached the Cal/EPA Cancer Potency Factor limit (0.085 µg/L) or concentrations predicted to cause toxicity to sensitive invertebrates (>0.11 µg/L *Ceriodaphnia* 2-day LC50, USEPA ECOTOX database).
- The insecticide disulfoton was detected in one sample from the Ulatis Creek site. The detection (0.0081 µg/L) did not exceed or approach the Basin Plan limit (0.05 µg/L).
- The herbicide diuron was detected in six samples, including two field duplicates, from four different sites. Diuron exceeded the narrative objective (2 µg/L) in three of these samples from two sites (Pine Creek and Ulatis Creek).
    - Diuron was applied to approximately 573 acres of walnuts (via a total of 26 ground applications) in the Pine Creek drainage in the month prior to December 8, 2011. There was a total of about 1.2 inches of rain for the month, with the last significant rainfall occurring on November 24 (≤0.5 in.), about 2 weeks before the sample event.

    - Diuron was applied to 169 acres of alfalfa (16 applications) in the Ulatis Creek drainage in the month prior to the January 23, 2012 exceedance.

- The insecticide esfenvalerate was detected in one sample from the Cache Creek site. The concentration in this sample (DNQ at 0.0003 µg/L) did not exceed or approach concentrations predicted to cause toxicity to sensitive invertebrates (0.07 µg/L *Ceriodaphnia dubia* 4-day EC50, USEPA ECOTOX database).

- The insecticide ethoprop was detected in one sample from the Ulatis Creek site. The concentration in this sample (0.0065 µg/L) did not exceed or approach concentrations predicted to cause toxicity to sensitive invertebrates (44-180 µg/L *Daphnia magna* 2-day EC50, USEPA ECOTOX database).

- Malathion was detected in one sample at Gilsizer Slough. Detection of malathion is an exceedance of the Basin Plan prohibition. There were no reported applications of malathion in the Gilsizer Slough drainage in the month prior to the exceedance observed on January 24, 2012, and it was concluded that the exceedance was not caused by an agricultural application. The detected concentration (0.0135 µg/L) is below concentrations expected to cause toxicity to sensitive invertebrates (0.5 µg/L *Daphnia magna* 2-day EC50, USEPA ECOTOX database). No toxicity tests were performed for this sample.

- The insecticide mevinphos was detected in one sample from the Ulatis Creek site. The concentration in this sample (DNQ at 0.0138 µg/L) did not exceed or approach concentrations predicted to cause toxicity to sensitive invertebrates (0.83-1.10 µg/L *Ceriodaphnia dubia* 2-day LC50, USEPA ECOTOX database).

- The herbicide oryzalin was detected in three samples, including one field duplicate, from two sites (Ulatis Creek, Willow Slough). None of the samples exceeded or approached concentrations predicted to cause toxicity to algae (42 µg/L *Selenastrum* 5-day EC50, USEPA ECOTOX database). Toxicity to *Selenastrum* was observed in the Ulatis Creek sample; however, diuron was detected at concentrations that explained the observed *Selenastrum* toxicity (8.1 and 8 µg/L; *Selenastrum* four-day EC50 = 2.4 µg/L).

- The pesticide oxyfluorfen was detected in five samples, including one field duplicate, from four different sites. No results exceeded the concentration predicted to cause toxicity to green algae (0.08 µg/L *Selenastrum* 3-day LC50, USEPA ECOTOX database).
    - *Selenastrum* toxicity was observed in the December 8, 2011 Pine Creek sample. Diuron was identified as the primary cause of toxicity. Oxyfluorfen (detected at 0.022 µg/L) was a potential minor contributor to the toxicity. It was applied to 844 acres of walnut, almond, and prunes. Oxyfluorfen is toxic to *Selenastrum* at low concentrations (LC50=0.08 µg/L) and has a >30-day half-life in soil but low mobility in soil and water.
    - Oxyfluorfen was detected at 0.012 µg/L and 0.014 µg/L in Butte Slough on February 23, 2012. No toxicity to *Selenastrum* was observed in the Butte Slough sample.
    - Oxyfluorfen was detected in Lurline Creek (0.029 µg/L) and Freshwater Creek (0.065 µg/L) on April 18, 2012. Concentrations did not exceed. No toxicity tests

were performed for these samples, and the results did not exceed the concentration predicted to cause toxicity to Selenastrum.

- The insecticide methyl parathion was detected in two samples, including one field duplicate, from the Pine Creek site. Detection of methyl parathion is an exceedance of the Basin Plan prohibition. The detected concentrations (0.0342 and 0.0328 µg/L) did not exceed or approach concentrations predicted to cause toxicity to sensitive invertebrates (*Daphnia magna* 2-day EC50 = 5.7-12 µg /l; USEPA ECOTOX database). Partial PUR application data indicated that there was at least one application of methyl parathion to 262 acres of walnuts in the month preceding the exceedance. The PUR results are not yet complete, however, and there may have been additional applications to walnuts or other crops during this period.
- The herbicide simazine was detected in one sample from the Pine Creek site and exceeded the California primary MCL of 4 µg/L. The detected concentration (5.4 µg/L) did not exceed or approach concentrations predicted to cause toxicity to algae (100 µg/L *Selenastrum* 4-day EC50, USEPA ECOTOX database). Simazine was applied within the Pine Creek drainage in the month prior to sampling: 100 acres of almonds were treated with simazine on November 8, 2011, and 771 acres of walnuts were treated with simazine between November 9 and December 8, 2011. All were ground-applied (no aerial applications). There was toxicity to *Selenastrum* in the associated sample collected on December 8, 2011, but, based on its chemical and toxicity characteristics, simazine was unlikely to have contributed to the algae toxicity.

