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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 Plan

Semi-Annual Storm Season Monitoring Report 2008

prepared by

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SUMMARY OF MONITORING PROGRAM.

The Sacramento Valley Water Quality Coalition (Coalition) has developed and implemented a Monitoring and Reporting Program Plan (MRPP) to meet the requirements of the *Conditional Waiver for Irrigated Lands* (hereinafter abbreviated as *ILRP* for *Irrigated Lands Regulatory Program*) and subsequent amendments to the *ILRP* requirements (WQO-2004-0003, SWRCB 2004, R5-2005-0833). The sampling and analytical methods used in the Coalition and subwatershed monitoring programs have been approved by the Central Valley Regional Water Quality Control Board (Water Board in the Conditional Approval of Watershed Evaluation Report (WER) and MRPP issued December 2, 2004 pending submittal of additional documentation, which was subsequently provided on January 19, 2005.

To achieve the objectives of the Monitoring and Reporting Program (MRP), the Coalition initially implemented a phased MRPP that evaluated samples for the presence of statistically significant toxicity of sufficient magnitude in the initial sample to trigger follow-up actions designed to identify constituents causing toxicity. The Coalition is also continuing to evaluate samples for violations of applicable numeric water quality objectives to trigger follow-up actions. The Coalition is evaluating the degree of implementation of current management practices in priority watersheds and recommending specific 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 2008 monitoring effort has been conducted in coordination with the Northeastern California Water Association, the Napa County Putah Creek Watershed Group, and the Upper Feather River Watershed Group Proposition 50 Team. The Coalition is also coordinating with the California Rice Commission (CRC) under the December 2004 Coalition – CRC Memorandum of Understanding.

The parameters monitored by the Coalition are as specified in the *ILRP* requirements (WQO-2004-0003, SWRCB 2004, R5-2005-0833). The following environmental monitoring elements are included in the Phases 1-3 of the Coalition MRPP:

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

Note that not all parameters are monitored during every phase of monitoring. Specific individual parameters measured and the relevant Phases of the Coalition monitoring effort are listed in **Table 1**. Note that this list is consistent with the *ILRP* in effect when the Coalition monitoring program was continued in December 2007.

A total of 35 regular and Management Plan sites were monitored by the Coalition and coordinating subwatershed monitoring programs during the 2008 Storm Season. 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 annual frequency of samples to be collected for the Coalition's 2008 monitoring are summarized in Table 4. This report includes results only for the storm season 2008 (December 2007 - March 2008)

Sample collection and analysis has and will continue to be performed by the following agencies and subcontractors:

- Pacific EcoRisk (Martinez, California) will conduct sampling and will perform all toxicity analyses;
- Caltest Analytical Laboratory (Napa, California) will conduct all conventional and microbiological analyses;
- CRG Marine Laboratories (Torrance, California) and APPL (Fresno, California) will conduct pesticide analyses.

MANAGEMENT PRACTICES AND ACTIONS TAKEN

To address specific water quality exceedances observed during monitoring, the Coalition and its partners have developed two management plans, the *Diazinon Runoff Management Plan for Orchard Growers in the Sacramento Valley* and the *Yolo Technical Report*. In addition, the Coalition has conducted a *Bacterial Source Identification Study for* E. coli and has developed a *Landowner Outreach and Management Practices Implementation Communications Process for Monitoring Results (Management Practices Process)* to address exceedances that were not included as part of either of these management plans.

To address water quality exceedances not specifically addressed in existing management plans or studies, the Coalition and its partners developed the *Management Practices Process*. On May 10, 2005, the Coalition sent a letter to the Chair of the State Water Resources Control Board (State Water Board) outlining a *Management Practices Action Plan* for the Sacramento Valley. On November 14, 2006, building on both the *Management Practices Action Plan* and the *Regional Plan for Action*, the Coalition submitted a detailed plan, the *Management Practices Process*. This plan describes an aggressive approach for the Coalition and its subwatersheds to follow when there are exceedances of the water quality objectives formally adopted by the Regional Board.

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* to address water quality problems identified in the Sacramento Valley. The strategic approach taken by the Coalition is to notify 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 targeted 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 modifying the uses of specific farm and wetland inputs to prevent movement of a constituent of concern into Sacramento Valley surface waters.

RESULTS AND CONCLUSIONS

The Coalition submits this 2008 Storm Season Semi-Annual Monitoring Report (SAMR) under the Water Board's *ILRP*. The 2008 Storm Season SAMR 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. This SAMR characterizes potential water quality impacts of agricultural drainage from a broad geographic area in the Sacramento Valley from December 2007 through March 2008. To date, a total of nine Coalition storm season sampling events and 18 irrigation season events have been completed, with additional events collected by coordinating programs. For the period of record in this Semi-Annual Report (December 2007 – March 2008), samples were collected during 4 storm season events at a total of 35 different locations, including follow-up sample sites.

To summarize, the results from the 2008 Storm Season monitoring continue to indicate that there are not major water quality problems with agricultural and managed wetlands discharges in the Sacramento River Basin. For the sites with observed toxicity, the Coalition and its subwatersheds took the appropriate actions to address these issues. By its nature, the SAMR focuses in detail on the small number of sites and samples that exhibited toxicity and exceedances of conventional and microbiological parameters, as well as the actions taken and planned by the Coalition and its members to address these issues.

From December 2007 through March 2008, 139 water column toxicity tests were conducted with three aquatic species on 55 samples from 23 different sites. There were 10 statistically significant water column toxicity exceedances with reductions greater than 20% compared to control in Coalition Storm Season samples (4 *Ceriodaphnia* tests, 2 *Pimephales* tests, and 4 *Selenastrum* tests). The results of the two *Pimephales* tests (fathead minnows) were affected by pathogen-related mortality (a test interference) and were not considered exceedances. In total, 5.8% of all tests and 15% of water samples exhibited a statistically significant reduction in invertebrate or fish survival or algae cell density of greater than 20% compared to the control. Observations of statistically significant toxicity are considered exceedances of the Basin Plan narrative objective for toxicity and were reported to Water Board staff by the Coalition in Exceedance and Communication Reports, as required by the *ILRP* and the Coalition's MRPP. Chemical results were evaluated for all of the cases of observed toxicity. In four of these cases, the toxicity to *Selenastrum* was explained by the concentrations of diuron. For the five samples that triggered Toxicity Identification Evaluation (TIE) procedures to investigate the cause of toxicity, toxicity was not persistent in four of the samples (i.e., there was no significant toxicity in the untreated baseline TIE sample), indicating a rapid breakdown of the source of toxicity, and therefore probably a short duration of toxicity in ambient waters. The remaining TIE indicated that trace metals may have contributed to the *Selenastrum* toxicity in one sample, but this conclusion was not supported by the chemical results which indicated that metals were not elevated in the sample.

When detected, pesticides rarely exceeded applicable objectives, and were typically not associated with toxicity. Two registered pesticides (diazinon and simazine) and 3 unregistered legacy organochlorine pesticides (aldrin, DDE, DDT) exceeded applicable water quality objectives in a total of 13 Storm Season 2008 samples. One pesticide (diuron) was detected at concentrations with the potential to cause toxicity to sensitive nonvascular plant test species, and diuron was associated with significant toxicity to *Selenastrum*. Notably, there was only one observed exceedance of the Basin Plan diazinon objective in the 2008 storm season, and this exceedance was not associated with toxicity.

Many of the pesticides specifically required to be monitored for 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 six Coalition samples to date, and has never approached concentrations likely to cause toxicity to sensitive test species. Over 98% of all pesticide analyses performed to date for the Coalition are below detection. This indicates that monitoring of many of these pesticides in water is unlikely to provide meaningful results regarding sources or needs for changes in management practices. Based on these results, the Coalition will propose much more focused monitoring of ILRP pesticides in 2009 when the recently adopted revised ILRP MRP will be implemented. Similarly, the Coalition will propose to conduct much more focused monitoring of most trace elements (arsenic, cadmium, lead, nickel, selenium, and zinc) in 2009 because Coalition monitoring has demonstrated that these metals do not exceed objectives and are not likely to cause adverse impacts to aquatic life or human health in waters receiving agricultural runoff in the Coalition watershed.

Exceedances of adopted Basin Plan objectives and advisory limits were observed for boron, conductivity, *E. coli (not approved by State Board)*, nitrate as N, pH, selenium, and total dissolved solids (**Table 20**). There were no exceedances of water quality objectives for monitored nutrient compounds other than nitrate as N. The majority of exceedances of adopted numeric objectives consisted of conductivity, total dissolved solids, and *E. coli*. Although agricultural runoff and irrigation return flows may contribute to exceedances of these objectives, all of these parameters are controlled or significantly affected by natural processes and sources that are not controllable by agricultural management practices. Follow-up strategies to evaluate causes of pH and dissolved oxygen exceedances were implemented by the Coalition in the 2006 irrigation season. Sources of *E. coli* exceedances have been investigated through a region-wide pilot study conducted by the Coalition. The Coalition is currently working with the Water Board to develop a more comprehensive *E. coli* study. The Coalition also participates in the *ILRP* Technical Issues Committee (TIC) workgroups to develop procedures and guidelines for evaluation of exceedances. The TIC has worked with Water Board *ILRP* staff to develop recommendations for amendments to the current *ILRP*MRP requirements and procedures. Many of these recommendations have been incorporated into the revised MRP adopted in January 2008.