Table 23. Pesticides Detected in 2012 Coalition Monitoring

SiteID	SampleDate	AnalyteName		Result[1] (µg/L)	Trigger Limit[2]	Basis for Limit[3]
WLKCH	12/8/2011	Bromacil	DNQ	0.39	NA	
WLKCH	12/8/2011	Bromacil	=	0.45	NA	
GIDLR	10/18/2011	Chlorpyrifos	=	0.008	0.015	BPA
PNCGR	**10/19/2011**	**Chlorpyrifos**	**=**	**0.0383**	**0.015**	**BPA**
GILSL	1/24/2012	Chlorpyrifos		0.0033	0.015	BPA
GIDLR	2/21/2012	Chlorpyrifos		0.0114	0.015	BPA
PNCGR	2/22/2012	Chlorpyrifos		0.0027	0.015	BPA
GILSL	2/23/2012	Chlorpyrifos	DNQ	0.0013	0.015	BPA
GIDLR	3/14/2012	Chlorpyrifos		0.0074	0.015	BPA
GIDLR	3/14/2012	Chlorpyrifos		0.0067	0.015	BPA
UCBRD	**3/14/2012**	**Chlorpyrifos**		**0.0222**	**0.015**	**BPA**
STYHY	3/15/2012	Chlorpyrifos	DNQ	0.0003	0.015	BPA
UCBRD	4/17/2012	Chlorpyrifos		0.0095	0.015	BPA
CCCPY	4/18/2012	Chlorpyrifos	DNQ	0.0003	0.015	BPA
COLDR	5/15/2012	Chlorpyrifos	DNQ	0.0011	0.015	BPA
UCBRD	**5/15/2012**	**Chlorpyrifos**		**0.038**	**0.015**	**BPA**
WLSPL	5/15/2012	Chlorpyrifos		0.0027	0.015	BPA
PNCGR	5/16/2012	Chlorpyrifos		0.0034	0.015	BPA

SiteID	SampleDate	AnalyteName		Result[1] (µg/L)	Trigger Limit[2]	Basis for Limit[3]
PNCGR	5/16/2012	Chlorpyrifos		0.0036	0.015	BPA
CCSTR	5/17/2012	Chlorpyrifos		0.0048	0.015	BPA
CCCPY	6/21/2012	Chlorpyrifos	DNQ	0.0002	0.015	BPA
COLDR	7/17/2012	Chlorpyrifos	DNQ	0.0016	0.015	BPA
LHNCT	7/18/2012	Chlorpyrifos	DNQ	0.0014	0.015	BPA
WLKCH	7/18/2012	Chlorpyrifos	DNQ	0.0014	0.015	BPA
CCCPY	8/21/2012	Chlorpyrifos	DNQ	0.0008	0.015	BPA
GIDLR	9/18/2012	Chlorpyrifos	DNQ	0.0011	0.015	BPA
CCSTR	9/20/2012	Chlorpyrifos		0.0044	0.015	BPA
UCBRD	6/19/2012	Demeton		0.0021	NA	
CCSTR	1/24/2012	Diazinon		0.0081	0.1	(BP chronic)
CCSTR	1/24/2012	Diazinon		0.0063	0.1	(BP chronic)
GILSL	1/24/2012	Diazinon		0.0128	0.1	(BP chronic)
LSNKR	1/24/2012	Diazinon		0.0064	0.1	(BP chronic)
GILSL	2/23/2012	Diazinon		0.028	0.1	(BP chronic)
RARPP	4/17/2012	Diazinon		0.032	0.1	(BP chronic)
RARPP	4/17/2012	Diazinon		0.0322	0.1	(BP chronic)
WLSPL	4/17/2012	Diazinon		0.0302	0.1	(BP chronic)
COLDR	5/15/2012	Diazinon		0.0085	0.1	(BP chronic)
GILSL	5/15/2012	Diazinon		0.009	0.1	(BP chronic)
LSNKR	5/15/2012	Diazinon		0.007	0.1	(BP chronic)
RARPP	5/15/2012	Diazinon		0.0104	0.1	(BP chronic)
SSKNK	5/15/2012	Diazinon		0.0066	0.1	(BP chronic)
SSLIB	5/15/2012	Diazinon		0.0065	0.1	(BP chronic)
UCBRD	5/15/2012	Diazinon		0.0118	0.1	(BP chronic)
WLSPL	5/15/2012	Diazinon		0.0148	0.1	(BP chronic)
PNCGR	5/16/2012	Diazinon		0.0046	0.1	(BP chronic)
PNCGR	5/16/2012	Diazinon		0.0058	0.1	(BP chronic)
CCSTR	5/17/2012	Diazinon		0.0065	0.1	(BP chronic)
UCBRD	6/19/2012	Diazinon		0.025	0.1	(BP chronic)
WLSPL	6/19/2012	Diazinon		0.0329	0.1	(BP chronic)
GIDLR	9/18/2012	Diazinon	DNQ	0.0024	0.1	(BP chronic)
CCSTR	9/20/2012	Diazinon	DNQ	0.0023	0.1	(BP chronic)
GILSL	1/24/2012	Dichlorvos	DNQ	0.0034	0.085	Cal/EPA
UCBRD	6/19/2012	Dichlorvos	DNQ	0.0054	0.085	Cal/EPA
UCBRD	6/19/2012	Disulfoton		0.0081	0.05	BP
PNCGR	**12/8/2011**	**Diuron**	**=**	**14**	**2**	**Narrative**
WLKCH	12/8/2011	Diuron	DNQ	0.25	2	Narrative
WLKCH	12/8/2011	Diuron	DNQ	0.2	2	Narrative
UCBRD	**1/23/2012**	**Diuron**	**=**	**8.1**	**2**	**Narrative**
UCBRD	**1/23/2012**	**Diuron**	**=**	**8**	**2**	**Narrative**
WLSPL	1/23/2012	Diuron	DNQ	0.36	2	Narrative

SiteID	SampleDate	AnalyteName		Result[1] (µg/L)	Trigger Limit[2]	Basis for Limit[3]
CCCPY	6/21/2012	Esfenvalerate /Fenvalerate	DNQ	0.0003	NA	
UCBRD	6/19/2012	Ethoprop		0.0065	NA	
GILSL	**1/24/2012**	**Malathion**		**0.0135**	**ND[4]**	**BP**
UCBRD	6/19/2012	Mevinphos	DNQ	0.0138	NA	
UCBRD	1/23/2012	Oryzalin	=	1.4	NA	
UCBRD	1/23/2012	Oryzalin	=	1.4	NA	
WLSPL	1/23/2012	Oryzalin	=	0.4	NA	
PNCGR	12/8/2011	Oxyfluorfen	DNQ	0.022	NA	
BTTSL	2/23/2012	Oxyfluorfen	DNQ	0.012	NA	
BTTSL	2/23/2012	Oxyfluorfen	DNQ	0.014	NA	
FRSHC	4/18/2012	Oxyfluorfen	=	0.065	NA	
LRLNC	4/18/2012	Oxyfluorfen	DNQ	0.029	NA	
PNCGR	**5/16/2012**	**Parathion, Methyl**		**0.0342**	**ND[4]**	**BP**
PNCGR	**5/16/2012**	**Parathion, Methyl**		**0.0328**	**ND[4]**	**BP**
PNCGR	**12/8/2011**	**Simazine**	**=**	**5.4**	**4**	**CA 1° MCL**

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. "NA" if no ILRP limit established.
3. Water Quality Objective Basis: BP = Central Valley Basin Plan; BPA = Basin Plan Amendment; Cal/EPA = Cal/EPA Cancer Potency Factor; 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 µg/L, and the Basin Plan performance goal for methyl parathion is 0.13 µg/L.

Pesticides Detected in Sediment in Coalition Monitoring

All detected pesticide concentrations for sediment chemistry analyses are included in **Table 24**.

- Bifenthrin was detected in three sediment samples from two sites (Willow Slough, Z-Drain). Bifenthrin concentrations detected in the Z-drain samples did not appear to have been elevated sufficiently to cause or contribute significantly to sediment toxicity. No sediment toxicity analyses were conducted for these samples.
- Chlorpyrifos was detected in one sediment sample from one site (Z-Drain) but was unlikely to have caused or contributed significantly to the sediment toxicity observed in the August sample based on detected concentrations and known toxicity thresholds for *Hyalella*.
- Esfenvalerate/Fenvalerate was detected in one sediment sample from one site (Z-Drain), and was likely to have contributed significantly to the sediment toxicity observed in the August 2012 sample based on detected concentrations and known toxicity thresholds for *Hyalella*. The majority of the detected pyrethroid concentration in this sample was esfenvalerate, and a total of 0.82 TUs of agricultural use pyrethroids were likely responsible for the toxicity.
- L-Cyhalothrin was detected in two sediment samples from one site (Z-Drain) but was unlikely to have caused or contributed significantly to the sediment toxicity observed in the August sample based on detected concentrations and known toxicity thresholds for *Hyalella*.

Table 24. Pesticides Detected in Sediment in 2012 Coalition Monitoring

Site ID	Date Sampled	Analyte	Result[(1)] (ng/g d.w.)	
ZDDIX	10/19/2011	Bifenthrin	=	0.74
WLSPL	12/7/2011	Bifenthrin	DNQ	0.28
ZDDIX	8/21/2012	Bifenthrin	DNQ	1.4
ZDDIX	8/21/2012	Chlorpyrifos	DNQ	1
ZDDIX	8/21/2012	Esfenvalerate/Fenvalerate	=	21
ZDDIX	10/19/2011	L-Cyhalothrin	=	1
ZDDIX	8/21/2012	L-Cyhalothrin	DNQ	0.85

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).

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), pH, total dissolved solids, and trace metals during 2012 Coalition Monitoring (**Table 25**).

Conductivity

Conductivity was monitored in 255 samples from 41 Coalition sites. Conductivity exceeded the California recommended 2˚ MCL (900 µS/cm) for drinking water in 35 samples and the unadopted UN Agricultural Goal (700 µS/cm) in a total of 52 samples collected from 13 different sites. Nine of the exceedances were observed at Ulatis Creek (UCBRD), and 10 were observed at Willow Slough (WLSPL).

In addition, two out of the two conductivity samples collected by the Upper Feather Watershed Group from the Middle Fork Feather River (MFFGR) in 2012 exceeded the 90th percentile site-specific water quality objective value in the Basin Plan (150 µS/cm). The 90^{th} percentile of all samples collected from the Middle Fork Feather River for the ILRP since 2005 (205 µS/cm) also exceeded this site-specific objective.

Dissolved Oxygen

During 2012 Coalition Monitoring, dissolved oxygen was measured in 271 samples from 41 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 13 samples from eight sites and below the Basin Plan lower limit of 7.0 mg/L for waterbodies with a COLD designated beneficial use in an additional 35 samples from 14 sites.