The Coalition initiated some Phase 2 monitoring elements during the 2005 irrigation season, concurrent with the Phase 1 irrigation season monitoring, and has added and continued these elements for many of the current monitoring sites. The Phase 2 elements monitored include additional pesticide analyses, trace elements, and nutrients. The Coalition implemented a strategy of monitoring Phase 1 and Phase 2 constituents concurrently for new monitoring sites implemented in 2007.

The Coalition has implemented the required elements of the ILRP since 2004. The Coalition developed a WER which set the priorities for development and implementation of the MRPP. The Coalition successfully developed the MRPP and QAPP required by the *ILRP*, and these documents have been approved by the Water Board. Subsequent revisions requested by the Water Board have been incorporated into these documents and were implemented during the 2006 irrigation season monitoring, and continued for 2008 Coalition monitoring. The Coalition continues to adapt and improve elements of the monitoring program based on the knowledge gained through *ILRP* monitoring efforts.

The Coalition implemented the approved monitoring program in coordination with its subwatershed partners, and has initiated follow-up activities to address observed exceedances. The Coalition has also completed a Management Practice Action Plan (provided in Appendix G of the *Irrigation Season Semi-Annual Monitoring Report 2007*) designed to communicate information and monitoring results within the Coalition, track implementation of management practices in the watershed, and evaluate effectiveness of management practices. 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 semi-annual monitoring report is documentation of the success and continued progress of the Coalition in achieving these objectives.

Introduction

The primary purpose of this report is to document the monitoring efforts and results of the Sacramento Valley Water Quality Coalition (Coalition) Monitoring and Reporting Program Plan (MRPP). This Storm Season Semi-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).

The Storm Season Semi-Annual Monitoring Report includes the following elements, as specified in the *ILRP*:

- A description of the watershed
- A summary of monitoring objectives
- Descriptions of sampling site locations and characteristics
- A summary of the sampling and analytical methods used
- All monitoring results, including field logs, laboratory reports, and chains-of-custody
- An evaluation of pesticide use information
- Interpretation of the monitoring results reported
- Evaluation of management practices in the Coalition watershed
- Actions taken to address exceedances observed in monitoring
- Conclusions and recommendations of the Storm Season Semi-Annual Monitoring Report

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. Additionally, the Coalition monitors in the Cosumnes River watershed, which is not part of the Sacramento River watershed. Beginning near the town of Red Bluff at its northern terminus, the Sacramento Valley stretches about 150 miles to the southeast where it merges into the Sacramento-San Joaquin River Delta south of the Sacramento metropolitan area. The valley is 30 to 45 miles wide in the southern to central parts but narrows to about 5 miles wide near Red Bluff. Its elevation decreases from 300 feet at its northern end to near sea level in the delta. The greater Sacramento River watershed includes sites from 5,000 feet in elevation to near sea level.

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

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

Monitoring Objectives

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

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

The Coalition is achieving these objectives by implementing a phased MRPP that initially evaluates samples for the presence of statistically significant toxicity of sufficient magnitude in the initial sample to trigger follow-up actions designed to identify constituents causing toxicity. Also, the Coalition is evaluating samples for violations of applicable numeric water quality objectives to trigger follow-up actions. Additionally, the Coalition is evaluating the degree of implementation of current management practices in priority watersheds and recommending specific practices as water quality results indicate a need to do so. The Coalition is committed to the principle of adaptive management to control specific discharges of waste that are having an impact on water quality. This iterative approach allows for the most effective use of scarce human and fiscal resources.

The parameters monitored by the Coalition to achieve these objectives are as specified in the *ILRP* and in subsequent amendments to the *ILRP* requirements (WQO-2004-0003, SWRCB 2004, R5-2005-0833). The following environmental monitoring elements are included in Phases 1-3 of the Coalition MRPP:

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

Note that not all parameters are monitored during every phase of monitoring. Specific individual parameters measured and the relevant Phases of the Coalition monitoring effort are listed in **Table 1**. Note that this list is consistent with the *ILRP* in effect when the Coalition 2008 monitoring program was implemented in January 2008.

Table 1. Constituents to be Monitored for Phases 1–3 of Monitoring

Constituent	Quantitation Limit (in Water)	Reporting Unit	Monitoring Phases
Physical Parameters			
Flow	NA	CFS (Ft^3/Sec)	Phase 1, 2 & 3
pH	0.1 [(a)]	-log[H^+]	Phase 1, 2 & 3
Conductivity	0.1 [(a)]	μmhos/cm	Phase 1, 2 & 3
Dissolved Oxygen	0.1 [(a)]	mg/L	Phase 1, 2 & 3
Temperature	0.1 [(a)]	˚C	Phase 1, 2 & 3
Color	NA	Chloroplatinate Units (CU)	Phase 1, 2 & 3
Hardness, total as $CaCO_3$	10	mg/L	Phase 2
Turbidity	1.0	NTU	Phase 1, 2 & 3
Total Dissolved Solids	3.0	mg/L	Phase 1, 2 & 3
Total Suspended Solids	3.0	mg/L	Phase 1, 2 & 3
Total Organic Carbon	0.5	mg/L	Phase 1, 2 & 3
Pathogen Indicators			
E. Coli bacteria	2	MPN/100 mL	Phase 1
Water Column and Sediment Toxicity			
Ceriodaphnia, 96-h acute	NA	% Mortality	Phase 1
Pimephales, 96-h acute	NA	% Mortality	Phase 1 [(d)]
Selenastrum, 96-h short-term chronic	NA	Cell Growth	Phase 1
Hyalella, 10-day short-term chronic	NA	% Mortality	Phase 1
Pesticides			
Carbamates	(b)	ug/L	Phase 2 [(c)]
Organochlorines	(b)	ug/L	Phase 2 [(c)]
Organophosphorus	(b)	ug/L	Phase 2 [(c)]
Pyrethroids	(b)	ug/L	Phase 2 [(c)]
Herbicides	(b)	ug/L	Phase 2 [(c)]
Trace Elements			
Arsenic	0.5	ug/L	Phase 2 [(c)]
Boron	10	ug/L	Phase 2 [(c)]
Cadmium	0.1	ug/L	Phase 2 [(c)]
Copper	0.5	ug/L	Phase 2 [(c)]
Lead	0.25	ug/L	Phase 2 [(c)]
Nickel	0.5	ug/L	Phase 2 [(c)]
Selenium	1.0	ug/L	Phase 2 [(c)]
Zinc	1.0	ug/L	Phase 2 [(c)]
Nutrients			
Total Kjeldahl Nitrogen	0.1	mg/L	Phase 2 [(c)]
Phosphorus, total	0.1	mg/L	Phase 2 [(c)]
Soluble Orthophosphate	0.01	mg/L	Phase 2 [(c)]
Nitrate as N	0.1	mg/L	Phase 2 [(c)]
Nitrite as N	0.03	mg/L	Phase 2 [(c)]
Ammonia as N	0.1	mg/L	Phase 2 [(c)]

(a) Detection and reporting limits are not strictly defined. Tabled value indicates required reporting precision.
(b) Limits are different for individual pesticides.
(c) Phase 2 monitoring may be conducted concurrently with Phase 1. Pesticides, trace elements, or nutrients suspected of causing toxicity or of causing exceedances of relevant water quality objectives may continue to be monitored in Phase 3.
(d) *Pimephales* toxicity testing was discontinued in 2007 due to the lack of observed toxicity at any site in 2005 and 2006.

Sampling Site Descriptions

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

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

In January 2007, the Coalition adopted a more aggressive monitoring approach that involved, in part, replacing previously monitored sites with high priority sites in intermediate size drainages. Thirteen new monitoring locations in unmonitored drainages replaced sites monitored in 2006 with completed Phase 2 monitoring. Candidate drainages for new monitoring locations were selected based on overall monitoring priorities and an increased focus on maximizing the number of intermediate size drainages in 2007 to meet the requirements of the R5-2005-0833 MRP. The bases for making these monitoring recommendations for sites monitored in 2006 were provided in the Coalition's 2007 Monitoring Plan. Under the Coalition's long-term monitoring strategy outlined in 2006 and implemented in 2007, there would have been substantial changes included in the sites monitored for 2008. However, due to the significant changes expected in monitoring requirements for the revised ILRP MRP adopted in January 2008, the Monitoring Plan for 2008 is largely a continuation of the monitoring planned and conducted in 2007. Because the Coalition selected high priority drainages for its initial monitoring efforts, the monitoring conducted through 2008 will provide a solid foundation of data to characterize agricultural waters in the watershed.

SAMPLING SITE LOCATIONS AND LAND USES

The sites monitored by the Coalition in 2008 are listed in **Table 2** and **Table 3**. All sites monitored in 2008 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 F**.

Table 2. Coalition Monitoring Sites, 2008

Subwatershed	Site Name	Latitude	Longitude	Implementing Agency	Map Index
ButteYubaSutter	Sacramento Slough Bridge near Karnak	38.7850	-121.6533	SVWQC/CRC	55
	Grasshopper Slough at Forty Mile Road	38.9938	-121.4898	SVWQC	39
	Lower Snake R. at Nuestro Rd	39.1853	-121.7036	SVWQC	40
ColusaBasin	Colusa Basin Drain above KL	38.8125	-121.7731	SVWQC/CRC	9
	Freshwater Creek at Gibson Rd	39.1766	-122.1892	SVWQC	41
	Logan Creek at 4 Mile-Excelsior Rd	39.3653	-122.1161	SVWQC	42
	Lurline Creek at 99W	39.2122	-122.1833	SVWQC	43
	Walker Creek at Co Rd 48	39.5388	-122.1762	SVWQC	44
ElDorado	Coon Hollow Creek	38.7534	-120.7240	SVWQC	45
LakeNapa	Pope Creek upstream from Lake Berryessa	38.6464	-122.3642	PCWG	23
	Capell Creek u/s from Lake Berryessa	38.4825	-122.2411	PCWG	24
	Middle Creek u/s from Highway 20	39.1635	-122.9161	SVWQC	38
PitRiver	Pit River at Pittville	41.0454	-121.3317	NECWA	1
	Fall River at Fall River Ranch Bridge	41.0351	-121.4864	NECWA	2
	Pit River at Canby Bridge	41.4017	-120.9310	NECWA	3
PNSSNS	Coon Creek at Brewer Road	38.9340	-121.4518	SVWQC	46
SacramentoAmador	Laguna Creek at Alta Mesa Road	38.3110	-121.2263	SVWQC	47
	Grand Island Drain near Leary Road	38.2399	-121.5649	SVWQC	54
ShastaTehama	Coyote Creek at Tyler Road	40.0926	-122.1590	SVWQC	48
SolanoYolo	Willow Slough Bypass at Pole Line	38.5902	-121.7306	SVWQC	52
	Cache Cr. at Diversion Dam	38.7137	-122.0851	SVWQC	50
	Shag Slough at Liberty Island Bridge	38.3068	-121.6934	SVWQC	29
	Ulatis Creek at Brown Road	38.3070	-121.7940	SVWQC	32
UpperFeatherRiver	Middle Fork Feather River above Grizzly Cr.	39.8160	-120.4260	UFRW	53
	Indian Creek at Arlington Bridge	40.0846	-120.9161	UFRW	36
	Spanish Creek below Greenhorn Creek	39.9735	-120.9103	UFRW	37

Table 3. Modifications for Continued Monitoring in 2008 at Sites Monitored in 2007

Subwatershed	Site	2008 Action and Rationale
ButteYubaSutter	Gilsizer Slough at George Washington Road	Continue with selected analytes to support evaluation of parameters of concern and management effectiveness.
ButteYubaSutter	Pine Creek at Nord Gianella Road	Continue with selected analytes to support documentation of management practice effectiveness. Monitoring conducted only during storm season.
Sacramento-Amador	Dry Creek at Alta Mesa Road	These sites were discontinued as regularly scheduled monitoring sites in 2008. Each site may continue to be monitored for specific parameters according to the schedule required by Management Plans currently under development.
Shasta-Tehama	Anderson Creek at Ash Creek Road	
El Dorado	North Canyon Creek	
Colusa-Glenn	Stony Creek on Hwy 45	

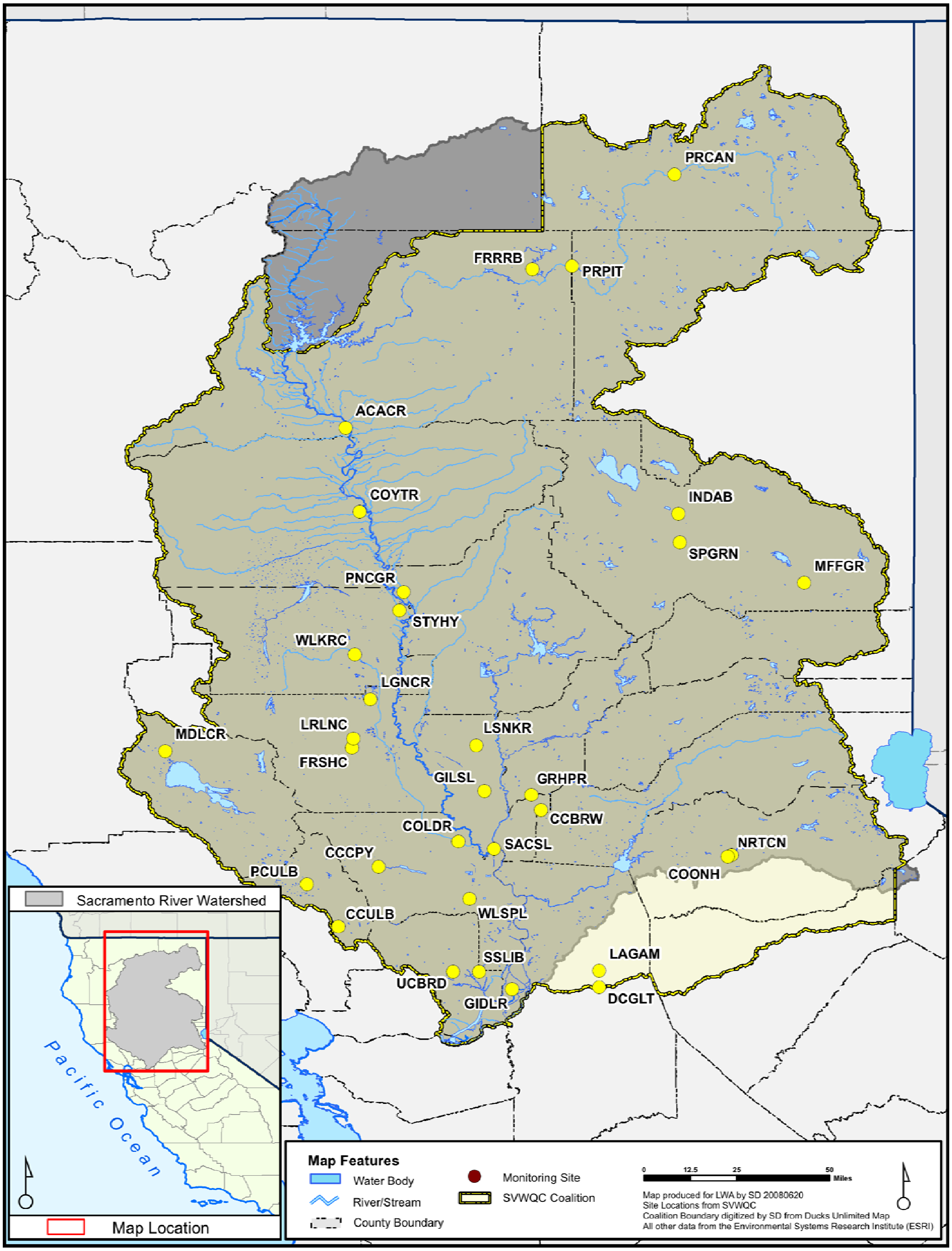

Figure 1. Coalition Monitoring Sites

SITE DESCRIPTIONS

Butte/Yuba/Sutter Subwatershed

Pine Creek at Nord-Gianella Road

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

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.

Gilsizer Slough at George Washington Road

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 actual 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.

Grasshopper Slough at Forty Mile Road

Grasshopper Slough is a small drainage about 4 miles west of Wheatland. It drains about 47,000 total acres. Predominant crops in this drainage include walnuts, rice, pasture, almonds, and prunes.

Lower Snake River at Nuestro Road

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.

Colusa Glenn Subwatershed

Stony Creek at Hwy 45 (near Rd. 24)

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.

Colusa Basin Drain above Knights Landing

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

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.

Logan Creek at 4 Mile-Excelsior Road

The Logan Creek drainage includes approximately 98,000 total acres. Irrigated acreage (excluding rice acreage) is approximately 28,000 acres. Predominant crops in the drainage are rice, grain, corn, pasture, and managed marshland.

Lurline Creek at 99W

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.

Walker Creek at County Road 48

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

El Dorado County Subwatershed

North Canyon Creek

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

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/Napa Subwatershed

Pope Creek and Capell Creek

The sites on Pope Creek and Capell Creek in Napa County are downstream of major storm runoff but are above the level of the receiving waters of Lake Berryessa. Collectively, these sites capture drainage from approximately 3,400 acres of irrigated lands. Primary crops include vineyards and olive orchards. Based upon the ephemeral nature of these two Napa County creeks, samples are planned to be collected three times per year: in January, March, and May.

Middle Creek Upstream from Highway 20

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

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

Pit River Subwatershed

Pit River at Pittville Bridge

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

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 water 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. One 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

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

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

Sacramento/Amador Subwatershed

Dry Creek at Alta Mesa Road

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).