Dissolved oxygen exceedances were caused primarily by low flows, stagnant conditions, or extensive submerged aquatic vegetation in some cases. The low flows and stagnant conditions have the potential to increase diurnal variability or limit oxygen production by instream algae and also to trap organic particulates that contribute to instream oxygen consumption.

E. coli Bacteria

E. coli bacteria were monitored in 175 samples from 17 sites, including 14 field duplicate samples. *E. coli* results exceeded the single sample maximum objective (235 MPN/100mL) in 44 samples from 11 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 2012 Coalition Monitoring included nitrate + nitrite as N, total Kjeldahl nitrogen (TKN), ammonia, total phosphorus, and dissolved orthophosphate. Nutrients were monitored in 181 samples at 18 different Coalition sites, including 15 field duplicate samples. Nitrate as N results exceeded the Basin Plan objective (10 mg/L) in two samples from one site (Ulatis Creek). 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 2012 Coalition Monitoring, pH was measured in 255 samples from 41 Coalition sites. pH exceeded the Basin Plan maximum of 8.5 Standard Units (-log[H+]) in eight Coalition samples collected from seven different sites and exceeded the Basin Plan minimum of 6.5 8.5 Standard Units (-log[H+]) in one Coalition sample at one site (STYHY).

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.

Most pH exceedances occurred in April, June, and August, during the irrigation season. 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.

Trace Metals

Trace metals monitored during 2012 Coalition Monitoring included both unfiltered metals (total arsenic, boron, copper, lead, molybdenum, and selenium) and filtered metals (dissolved copper and lead). Total trace metals were monitored in 56 samples (including 13 field duplicates), and dissolved trace metals were monitored in 14 samples at 10 different Coalition sites.

Arsenic

Arsenic was monitored in nine samples (including one field duplicates) from six different Coalition sites. Two samples for Grand Island Drain exceeded the Basin Plan objective (10 µg/L).

There are both legacy and a few current sources of arsenic. There is very little remaining agricultural use of arsenic-based pesticide products (based on review of DPR's PUR data), and arsenic has only a few potentially significant sources: (1) natural background from arsenic in the soils, and (2) arsenic remaining from legacy lead arsenate use in orchards, (3) arsenic used in various landscape maintenance and structural pest control applications (non-agriculture), and (4) arsenic used in wood preservatives. One possible source is the wooden bridge structure just upstream of the sampling site, if arsenic-based preservatives were used. One final, but somewhat unlikely source is an arsenic-based additive that may still be used for chicken feed (http://water.usgs.gov/owq/AFO/proceedings/afo/pdf/Wershaw.pdf), and which can potentially make its way through the chicken and into agriculture fields and runoff if the poultry litter is used on the field.

Boron

Boron was monitored in 17 samples (including seven field duplicates) from two different Coalition sites. Thirteen samples (including five field duplicates) at two sites (Tule Canal, Willow Slough) exceeded the Trigger Limit (700 µg/L, based on Ayers and Westcott). Boron is a naturally-occurring mineral that is not applied by agriculture, but is elevated in some irrigation supplies (especially groundwater) and soils and concentrations may be elevated through consumptive use of irrigation water. It is known to be naturally elevated in the groundwater and major tributaries supplying irrigation water in the Willow Slough drainage.

Copper

Dissolved copper was monitored in 14 samples (including three field duplicates) from six different Coalition sites. Two samples for the Pine Creek site exceeded the CTR hardness-based objective for dissolved copper in October and December of 2011 (14.09 and 10.47 µg/L, respectively). Copper is widely used by agriculture as a fungicide, but it also occurs naturally in soils and is commonly used for maintenance of septic systems. The heaviest agricultural use in the Pine Creek drainage typically occurs March through May, with walnuts accounting for >90% of the use.

Table 25. Other Physical, Chemical, and Microbiological Parameters Observed to Exceed Numeric Objectives in 2012 Coalition Monitoring