Laguna Creek at Alta Mesa Road

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.

Grand Island Drain near Leary Road

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 and off the island at several locations. The monitoring site is located on a drainage canal just west of a pumping station that returns water to the Delta. Approximately 8,000 acres drains to this monitoring location.

Shasta/Tehama Subwatershed

Anderson Creek at Ash Creek Road

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

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/Yolo Subwatershed

Willow Slough Bypass at Pole Line Road

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.

Cache Creek at Diversion Dam

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.

Shag Slough at Liberty Island Bridge

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

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.

Upper Feather River Watershed

Agriculture in this subwatershed is localized in mountain valleys that are suitable for grazing and growing alfalfa and grain hay crops. Monitoring in this subwatershed is therefore focused on characterizing drainage from three valleys with considerable agricultural acreage.

Middle Fork Feather River above Grizzly Creek

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 replaces Middle Fork Feather River at County Rd A-23, which lacks year-round flow (often dry by mid-July) and has numerous non-agricultural uses, including recreation and water trucks.

Indian Creek at Arlington Bridge

This site replaced Indian Creek downstream from Indian Valley. This site is located at the edge of the irrigated agriculture in the Indian Creek Watershed. Indian Creek drains the second largest irrigated agricultural region in this subwatershed, the Indian Valley. There are approximately 12,500 acres of native pasture, hay, and alfalfa. Drainage flows through the Indian Valley via Wolf Creek, Cooks Creek, Lights Creek and Indian Creek. The first three creeks ultimately flow to the southwest and join Indian Creek on the west side of the valley upstream from the monitoring site. This site provides a baseline for potential upstream monitoring on these tributary streams if necessary.

Spanish Creek below Greenhorn Creek Confluence

This site replaced Spanish Creek above the confluence with Greenhorn Creek. This site captures drainage from both Greenhorn and Spanish Creeks in the American Valley, which encompasses approximately 1,800 irrigated acres of pasture. Spanish Creek and Greenhorn Creek are the two primary streams draining the valley. A third stream, Mill Creek, connects with Spanish Creek upstream of the monitoring point. These creeks generally flow in a northerly direction, and ultimately, Spanish Creek connects with the North Fork Feather River.

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 2006) and approved by the Water Board.

Surface water samples were collected for analysis of the constituents listed in **Table 1** as specified in the Coalition's 2007 and 2008 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 are 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. 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. If grab sample collection methods were used, samples were taken at approximately mid-stream and mid-depth at the location of greatest flow (where feasible).

Sediment sampling was conducted on an approximately 50 meter reach of the waterbody near the same location as water quality sampling stations. The specific reach definitions vary based on conditions at each sampling station. 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 waterbodies, composite samples may be collected from the bottom of the channel using appropriate equipment, as specified in the Coalition QAPP. Sediment samples for toxicity analyses were collected in such a manner to minimize air above sediment and to prevent exposure to air.

Details of the standard operating procedures (SOPs) for collection of surface water and sediment samples are provided in Appendix C of the Coalition's QAPP.

The SVWQC monitoring program was initially implemented using the three-phased approach specified in the *ILRP* MRP and the Coalition's MRPP. Phase 1 monitoring includes analyses of physical parameters, drinking water constituents, and toxicity testing. Phase 2 monitoring includes chemical analyses of pesticides, metals, inorganic constituents and nutrients as well as continued monitoring of some required Phase 1 parameters, plus specific constituents that are identified as causes of toxicity testing in Phase 1. Phase 3 monitoring will include management practice effectiveness and implementation tracking and may include monitoring of additional water quality sites in the upper portions of the watershed. The initiation, scope, and schedule of

Phase 2 and Phase 3 monitoring are intended to be dependent on the results of Phase 1 monitoring, as described in the MRPP. Some elements of Phase 2 monitoring have been conducted concurrently with Phase 1 monitoring. The sites and annual frequency of samples planned to be collected for the Coalition's 2008 monitoring are summarized in **Table 4**.

The Coalition's long term monitoring strategy was designed to achieve overall characterization of high and medium priority drainages in 5 years. The Coalition's monitoring plan for 2007 also anticipated some changes in monitoring requirements in the revised MRP that was expected to be released by the Regional Board in 2006, and was delayed until January 2008. These changes in the *ILRP* MRP were expected to include an end to the phased monitoring approach of the current MRP, and replacement of the poorly defined requirement for 20% additional intermediate drainages per year with a more general requirement for a long term monitoring strategy to characterize agricultural drainages. Revisions in the adopted ILRP MRP (*Monitoring and Reporting Program Order No. R5-2008-0005*) included numerous technical changes in monitoring requirements, and implemented significant additional changes in the overall monitoring strategy.

The elements that are key to achieving the Coalition's goals and satisfying the intent of the requirements of the R5-2005-0833 MRP currently in effect are (1) the Coalition's prioritization process for selecting drainages and monitoring sites, and (2) an efficient strategy for implementing monitoring in intermediate drainages. The overall strategy for efficiently completing the required monitoring has been to focus selectively on unmonitored intermediate drainages that are rated high or medium priority based on their irrigated acreage, cropping patterns, pesticide use, and their potential for contributing to cumulative impacts on receiving waters. Generally, this objective was being achieved by replacing sites with completed monitoring with new sites in intermediate drainages, as was done in 2007. Additionally, the Coalition continued to monitor several integrator sites that characterize multiple smaller drainages and provide an assessment of the overall or cumulative quality of irrigated agriculture runoff. Examples of these integrator sites are Colusa Basin Drain near Knights Landing, and Shag Slough at Liberty Island Bridge. No significant changes to this strategy were implemented in 2008.

The other aspect of efficiently completing the required monitoring is to concurrently analyze all parameters required for Phase 1 and Phase 2 of the current R5-2005-0833 MRP. This allows drainages to be characterized in a single year instead in the two years required under the phased approach. All new sites implemented for 2007 were monitored for the full suite of parameters required for the MRP, as appropriate for the cropping and pesticide use patterns in each drainage. For continuing sites, a reduced set of parameters may be monitored based on previous monitoring results, with the goal of completing the Phase 2 monitoring for these sites in 2007. In cases where continued monitoring is required to evaluate effectiveness of management plans, the frequency and locations of monitoring will be established in the specific management plan and will be focused on the parameters of concern.

Table 4. Coalition 2008 Monitoring: Planned Annual Sampling Frequency

		Physical, Chemical, and Microbiological										Toxicity					
Subwatershed	**Location**	pH, conductivity, DO, temperature, flow	Turbidity, TDS, TSS, TOC	Nutrients	Trace Metals	Organophosphate pesticides	Triazines	Organonochlorines	Carbamate and Urea Pesticides	Glyphosate and Paraquat	Pathogen Indicators: E. Coli	Ceriodaphnia, 96-h acute	Pimephales, 96-h acute	Selenastrum, 96-h short-term chronic	Hyalella, 10-day short-term chronic	Pyrethroids in toxic sediments	Implementation
ButteYubaSutter	Grasshopper Sl. at Forty Mile Rd[2]	2	2	2	2	2	2	2	2	2	2	2	2	2	ns	ns	SVWQC
	Alternate site TBD[2]	6	6	6	6	6	6	6	6	6	6	6	6	6	2	2	SVWQC
	Lower Snake R. at Nuestro Rd	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC
	Sacramento Sl. Br. near Karnak	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC/CRC
Colusa Basin	Freshwater Creek at Gibson Rd	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC
	Logan Cr. at 4 Mile-Excelsior Rd	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC
	Lurline Creek at 99W	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC
	Walker Creek at Co Rd 48	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC
	Colusa Drain above KL	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC/CRC
El Dorado	Coon Hollow Creek[1]	8	8	8	8	mp	mp	mp	mp	ns	8	8	8	8	2	2	SVWQC
LakeNapa	Middle Creek u/s Hwy 20[1]	3	3	3	3	3	3	3	ns	3	3	3	3	3	2	2	SVWQC
	Pope Cr u/s from L. Berryessa[1]	3	3	ns	ns	ns	ns	ns	ns	ns	3	ns	ns	ns	ns	ns	PCWG
	Capell Cr u/s from L. Berryessa[1]	3	3	ns	ns	ns	ns	ns	ns	ns	3	ns	ns	ns	ns	ns	PCWG
Pit River	Pit River at Pittville[1]	8	8	8	ns	ns	ns	ns	ns	ns	8	ns	ns	ns	ns	ns	NECWA
	Fall R. at Fall R. Ranch Bridge[1]	8	8	8	ns	ns	ns	ns	ns	ns	8	ns	ns	ns	ns	ns	NECWA
	Pit River at Canby Bridge[1]	8	8	8	ns	ns	ns	ns	ns	ns	8	ns	ns	ns	ns	ns	NECWA
PNSNSS	Coon Creek at Brewer Rd	8	8	8	8	8	8	8	8	ns	8	8	8	8	2	2	SVWQC
SacAmador	Laguna Creek at Alta Mesa Rd	8	8	8	8	8	8	8	8	ns	8	8	8	8	2	2	SVWQC
	Grand Island Drain nr Leary Rd	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC
ShastaTehama	Coyote Creek at Tyler Rd[1]	8	8	8	8	8	ns	ns	8	ns	8	8	8	8	2	2	SVWQC
SolanoYolo	Willow Sl. Bypass at Pole Line	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC
	Cache Cr. at Diversion Dam	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC
	Ulatis Creek at Brown Road	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC
	Shag Sl. at Liberty Island Bridge	8	8	8	8	8	8	8	8	8	8	8	8	8	2	2	SVWQC
Upper Feather	Spanish Cr. below Greenhorn Cr[1]	7	7	7	ns	ns	ns	ns	ns	ns	7	ns	ns	ns	ns	ns	UFRW
	Indian Creek at Arlington Bridge[1]	7	7	7	ns	ns	ns	ns	ns	ns	7	ns	ns	ns	ns	ns	UFRW
	Middle Fk Feather R. above Grizzly Cr. [1]	7	7	7	ns	ns	ns	ns	ns	ns	7	ns	ns	ns	ns	ns	UFRW

Notes:

Tabled values indicate number of regular analyses planned for 2008.

"*ns*" indicates parameters are not sampled.

"*mp*" indicates specific parameters and frequency established in a Management Plan.

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

1. Subset of MRP parameters are monitored based on agricultural and pesticide use patterns in watershed.
2. An alternate site for Grasshopper Slough is being evaluated and will be initiated during Irrigation Season 2008. Grasshopper Slough will continue to be monitored as planned for the 2008 Storm Season.

ANALYTICAL METHODS

Water chemistry samples were analyzed for filtered (dissolved) and unfiltered/whole (total) fractions of the samples. Pesticide analyses were conducted only on unfiltered (whole) samples. Laboratories analyzing samples for this program have demonstrated the ability to meet the minimum performance requirements for each analytical method, including the ability to meet the project-specified quantitation limits (QL), the ability to generate acceptable precision and recoveries, and other analytical and quality control parameters documented in the Coalition 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* 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* are conducted as a 96-hour static non-renewal test.
- Determination of sediment toxicity to *Hyalella* was performed as described in *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates–Second Edition* (USEPA 2000). Toxicity tests with *Hyalella* were conducted as a 10-day whole-sediment toxicity test with renewal of overlying water at 12 hour intervals.

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

Procedures in the currently effective QAPP state that if any measurement endpoint from any of the three aquatic toxicity tests exhibits a significantly significant difference from the control of greater than 50%, 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 U.S. EPA 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 EPA 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 2006).

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. These QLs are considered to be maximum allowable limits to be used for laboratory data reporting. 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**. 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 (“J-values”).

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

Method	Analyte	Fraction	Units	MDL	QL	LAB
Physical and conventional Parameters						
EPA 110.2	Color	Filtered	ACU	2	5	CALTEST
EPA 130.2	Hardness, total as $CaCO_3$	Unfiltered	mg/L	3	5	CALTEST
EPA 180.1	Turbidity	Unfiltered	NTU	0.1	1	CALTEST
EPA 160.1	Total Dissolved Solids (TDS)	Filtered	mg/L	6	10	CALTEST
EPA 160.2	Total Suspended Solids (TSS)	Particulate	mg/L	2	3	CALTEST
EPA 415.1	Organic Carbon	Unfiltered	mg/L	0.3	0.5	CALTEST
Pathogen Indicators						
SM 9223B	E. Coli bacteria	NA	MPN/100 mL	2	2	CALTEST
Organophosphorus Pesticides						
EPA 625(m)	Azinphos-methyl	Unfiltered	µg/L	0.05	0.1	CRG
EPA 625(m)	Chlorpyrifos	Unfiltered	µg/L	0.005	0.01	CRG
EPA 625(m)	Diazinon	Unfiltered	µg/L	0.005	0.01	CRG
EPA 625(m)	Dimethoate	Unfiltered	µg/L	0.005	0.01	CRG
EPA 625(m)	Disulfoton	Unfiltered	µg/L	0.01	0.02	CRG
EPA 625(m)	Malathion	Unfiltered	µg/L	0.005	0.01	CRG
EPA 625(m)	Methamidophos	Unfiltered	µg/L	0.05	0.1	CRG
EPA 625(m)	Methidathion	Unfiltered	µg/L	0.01	0.02	CRG
EPA 625(m)	Parathion, Methyl	Unfiltered	µg/L	0.01	0.02	CRG
EPA 625(m)	Parathion, Ethyl	Unfiltered	µg/L	0.01	0.02	CRG
EPA 625(m)	Phorate	Unfiltered	µg/L	0.01	0.02	CRG
EPA 625(m)	Phosmet	Unfiltered	µg/L	0.05	0.1	CRG
Carbamate and Urea Pesticides						
EPA 8321	Aldicarb	Unfiltered	µg/L	0.2	0.4	APPL
EPA 8321	Carbaryl	Unfiltered	µg/L	0.05	0.07	APPL
EPA 8321	Carbofuran	Unfiltered	µg/L	0.05	0.07	APPL
EPA 8321	Diuron	Unfiltered	µg/L	0.2	0.4	APPL
EPA 8321	Linuron	Unfiltered	µg/L	0.2	0.4	APPL
EPA 8321	Methiocarb	Unfiltered	µg/L	0.2	0.4	APPL
EPA 8321	Methomyl	Unfiltered	µg/L	0.05	0.07	APPL
EPA 8321	Oxamyl	Unfiltered	µg/L	0.2	0.4	APPL
Organochlorine pesticides						
EPA 625(m)	4,4'-DDT (o,p' and p,p')	Unfiltered	µg/L	0.001	0.005	CRG
EPA 625(m)	4,4'-DDE (o,p' and p,p')	Unfiltered	µg/L	0.001	0.005	CRG
EPA 625(m)	4,4'-DDD (o,p' and p,p')	Unfiltered	µg/L	0.001	0.005	CRG
EPA 625(m)	Dicofol	Unfiltered	µg/L	0.001	0.005	CRG
EPA 625(m)	Dieldrin	Unfiltered	µg/L	0.001	0.005	CRG
EPA 625(m)	Endrin	Unfiltered	µg/L	0.001	0.005	CRG
EPA 625(m)	Methoxychlor	Unfiltered	µg/L	0.001	0.005	CRG

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

Method	Analyte	Fraction	Units	MDL	QL	LAB
Pyrethroid Pesticides						
EPA 625(m)	Biphenthrin	Unfiltered	µg/L	0.005	0.025	CRG
EPA 625(m)	Cyfluthrin	Unfiltered	µg/L	0.005	0.025	CRG
EPA 625(m)	Cypermethrin	Unfiltered	µg/L	0.005	0.025	CRG
EPA 625(m)	Esfenvalerate/Fenvalerate	Unfiltered	µg/L	0.005	0.025	CRG
EPA 625(m)	Lambda-Cyhalothrin	Unfiltered	µg/L	0.005	0.025	CRG
EPA 625(m)	Permethrin	Unfiltered	µg/L	0.005	0.025	CRG
Herbicides						
EPA 625(m)	Atrazine	Unfiltered	µg/L	0.005	0.01	CRG
EPA 625(m)	Simazine	Unfiltered	µg/L	0.005	0.01	CRG
EPA 625(m)	Molinate	Unfiltered	µg/L	0.05	0.1	CRG
EPA 625(m)	Thiobencarb	Unfiltered	µg/L	0.05	0.1	CRG
EPA 625(m)	Cyanazine	Unfiltered	µg/L	0.005	0.01	CRG
EPA 549.2	Paraquat	Unfiltered	µg/L	0.2	0.5	APPL
EPA 547	Glyphosate	Unfiltered	µg/L	2	10[(1)]	APPL
Trace Elements						
EPA 200.8	Arsenic	Filtered, Unfiltered	µg/L	0.08	0.5	CALTEST
EPA 200.8	Cadmium	Filtered, Unfiltered	µg/L	0.04	0.1	CALTEST
EPA 200.8	Copper	Filtered, Unfiltered	µg/L	0.2	0.5	CALTEST
EPA 200.8	Lead	Filtered, Unfiltered	µg/L	0.02	0.25	CALTEST
EPA 200.8	Nickel	Filtered, Unfiltered	µg/L	0.2	0.5	CALTEST
EPA 200.8	Selenium	Unfiltered	µg/L	0.5	2	CALTEST
EPA 200.8	Zinc	Filtered, Unfiltered	µg/L	0.3	10	CALTEST
EPA 2008/200.7	Boron	Filtered, Unfiltered	µg/L	2	10	CALTEST
Nutrients						
EPA 350.2	Ammonia as N	Unfiltered	mg/L	0.02	0.1	CALTEST
EPA 300	Nitrate as N	Unfiltered	mg/L	0.02	0.1	CALTEST
EPA 354.1	Nitrite as N	Unfiltered	mg/L	0.002	0.03	CALTEST
EPA 351.3	Total Kjeldahl Nitrogen	Unfiltered	mg/L	0.07	0.1	CALTEST
EPA 365.2	Soluble Orthophosphate	Unfiltered	mg/L	0.01	0.05	CALTEST
EPA 365.2	Phosphorus, Total	Unfiltered	mg/L	0.01	0.1[(1)]	CALTEST

(1) These QLs are higher than those specified in the R5-2005-0833 MRP document but are adequate to assess compliance with water quality objectives and potential impacts on beneficial uses.