Site ID	Sample Date	Analyte	Units	Result	Trigger Limit(1)	Basis for Limit(2)	Mgt Plan(3)
GIDLR	10/18/2011	Arsenic	µg/L	14	10	1˚ MCL	Active
GIDLR	12/7/2011	Arsenic	µg/L	11	10	1˚ MCL	Active
TCHWY	5/17/2012	Boron	µg/L	1510	700	Narrative	Active
TCHWY	5/17/2012	Boron	µg/L	1550	700	Narrative	Active
TCHWY	6/20/2012	Boron	µg/L	1370	700	Narrative	Active
TCHWY	6/20/2012	Boron	µg/L	1360	700	Narrative	Active
TCHWY	7/17/2012	Boron	µg/L	1190	700	Narrative	Active
TCHWY	7/17/2012	Boron	µg/L	1210	700	Narrative	Active
TCHWY	8/22/2012	Boron	µg/L	1110	700	Narrative	Active
WLSPL	1/23/2012	Boron	µg/L	1870	700	Narrative	Active
WLSPL	1/23/2012	Boron	µg/L	1860	700	Narrative	Active
WLSPL	2/21/2012	Boron	µg/L	2450	700	Narrative	Active
WLSPL	3/14/2012	Boron	µg/L	2430	700	Narrative	Active
WLSPL	3/14/2012	Boron	µg/L	2420	700	Narrative	Active
WLSPL	4/17/2012	Boron	µg/L	1580	700	Narrative	Active
CCCPY	2/21/2012	Conductivity	µS/cm	1055	900, 700(4)	Narrative	Active
COLDR	2/23/2012	Conductivity	µS/cm	989	900, 700(4)	Narrative	Active
COLDR	3/14/2012	Conductivity	µS/cm	933	900, 700(4)	Narrative	Active
COLDR	4/17/2012	Conductivity	µS/cm	922	900, 700(4)	Narrative	Active
COLDR	6/19/2012	Conductivity	µS/cm	936	900, 700(4)	Narrative	Active
FRSHC	11/8/2011	Conductivity	µS/cm	950	900, 700(4)	Narrative	Active
FRSHC	12/7/2011	Conductivity	µS/cm	974	900, 700(4)	Narrative	Active
FRSHC	1/23/2012	Conductivity	µS/cm	731	900, 700(4)	Narrative	Active
FRSHC	2/22/2012	Conductivity	µS/cm	902	900, 700(4)	Narrative	Active
FRSHC	3/15/2012	Conductivity	µS/cm	883	900, 700(4)	Narrative	Active
FRSHC	4/18/2012	Conductivity	µS/cm	819	900, 700(4)	Narrative	Active
GIDLR	12/7/2011	Conductivity	µS/cm	722	900, 700(4)	Narrative	Active
GIDLR	2/21/2012	Conductivity	µS/cm	785	900, 700(4)	Narrative	Active
GIDLR	4/19/2012	Conductivity	µS/cm	932	900, 700(4)	Narrative	Active
LRLNC	2/22/2012	Conductivity	µS/cm	924	900, 700(4)	Narrative	Active
LRLNC	4/18/2012	Conductivity	µS/cm	1003	900, 700(4)	Narrative	Active
MFFGR	7/17/2012	Conductivity	µS/cm	184	900, 700(4)	Narrative	Active
MGSLU	4/18/2012	Conductivity	µS/cm	1177	900, 700(4)	Narrative	No
MGSLU	5/16/2012	Conductivity	µS/cm	1528	900, 700(4)	Narrative	No
MGSLU	6/21/2012	Conductivity	µS/cm	1329	900, 700(4)	Narrative	No
RARPP	2/23/2012	Conductivity	µS/cm	993	900, 700(4)	Narrative	Active
RARPP	3/14/2012	Conductivity	µS/cm	1010	900, 700(4)	Narrative	Active
RARPP	4/17/2012	Conductivity	µS/cm	1322	900, 700(4)	Narrative	Active
SCCMR	2/22/2012	Conductivity	µS/cm	910	900, 700(4)	Narrative	Active

Site ID	Sample Date	Analyte	Units	Result	Trigger Limit[1]	Basis for Limit[2]	Mgt Plan[3]
SCCMR	4/18/2012	Conductivity	µS/cm	746	900, 700[4]	Narrative	Active
SSLIB	2/21/2012	Conductivity	µS/cm	751	900, 700[4]	Narrative	Active
SSLIB	4/17/2012	Conductivity	µS/cm	887	900, 700[4]	Narrative	Active
SSLIB	5/15/2012	Conductivity	µS/cm	837	900, 700[4]	Narrative	Active
TCHWY	5/17/2012	Conductivity	µS/cm	1003	900, 700[4]	Narrative	Active
TCHWY	6/20/2012	Conductivity	µS/cm	870	900, 700[4]	Narrative	Active
TCHWY	7/17/2012	Conductivity	µS/cm	883	900, 700[4]	Narrative	Active
TCHWY	8/22/2012	Conductivity	µS/cm	845	900, 700[4]	Narrative	Active
UCBRD	11/8/2011	Conductivity	µS/cm	900	900, 700[4]	Narrative	Active
UCBRD	12/7/2011	Conductivity	µS/cm	1086	900, 700[4]	Narrative	Active
UCBRD	2/21/2012	Conductivity	µS/cm	1107	900, 700[4]	Narrative	Active
UCBRD	4/17/2012	Conductivity	µS/cm	965	900, 700[4]	Narrative	Active
UCBRD	5/15/2012	Conductivity	µS/cm	782	900, 700[4]	Narrative	Active
UCBRD	6/19/2012	Conductivity	µS/cm	816	900, 700[4]	Narrative	Active
UCBRD	7/17/2012	Conductivity	µS/cm	821	900, 700[4]	Narrative	Active
UCBRD	8/21/2012	Conductivity	µS/cm	1009	900, 700[4]	Narrative	Active
UCBRD	9/18/2012	Conductivity	µS/cm	822	900, 700[4]	Narrative	Active
WLSPL	11/8/2011	Conductivity	µS/cm	1199	900, 700[4]	Narrative	Active
WLSPL	12/7/2011	Conductivity	µS/cm	1559	900, 700[4]	Narrative	Active
WLSPL	1/23/2012	Conductivity	µS/cm	1022	900, 700[4]	Narrative	Active
WLSPL	2/21/2012	Conductivity	µS/cm	1547	900, 700[4]	Narrative	Active
WLSPL	3/14/2012	Conductivity	µS/cm	1335	900, 700[4]	Narrative	Active
WLSPL	4/17/2012	Conductivity	µS/cm	1006	900, 700[4]	Narrative	Active
WLSPL	5/15/2012	Conductivity	µS/cm	916	900, 700[4]	Narrative	Active
WLSPL	6/19/2012	Conductivity	µS/cm	1557	900, 700[4]	Narrative	Active
WLSPL	7/18/2012	Conductivity	µS/cm	1282	900, 700[4]	Narrative	Active
WLSPL	8/21/2012	Conductivity	µS/cm	1397	900, 700[4]	Narrative	Active
ZDDIX	2/21/2012	Conductivity	µS/cm	1098	900, 700[4]	Narrative	Active
ZDDIX	4/17/2012	Conductivity	µS/cm	1137	900, 700[4]	Narrative	Active
PNCGR	10/19/2011	Copper	µg/L	15	14.09	CTR FW AQ Chronic	No
PNCGR	12/8/2011	Copper	µg/L	11	10.47	CTR FW AQ Chronic	No
BTTSL	6/20/2012	Dissolved Oxygen	mg/L	5.4	7	BP [SSO COLD]	Active
BTTSL	8/22/2012	Dissolved Oxygen	mg/L	5.76	7	BP [SSO COLD]	Active
CCBRW	8/23/2012	Dissolved Oxygen	mg/L	3.07	7	BP [SSO COLD]	Active
CCBRW	9/20/2012	Dissolved Oxygen	mg/L	6.76	7	BP [SSO COLD]	Active
CCSTR	1/24/2012	Dissolved Oxygen	mg/L	2.22	7	BP [SSO COLD]	Active
CCSTR	3/14/2012	Dissolved Oxygen	mg/L	4.06	7	BP [SSO COLD]	Active
CCSTR	5/17/2012	Dissolved Oxygen	mg/L	5.58	7	BP [SSO COLD]	Active
CCSTR	7/18/2012	Dissolved Oxygen	mg/L	0.54	7	BP [SSO COLD]	Active
CCSTR	8/23/2012	Dissolved Oxygen	mg/L	5.38	7	BP [SSO COLD]	Active
CCSTR	9/20/2012	Dissolved Oxygen	mg/L	2.67	7	BP [SSO COLD]	Active