Monitoring Results

The following sections summarize the monitoring conducted by the Coalition and its subwatershed partners for the 2008 Storm Season (December 2007 through March 2008).

SUMMARY OF SAMPLE EVENTS CONDUCTED

This report presents storm season monitoring results from three Coalition Irrigation Season sampling events (Events 025-027), as well as data for events conducted by coordinating Subwatershed monitoring programs between December 2007 and March 2008. The monitoring conducted in December 2007 was the continuation and completion of the Coalition's 2007 monitoring effort. These 2007 results are reported here because this event was conducted after the 2007 Storm Season Semi-Annual Report was completed and were therefore not included in previous reports. Samples collected for all of these events are listed in **Table 6**. Monitoring conducted by Subwatershed monitoring programs coordinating with the Coalition monitoring effort is included in this document and also summarized in **Table 6**.

The Coalition and subwatershed monitoring events were generally conducted during wet weather. Event monitoring analyses included water chemistry and aquatic toxicity. The sites and parameters for all events were monitored in accordance with the Coalition's MRPP and QAPP.

The field logs for all Coalition and Subwatershed samples collected for the December 2007 through March 2008 events are provided in **Appendix A**.

Table 6. Sampling for the Coalition Irrigation Season Monitoring: December 2007 – March 2008

Agency	Subwatershed	Site Name	Sample Count		Storm Season Events[1]			
			Planned	Collected	December	January	February	March
Sacramento Valley Water Quality Coalition (SVWQC)								
	Butte-Sutter-Yuba	Grasshopper Sl. At Forty Mile Rd	3	0	**DRY**	**DRY**	**DRY**	–
		Lower Snake R. at Nuestro Rd	3	3	12/20	1/29	2/22	–
		Pine Creek at Nord Gianella Rd	1	1	12/19	–	–	–
		Gilsizer Sl. at G. Washington Rd	1	1	12/20	–	–	–
		Sacramento Slough at Karnak	2	2	–	1/29	–	3/12
	Colusa Basin	Freshwater Creek at Gibson Rd	3	3	12/20	1/29	2/21	–
		Logan Cr. at 4 Mile-Excelsior Rd	3	3	12/20	1/28	2/21	–
		Lurline Creek at 99W	3	3	12/20	1/28	2/21	–
		Walker Creek at Co Rd 48	3	3	12/19	1/28	2/21	–
		Stony Cr. on Hwy 45 near Rd 24	1	0	**DRY**	–	–	–
		Stony Cr. At County Rd. P	1	1	12/19	–	–	–
		Stony Cr. At 99W	1	1	12/19	–	–	–
		Colusa Drain above KL	2	2	–	1/29	–	3/12
	El Dorado	North Canyon Creek	1	1	12/21	–	–	–
		Coon Hollow Creek	2	2	–	1/29	2/22	–
	Lake-Napa	Middle Creek u/s Hwy 20	2	2	12/20	1/29	–	–
	Placer-NSac-Nev-SSutter	Coon Creek at Brewer Rd	3	3	12/20	1/29	2/22	–
	Sac-Amador	Laguna Creek at Alta Mesa Rd	3	3	12/20	1/28	2/21	–
		Dry Creek at Alta Mesa Road	1	1	12/20	–	–	–
		Grand Island Drain near Leary Rd	2	2	–	1/28	2/21	–
	Shasta-Tehama	Coyote Creek at Tyler Rd	3	2	**No flow**	1/28	2/21	–
		Anderson Cr. at Ash Creek Rd	1	1	12/19	–	–	–
	Solano-Yolo	Willow Slough Bypass	3	3	12/19	1/28	2/21	
		Cache Cr. at Diversion Dam	3	3	12/20	1/29	2/22	–
		Ulatis Creek at Brown Road	3	3	12/19	1/28	2/21	–
		Shag Sl. at Liberty Island Bridge	3	3	12/19	1/28	2/21	–
		Sweany Cr. at Weber Rd.	1	1	12/19	–	–	–

Agency	Subwatershed	Site Name	Sample Count Planned	Sample Count Collected	Storm Season Events[(1)] December	January	February	March
Northeastern California Water Association (NECWA)								–
	Pit River	Pit River at Pittville	3	1	12/4	Snow only	Snow only	–
		Fall R. at Fall R. Ranch Bridge	3	1	12/4	Snow only	Snow only	–
		Pit River at Canby Bridge	3	1	12/4	Snow only	Snow only	–
Putah Creek Watershed Group (PCWG)								
	Lake-Napa	Pope Cr u/s from L. Berryessa	2	2	–	1/2	–	3/3
		Capell Cr u/s from L. Berryessa	2	2	–	1/2	–	3/3
Upper Feather River Watershed Group (UFRW)								
	Upper Feather	Spanish Cr. below Greenhorn Cr	1	1	–	1/22	–	–
		Indian Creek at Arlington Bridge	1	1	–	1/22	–	–
		Middle Fk Feather R. above Grizzly Ck	2	0	–	Site frozen	Site frozen	–
		Totals	**57**	**52**				

DRY – Site was dry; therefore, no samples were collected.
No flow – Site had no flow; thus, no samples were collected.

(1) "—" indicates no samples planned. **Bold** indicates follow-up sampling.

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 December 2007 through March 2008 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 2006). These DQOs are the detailed quality control specifications for precision, accuracy, representativeness, comparability, and completeness. These DQOs are used as comparison criteria during data quality review to determine if the minimum requirements have been met and the data may be used as planned.

Results of Field and Laboratory QC Analyses

Quality Control (QC) data are summarized in **Table 7** through **Table 14** and discussed below. All QC results programs are included with the lab reports in **Appendix B** of this document, and any qualifications of the data provided were retained and are presented with the tabulated monitoring data. Monitoring results for all programs discussed are tabulated in **Appendix C**.

Hold Times

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

- There were no hold time exceedances for initial analyses of environmental samples.

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, all analyses met the target data quality objectives:

- 44 of 1,225 EPA 8321 results had QLs and MDLs greater than the Project DQO due to loss of sample volume from broken bottles. All affected sample results were below the MDL. All sample-specific QLs for these results were adequate to assess exceedances of relevant water quality objectives.

- 2 of 42 EPA 547 results (glyphosate) had QLs and MDLs greater than the Project DQO due to loss of sample volume. All affected results were below the MDL. The elevated analytical QLs for these pesticides were adequate to assess exceedances of relevant water quality objectives.

Field Blanks

Field blanks were collected and analyzed for analyses of coliform bacteria, total organic carbon, ultraviolet absorbance, trace metals, and pesticides. With the exceptions discussed below, analytes of interest were generally not detected in field blanks:

- Trace metals were detected above the MDL in 20 field blank analyses. Seventeen of these results were below the QL. This resulted in 9 analytical results being qualified as an upper limit due to potential contamination. The qualifications did not affect assessment of any exceedances.
- Nitrate was detected below the QL in one field blank analyses. No analytical results required qualification and assessment of exceedances was not affected.
- Total phosphorus was detected above the QL in two field blank analyses. One analytical result required qualification. Assessment of exceedances was not affected.
- Total organic carbon was detected above the QL in two field blank analyses. No analytical results required qualification and assessment of exceedances was not affected.

Field Duplicates

Field duplicate samples were collected and analyzed for all parameters. The data quality objective for field duplicates is a Relative Percent difference (RPD) not exceeding 25%. With the exceptions discussed below, all field replicates met this data quality objective:

- Field duplicate results exceeded the DQO for 1 color result. One environmental result was qualified as *estimated* on this basis.
- Field duplicate results exceeded the DQO for 1 TDS result. One environmental result was qualified as *estimated* on this basis.
- Field duplicate results exceeded the DQO for 2 TSS results. Two environmental results were qualified as *estimated* on this basis.
- Field duplicate results exceeded the DQO for 1 turbidity result. One environmental result was qualified as *estimated* on this basis.
- Field duplicate results exceeded the DQO for 2 metals results. No environmental results were qualified as *estimated* on this basis.
- Field duplicate results exceeded the DQO for 1 total phosphorus results. One environmental result was qualified as *estimated* on this basis.
- Field duplicate results exceeded the DQO for 1 TOC result. One environmental result was qualified as *estimated* on this basis.

Method Blanks

Method blanks were analyzed for TDS, TSS, TOC, turbidity, trace metals, nutrients, and pesticides. The data quality objective for method blanks is no detectible concentrations of the analyte of interest. With the exceptions discussed below, all analyses met this data quality objective:

- Trace metals were detected above the MDL in 31 total method blank analyses. All but one of the detected method blank results were below the QL. 19 analytical results were qualified as a result of potential analytical contamination. The qualifications did not affect assessment of any exceedances.

Laboratory Control Spikes and Surrogates

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

- The results of 1 surrogate recovery analysis for pesticides by EPA 8321 was below the minimum acceptable recovery DQO. No data required qualification.

Laboratory Duplicates

Laboratory Duplicates were analyzed for TDS, TSS, turbidity, and pesticides (**Table 12**). The data quality objective for laboratory duplicates is a Relative Percent difference (RPD) not exceeding 20%. With the exceptions discussed below, all laboratory duplicate analyses met this data quality objective:

- No lab duplicates were outside of the project DQO

Matrix Spikes and Matrix Spike Duplicates

Matrix Spikes and Matrix Spike Duplicates were analyzed for trace metals, nutrients, and pesticides (**Table 13** and **Table 14**). The data quality objective for matrix spikes is 80-120% recovery of most analytes of interest. The data quality objective for matrix spike recoveries of pesticides varies for each analyte or surrogate and is based on the standard deviation of actual recoveries for the method. The data quality objective for matrix spike duplicates is a Relative Percent difference (RPD) not exceeding 20%. With the exceptions discussed below, all analyses met these data quality objectives:

- Matrix Spike recoveries for 2 TOC analyses in non-Coalition matrices were below the DQO. No data required qualification.
- Matrix Spike recoveries for 2 paraquat pesticide analyses were below the DQO. This resulted in qualification of 1 environmental result as low biased.
- Matrix Spike recoveries for 4 pesticide analyses by EPA 625m were below the DQO. All associated results were below detection and no data required qualification.

Summary of Precision and Accuracy

Based on the QC data for the monitoring discussed above, the precision and accuracy of the majority of monitoring results meet the DQOs and there were no systematic sampling or analytical problems. These data are adequate for the purposes of the Coalition's monitoring program and few results required qualification. Of the 40 total qualified data, 9 results were qualified as *estimated* due to high variability in lab or field replicate analyses, 1 result was qualified as *high biased* or *low biased*, and 30 results were potentially affected by contamination and qualified as *upper limits*. Of the results qualified as *upper limits*, 18 were below the QL, and none of the data qualified as *upper limits* were exceedances. Of the 7,070 analytical results generated from December 2007 – March 2008, 40 results required qualification or rejection, resulting in 99.4% valid and unqualified data with no restrictions on use.

Completeness

The objectives for completeness are intended to apply to the monitoring program as a whole. As summarized in **Table 6**, 68 of the 75 initial water column samples planned by the Coalition and coordinating programs were collected, and all collected samples were analyzed, for an overall sampling success rate of 91%. No additional follow-up samples were also collected and analyzed. All of the uncollected samples planned for the 2008 Storm Season (7) were due to the lack of flow at the sample sites or frozen conditions not appropriate for water sampling. Planned sampling that was not completed successfully is summarized below:

- Samples planned for Grasshopper Slough, Coyote Creek, and Stony Creek were not collected because the sampling sites had no flow.
- Samples planned for NECWA sites in January and February were no collected because the water bodies were frozen and inaccessible.

Table 7. Summary of Field Blank Quality Control Sample Evaluations for SVWQC Monitoring: December 2007 – March 2008

Method	Analyte	Data Quality Objective	Number of Analyses	Number Passing	% Success
EPA 130.2	Hardness	< MDL	**2**	2	100%
EPA 200.8	Trace Metals	< MDL	40	20	50%
EPA 300	Nitrate, as N	< MDL	3	2	67%
EPA 350.2	Ammonia, as N	< MDL	3	3	100%
EPA 351.3	Total Kjeldahl Nitrogen	< MDL	3	3	100%
EPA 354.1	Nitrite, as N	< MDL	3	3	100%
EPA 365.2	Total Phosphorus, as P	< MDL	3	1	33%
EPA 365.2 (filtered)	Dissolved Orthophosphate, as P	< MDL	3	3	100%
EPA 415.1	Total Organic Carbon (TOC)	< MDL	2	0	0%
EPA 547	Glyphosate	< MDL	3	3	100%
EPA 549.2	Paraquat	< MDL	3	3	100%
EPA 625m	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	< MDL	198	198	100%
EPA 8321A	Carbamate Pesticides		75	75	100%
SM20-9223	E. coli	< MDL	3	3	100%
Totals			**344**	**319**	**93%**

Table 8. Summary of Field Duplicate Quality Control Sample Results for SVWQC Monitoring: December 2007 – March 2008

Method		Data Quality Objective	Number Analyses	Number Passing	% Success
EPA 110.2	Color	RPD ≤ 25%	1	0	0%
EPA 130.2	Hardness	RPD ≤ 25%	3	3	100%
EPA 160.1	Total Dissolved Solids (TDS)	RPD ≤ 25%	3	2	67%
EPA 160.2	Total Suspended Solids (TSS)	RPD ≤ 25%	3	1	33%
EPA 180.1	Turbidity	RPD ≤ 25%	3	2	67%
EPA 200.8	Trace Metals	RPD ≤ 25%	48	46	95.8%
EPA 300	Nitrate, as N	RPD ≤ 25%	3	3	100%
EPA 350.2	Ammonia as N	RPD ≤ 25%	3	3	100%
EPA 351.3	Total Kjeldahl Nitrogen	RPD ≤ 25%	3	3	100%
EPA 354.1	Nitrite, as N	RPD ≤ 25%	3	3	100%
EPA 365.2	Phosphate as P, Total	RPD ≤ 25%	3	3	67%
EPA 365.2 (filtered)	Dissolved Orthophosphate, as P	RPD ≤ 25%	3	3	100%
EPA 415.1	Total Organic Carbon (TOC)	RPD ≤ 25%	2	1	50%
EPA 547	Glyphosate	RPD ≤ 25%	3	3	100%
EPA 547	Paraquat	RPD ≤ 25%	3	3	100%
EPA 625m	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	RPD ≤ 25%	215	215	100%
EPA 8321	Carbamate Pesticides	RPD ≤ 25%	75	75	100%
Toxicity tests	Ceriodaphnia, Selenastrum, Hyalella	RPD ≤ 25%	8	8	100%
Totals			***385***	***377***	**97.9%**

Table 9. Summary of Method Blank Results for SVWQC Monitoring: December 2007 – March 2008

Method	Analyte	Data Quality Objective	Number of Analyses	Number Passing	% Success
EPA 110.2	Color	< MDL	1	1	100%
EPA 130.2	Hardness	< MDL	7	7	100%
EPA 160.1	Total Dissolved Solids	< MDL	5	5	100%
EPA 160.2	Total Suspended Solids	< MDL	5	5	100%
EPA 180.1	Turbidity	< MDL	4	4	100%
EPA 200.8	Trace Metals	< MDL	128	97	76%
EPA 300	Nitrate, as N	< MDL	5	5	100%
EPA 350.2	Ammonia as N	< MDL	5	5	100%
EPA 351.3	Total Kjeldahl Nitrogen	< MDL	6	6	100%
EPA 354.1	Nitrite, as N	< MDL	5	5	100%
EPA 365.2	Phosphate/Orthophosphate, as P	< MDL	9	9	100%
EPA 415.1	Total Organic Carbon	< MDL	8	8	100%
SM20-9223	E. coli	< MDL	5	5	100%
EPA 547	Glyphosate	< MDL	4	4	100%
EPA 549.2	Paraquat	< MDL	4	4	100%
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	< MDL	401	401	100%
EPA 8321	Carbamate Pesticides	< MDL	100	100	100%
Totals			**702**	**671**	

Table 10. Summary of Lab Control Spike Results for SVWQC Monitoring: December 2007 – March 2008

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
EPA 110.2	Color	80-120%	1	1	100%
EPA 130.2	Hardness	80-120%	8	8	100%
EPA 160.1	Total Dissolved Solids	80-120%	7	7	100%
EPA 160.2	Total Suspended Solids	80-120%	7	7	100%
EPA 200.8	Trace Metals	80-120%	127	127	100%
EPA 350.2	Ammonia as N	80-120%	5	5	100%
EPA 351.3	Total Kjeldahl Nitrogen	80-120%	7	7	100%
EPA 300	Nitrate, as N	80-120%	6	6	100%
EPA 354.1	Nitrite, as N	80-120%	5	5	100%
EPA 365.2	Phosphate/Orthophosphate, as P	80-120%	9	9	100%
EPA 415.1	Total Organic Carbon	80-120%	8	8	100%
EPA 547	Glyphosate	78-128%	7	7	100%
EPA 549.2	Paraquat	42-104%	4	4	100%
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	(1)	818	818	100%
EPA 8321	Carbamate Pesticides	(1)	100	100	100%
Totals			**1119**	**1119**	

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 11. Summary of Surrogate Recovery Results for SVWQC Monitoring: December 2007 – March 2008

Method	Analyte	Data Quality Objective	Number of Analyses	Number Passing	% Success
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	(1)	348	348	100%
EPA 8321	Carbamate Pesticides	(1)	128	127	99.2%
Totals			**476**	**476**	