Site ID	Sample Date	Analyte	Units	Result	Trigger Limit[1]	Basis for Limit[2]	Mgt Plan[3]
COLDR	8/21/2012	Dissolved Oxygen	mg/L	4.85	7	BP [SSO COLD]	Active
COYTR	2/22/2012	Dissolved Oxygen	mg/L	6.5	7	BP [SSO COLD]	Active
COYTR	6/20/2012	Dissolved Oxygen	mg/L	6.03	7	BP [SSO COLD]	Active
COYTR	8/22/2012	Dissolved Oxygen	mg/L	2.73	7	BP [SSO COLD]	Active
GIDLR	10/18/2011	Dissolved Oxygen	mg/L	4.6	5	BP [SSO WARM]	Active
GIDLR	7/17/2012	Dissolved Oxygen	mg/L	3.87	5	BP [SSO WARM]	Active
GIDLR	8/23/2012	Dissolved Oxygen	mg/L	4.29	5	BP [SSO WARM]	Active
GILSL	6/20/2012	Dissolved Oxygen	mg/L	1.3	5	BP [SSO WARM]	Active
GILSL	7/18/2012	Dissolved Oxygen	mg/L	1.8	5	BP [SSO WARM]	Active
GILSL	8/22/2012	Dissolved Oxygen	mg/L	3.04	5	BP [SSO WARM]	Active
LAGAM	6/19/2012	Dissolved Oxygen	mg/L	5.6	7	BP [SSO COLD]	Active
LHNCT	7/18/2012	Dissolved Oxygen	mg/L	3.57	7	BP [SSO COLD]	Active
LSNKR	7/18/2012	Dissolved Oxygen	mg/L	4.64	5	BP [SSO WARM]	No
MDLCR	8/21/2012	Dissolved Oxygen	mg/L	5.38	7	BP [SSO COLD]	No
MFFGR	7/17/2012	Dissolved Oxygen	mg/L	6.66	7	BP [SSO COLD]	Completed
MGSLU	2/22/2012	Dissolved Oxygen	mg/L	2.7	7	BP [SSO COLD]	No
MGSLU	4/18/2012	Dissolved Oxygen	mg/L	6.46	7	BP [SSO COLD]	No
MGSLU	5/16/2012	Dissolved Oxygen	mg/L	5.36	7	BP [SSO COLD]	No
MGSLU	6/21/2012	Dissolved Oxygen	mg/L	3.48	7	BP [SSO COLD]	No
PNCGR	10/19/2011	Dissolved Oxygen	mg/L	2.3	7	BP [SSO COLD]	Active
PNCGR	11/9/2011	Dissolved Oxygen	mg/L	4.4	7	BP [SSO COLD]	Active
PNCGR	12/8/2011	Dissolved Oxygen	mg/L	3.17	7	BP [SSO COLD]	Active
PNCGR	5/16/2012	Dissolved Oxygen	mg/L	5.8	7	BP [SSO COLD]	Active
PRCAN	6/20/2012	Dissolved Oxygen	mg/L	6.28	7	BP [SSO COLD]	Active
RARPP	8/21/2012	Dissolved Oxygen	mg/L	4.7	5	BP [SSO WARM]	No
SSLIB	7/17/2012	Dissolved Oxygen	mg/L	4.51	5	BP [SSO WARM]	No
STYHY	3/15/2012	Dissolved Oxygen	mg/L	6.2	7	BP [SSO COLD]	No
UCBRD	7/17/2012	Dissolved Oxygen	mg/L	2.5	5	BP [SSO WARM]	Active
WLKCH	5/16/2012	Dissolved Oxygen	mg/L	4	5	BP [SSO WARM]	Active
WLKCH	7/18/2012	Dissolved Oxygen	mg/L	4.7	5	BP [SSO WARM]	Active
WLSPL	4/17/2012	Dissolved Oxygen	mg/L	6.51	7	BP [SSO COLD]	No
WLSPL	5/15/2012	Dissolved Oxygen	mg/L	4.91	7	BP [SSO COLD]	No
WLSPL	8/21/2012	Dissolved Oxygen	mg/L	4.69	7	BP [SSO COLD]	No
ZDDIX	6/19/2012	Dissolved Oxygen	mg/L	3.38	5	BP [SSO WARM]	Active
ACACR	1/24/2012	E. coli	MPN/100mL	390	235	BP	Suspended
ACACR	3/15/2012	E. coli	MPN/100mL	410	235	BP	Suspended
ACACR	6/20/2012	E. coli	MPN/100mL	270	235	BP	Suspended
ACACR	7/18/2012	E. coli	MPN/100mL	820	235	BP	Suspended
ACACR	7/18/2012	E. coli	MPN/100mL	390	235	BP	Suspended
ACACR	8/22/2012	E. coli	MPN/100mL	300	235	BP	Suspended
ACACR	9/19/2012	E. coli	MPN/100mL	490	235	BP	Suspended
ACACR	11/9/2011	E. coli	MPN/100mL	410	235	BP	Suspended

Site ID	Sample Date	Analyte	Units	Result	Trigger Limit(1)	Basis for Limit(2)	Mgt Plan(3)
CCBRW	3/14/2012	E. coli	MPN/100mL	2400	235	BP	Completed
CCBRW	3/14/2012	E. coli	MPN/100mL	>2400	235	BP	Completed
CCBRW	9/20/2012	E. coli	MPN/100mL	370	235	BP	Completed
CRTWN	1/23/2012	E. coli	MPN/100mL	550	235	BP	Suspended
FRSHC	1/23/2012	E. coli	MPN/100mL	320	235	BP	Suspended
FRSHC	1/23/2012	E. coli	MPN/100mL	460	235	BP	Suspended
FRSHC	3/15/2012	E. coli	MPN/100mL	490	235	BP	Suspended
FRSHC	4/18/2012	E. coli	MPN/100mL	580	235	BP	Suspended
GIDLR	1/23/2012	E. coli	MPN/100mL	1000	235	BP	Suspended
LHNCT	1/24/2012	E. coli	MPN/100mL	980	235	BP	Suspended
LHNCT	3/15/2012	E. coli	MPN/100mL	2400	235	BP	Suspended
LHNCT	5/15/2012	E. coli	MPN/100mL	290	235	BP	Suspended
LHNCT	6/20/2012	E. coli	MPN/100mL	1000	235	BP	Suspended
LSNKR	10/19/201	E. coli	MPN/100mL	2000	235	BP	Suspended
LSNKR	11/9/2011	E. coli	MPN/100mL	330	235	BP	Suspended
LSNKR	1/24/2012	E. coli	MPN/100mL	360	235	BP	Suspended
LSNKR	3/15/2012	E. coli	MPN/100mL	1300	235	BP	Suspended
LSNKR	6/20/2012	E. coli	MPN/100mL	460	235	BP	Suspended
LSNKR	6/20/2012	E. coli	MPN/100mL	290	235	BP	Suspended
LSNKR	7/18/2012	E. coli	MPN/100mL	770	235	BP	Suspended
LSNKR	9/19/2012	E. coli	MPN/100mL	650	235	BP	Suspended
PNCGR	1/24/2012	E. coli	MPN/100mL	690	235	BP	Suspended
PNCGR	3/15/2012	E. coli	MPN/100mL	340	235	BP	Suspended
PNCGR	5/16/2012	E. coli	MPN/100mL	2400	235	BP	Suspended
UCBRD	1/23/2012	E. coli	MPN/100mL	2400	235	BP	Suspended
UCBRD	3/14/2012	E. coli	MPN/100mL	2000	235	BP	Suspended
UCBRD	3/14/2012	E. coli	MPN/100mL	2000	235	BP	Suspended
UCBRD	5/15/2012	E. coli	MPN/100mL	2400	235	BP	Suspended
WLKCH	1/24/2012	E. coli	MPN/100mL	2400	235	BP	Suspended
WLKCH	5/16/2012	E. coli	MPN/100mL	2400	235	BP	Suspended
WLKCH	6/20/2012	E. coli	MPN/100mL	1000	235	BP	Suspended
WLKCH	8/22/2012	E. coli	MPN/100mL	2400	235	BP	Suspended
WLSPL	11/8/2011	E. coli	MPN/100mL	440	235	BP	Suspended
WLSPL	8/21/2012	E. coli	MPN/100mL	770	235	BP	Suspended
WLSPL	5/15/2012	E. coli	MPN/100mL	250	235	BP	Suspended
WLSPL	8/21/2012	E. coli	MPN/100mL	2400	235	BP	Suspended
UCBRD	12/7/2011	Nitrate+Nitrite	mg/L	13	10	1˚ MCL	Completed
UCBRD	2/21/2012	Nitrate+Nitrite	mg/L	17	10	1˚ MCL	Completed
DCGLT	8/23/2012	pH	-log[H+]	9.29	6.5 - 8.5	BP	Active
GILSL	2/23/2012	pH	-log[H+]	9	6.5-8.5	BP	Active
PNCGR	6/20/2012	pH	-log[H+]	9.17	6.5 - 8.5	BP	No
STYHY	4/18/2012	pH	-log[H+]	5.98	6.5 - 8.5	BP	Active

Site ID	Sample Date	Analyte	Units	Result	Trigger Limit(1)	Basis for Limit(2)	Mgt Plan(3)
STYHY	6/20/2012	pH	-log[H+]	8.74	6.5 - 8.5	BP	Active
TCHWY	2/21/2012	pH	-log[H+]	9.45	6.5-8.5	BP	No
TCHWY	4/17/2012	pH	-log[H+]	8.98	6.5 - 8.5	BP	No
ZDDIX	4/17/2012	pH	-log[H+]	8.97	6.5 - 8.5	BP	Active
ZDDSS	4/17/2012	pH	-log[H+]	8.63	6.5 - 8.5	BP	Active

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 µS/cm) and/or the California recommended 2˚ MCL (900 µS/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.
7. Field duplicate

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 the most recent Management Plan Progress Report (MPPR) to the Water Board in April 2012. The MPPR that documents the status and progress toward Management Plan requirements for 2012 will be provided to the Water Board at the end of March 2013. Activities conducted in 2012 to implement the Coalition's Management Plan included addressing exceedances of objectives for registered pesticides, completion of source evaluations for pesticides and toxicity, development of management practice implementation goals, and monitoring required for toxicity and pesticide management plans and TMDLs.

Implementation completed specifically for registered pesticides and toxicity 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 have been 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 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 during the monitoring period are summarized in an Excel table for each watershed in **Appendix F**. Available outreach materials are also included as attachments in **Appendix F**.

Conclusions and Recommendations

The Coalition submits this *2012 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 2012 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 2011 through September 2012. To date, a total of 79 Coalition storm and irrigation season events have been completed, with additional events collected by coordinating programs and for follow-up evaluations. For the period of record in this AMR (October 2011 through September 2012), samples were collected for 10 scheduled monthly events and 2 wet weather ("storm") events.

Pesticides were infrequently detected (~2.5% of 2012 pesticide results), and when detected, rarely exceeded applicable objectives. Five registered pesticides (chlorpyrifos, diuron, malathion, methyl parathion, and simazine) exceeded applicable water quality objectives or ILRP trigger limits in ten out of 148 total Coalition monitoring samples in 2012 (including exceedances in two field duplicate samples).

Many of the pesticides specifically required to be monitored in the past 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. Coalition monitoring of pesticides for the *ILRP* for 2012 was conducted based on management plan requirements, and the reported pesticide use and relative toxicity risks for these pesticides in the subwatersheds. Similarly, the Coalition conducted more focused monitoring of most trace elements (arsenic, cadmium, lead, molybdenum, nickel, selenium, and zinc) informed by the Coalition's past monitoring results, which have demonstrated that these metals typically 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. This more focused strategy for monitoring pesticides and trace metals was implemented in 2010 in accordance with the Coalition's 2009 MRP (Order No. R5-2009-0875, CVRWQCB 2009[6]).

The majority of exceedances of adopted numeric objectives continue to consist of conductivity, dissolved oxygen, and *E. coli*. Agricultural runoff and irrigation return flows may contribute to exceedances of these objectives, but these parameters are largely controlled or significantly

[6] 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.

affected by natural processes and sources that are not controllable by agricultural management practices.

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 initial 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 the Coalition's program and implemented through the Coalition's ongoing *ILRP* monitoring efforts. The Coalition also 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 required 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 AMR is documentation of the success and continued progress of the Coalition in achieving these objectives.

References

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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

Memorandum

Claus Suverkropp
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DATE: July 15, 2013

TO: Cark Cady, CVRWQCB

COPY TO: Bruce Houdesheldt, NCWA
Susan Fregien, CVRWQCB

SUBJECT: **Requested Amendments to SVWQC 2012 Annual Monitoring Report**

Per your request and as discussed on June 19, 2013, at our quarterly Management Plan meeting, we are providing the information described below to supplement or complete the SVWQC Annual Monitoring Report 2012 for the ILRP Monitoring and Reporting Program. Please contact me if you need any additional information to proceed with your review of the Annual Monitoring Report.

The following Exceedance Reports are amended or provided as requested:

- Dissolved Oxygen exceedance at MFFGR — This was missing from Event 77 exceedance report for July 2012
  Now included in amended report " 077 EXC JUL27 FLD amended 20130619.pdf"
- Selenastrum exceedance at PNCGR — The Event 70 (Dec 2011) toxicity exceedance report was missing from the AMR files.
  Missing report " 070 EXC DEC16 TOX.pdf " provided.
- Simazine exceedance at PNCGR — This was incorrectly flagged by DB and missing from E70 (Dec 2011) Exceedance Report
  Now included in amended report "070 EXC FEB08 LAB amended 20130619.pdf"
- Boron exceedance at WLSPL —These were included in the Event 71, Event 72, and Event 73 reports, but missing from Event 74 (April 2012).
  Now included in amended report "074 EXC JUN21 LAB amended 20130619.pdf"
- Conductivity exceedance at MFFRG — This was missing from Event 77 (JUL 2012) Exceedance report.
  Now included in amended report " 077 EXC JUL27 FLD amended 20130619.pdf"

- Dissolved oxygen exceedance at PRCAN — This was missing from the Event 76 (JUN 2012) exceedance report.
  Now included in amended report " 076 EXC JUL02 FLD amended 20130619.pdf"

Table 25 of the Annual Monitoring Report (pages 71-75) was missing the following exceedances. These were added to the table and the amended table is attached with this memorandum.

- Conductivity exceedance at MFFGR (Event 76 (JUN 2012))
  Added to Table 25, page 71.
- Dissolved oxygen exceedance at PRCAN (Event 77 (JUL 2012))
  Added to Table 25, page 73.