Note:
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 12. Summary of Lab Duplicate Results for SVWQC Monitoring: December 2007 – March 2008

Method	Analyte	Data Quality Objective	Number of Pairs Analysed	Number Passing	% Success
EPA 110.2	Color	≤20% RPD	1	1	100%
EPA 160.1	Total Dissolved Solids	≤20% RPD	6	6	100%
EPA 160.2	Total Suspended Solids	≤20% RPD	6	6	100%
EPA 180.1	Turbidity	≤20% RPD	5	5	100%
EPA 547	Glyphosate	78-128%	4	4	100%
EPA 549.2	Paraquat	42-104%	2	2	100%
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	≤30% RPD	130	130	100%
Totals			**154**	**154**	

Table 13. Summary of Matrix Spike Recovery Results for SVWQC Monitoring: December 2007 – March 2008

Method	Analyte	Data Quality Objective	Number of Analyses	Number Passing	% Success
EPA 130.2	Hardness	80-120%	14	14	100%
EPA 200.8	Trace Metals	80-120%	240	234	97.5%
EPA 350.2	Ammonia as N	80-120%	10	10	100%
EPA 351.3	Total Kjeldahl Nitrogen	80-120%	14	14	100%
EPA 300	Nitrate, as N	80-120%	12	12	100%
EPA 354.1	Nitrite, as N	80-120%	12	12	100%
EPA 365.2	Phosphate/Orthophosphate, as P	80-120%	20	20	100%
EPA 415.1	Total Organic Carbon	80-120%	22	20	91%
EPA 547	Glyphosate	78-128%	6	6	100%
EPA 549.2	Paraquat	50-126%	6	4	67%
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	(1)	390	386	99%
EPA 8321	Carbamate Pesticides	(1)	100	100	100%
Totals			**846**	**832**	

Note:

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 14. Summary of Matrix Spike Duplicate Precision Results for SVWQC Monitoring: December 2007 – March 2008

Method	Analyte	Data Quality Objective	Number of Pairs Analyzed	Number Passing	% Success
EPA 130.2	Hardness	80-120%	7	7	100%
EPA 200.8	Trace Metals	≤20% RPD	55	52	95%
EPA 350.2	Ammonia as N	≤20% RPD	5	5	100%
EPA 351.3	Total Kjeldahl Nitrogen	≤20% RPD	7	7	100%
EPA 300	Nitrate, as N	≤20% RPD	6	6	100%
EPA 354.1	Nitrite, as N	≤20% RPD	6	6	100%
EPA 365.2	Phosphate/Orthophosphate, as P	≤20% RPD	10	10	100%
EPA 415.1	Total Organic Carbon	≤20% RPD	10	10	100%
EPA 547	Glyphosate	≤20% RPD	3	3	100%
EPA 549.2	Paraquat	≤20% RPD	3	2	67%
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	≤30% RPD	195	195	100%
EPA 8321	Carbamate Pesticides	≤25% RPD	50	50	100%
Totals			**357**	**353**	

TABULATED RESULTS OF LABORATORY ANALYSES

The tabulated results for all validated and QA-evaluated data are provided in **Appendix C**. This appendix includes results for non-target pesticide analytes reported along with the pesticides of primary interest for the Coalition's monitoring program. Copies of final laboratory reports, including chromatographs for pesticide analyses, and all reported Quality Assurance data for Coalition monitoring results are provided in **Appendix B**.

Pesticide Use Information

Resolution R5-003-0826 requires sampling for 303(d)-listed constituents identified in waterbodies downstream from Coalition sampling locations. Additionally, the *ILRP* requires pesticide use reporting in the annual monitoring report. This evaluation is conducted annually and this section is reserved for use within the upcoming *2008 Irrigation Season Semi-Annual Monitoring Report.*

Data Interpretation

SUMMARY OF SAMPLING CONDITIONS

Sample collection for the December 2007 – March 2008 Coalition storm season was characterized by slightly below-average precipitation in December, well above-average precipitation in January, slightly below-average precipitation in February, and near-record low precipitation in March.[1] Storm season sample events were collected during December, January and February for most Sacramento Valley watershed sites for the Coalition.

Significant rainfall events occurred throughout the watershed during December, January and February. These events were characterized by three Coalition storm season sample events (Event 025, December 19-21; Event 026, January 28-29; and Event 027, February 21-22). One Coalition storm season sample event occurred at one site each in the Colusa Basin and Butte-Sutter-Yuba subwatersheds during the predominantly dry month of March. In addition, the following subwatershed groups collected samples during the storm season: the Northeastern California Water Association (NECWA) collected samples in December; the Putah Creek Watershed Group (PCWG) collected samples in January and March; and the Upper Feather River Watershed Group (UFRW) collected samples in January.

Regional precipitation patterns are illustrated in **Figures 2-a** through **2-e**. Precipitation was generally greater at higher elevations and in the northern part of the watershed. Storm flows through the watershed exhibited typical wet season variability during the storm season (**Figures 3 a-f**). Within the Central Valley, peaks in river stage generally corresponded with precipitation events. Stream flows at higher elevation sampling sites (Pit River and Indian Creek) were highest in March due to input from snowmelt.

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

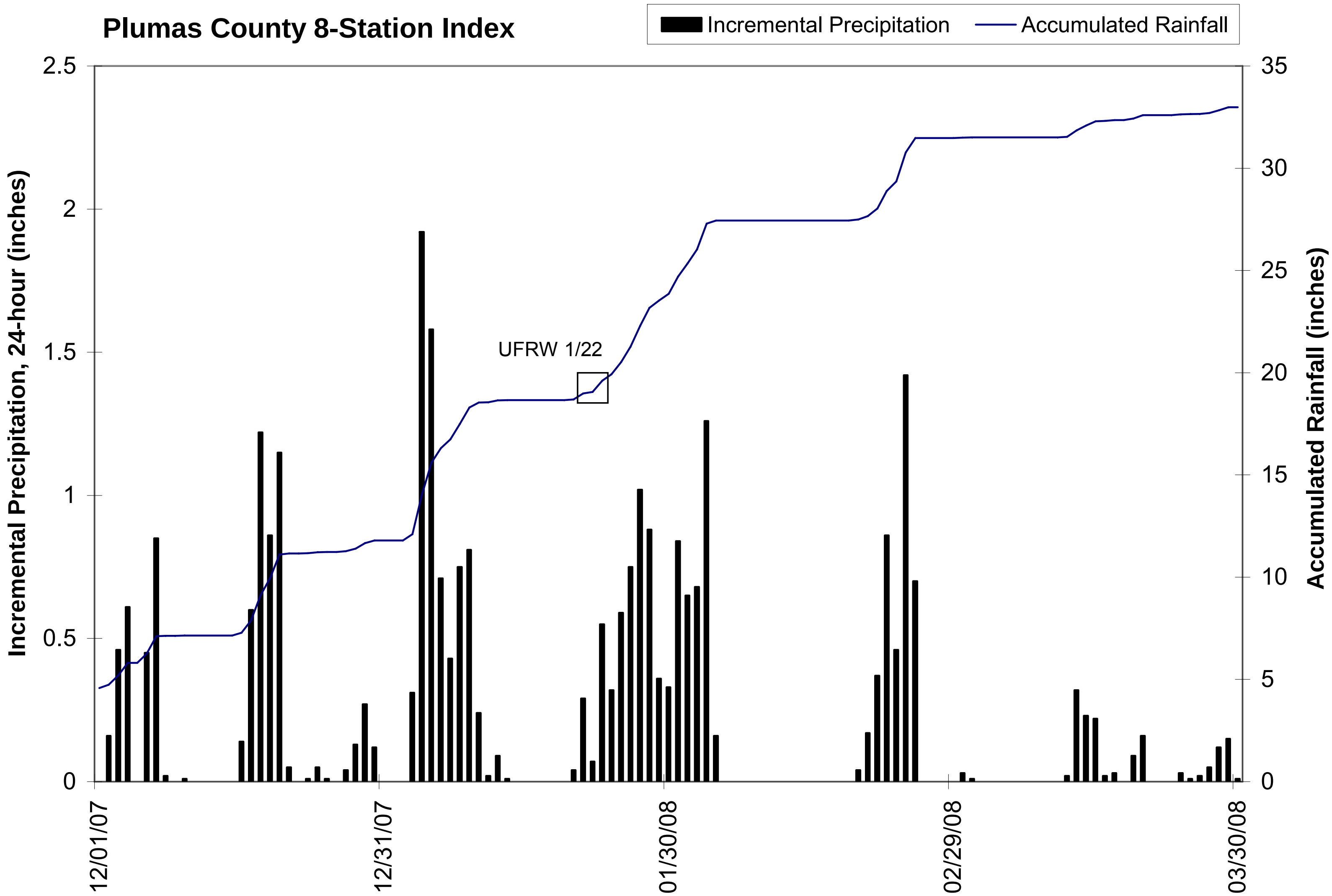

Figure 2-a. Precipitation during December 2007 – March 2008 Coalition Monitoring: Plumas County

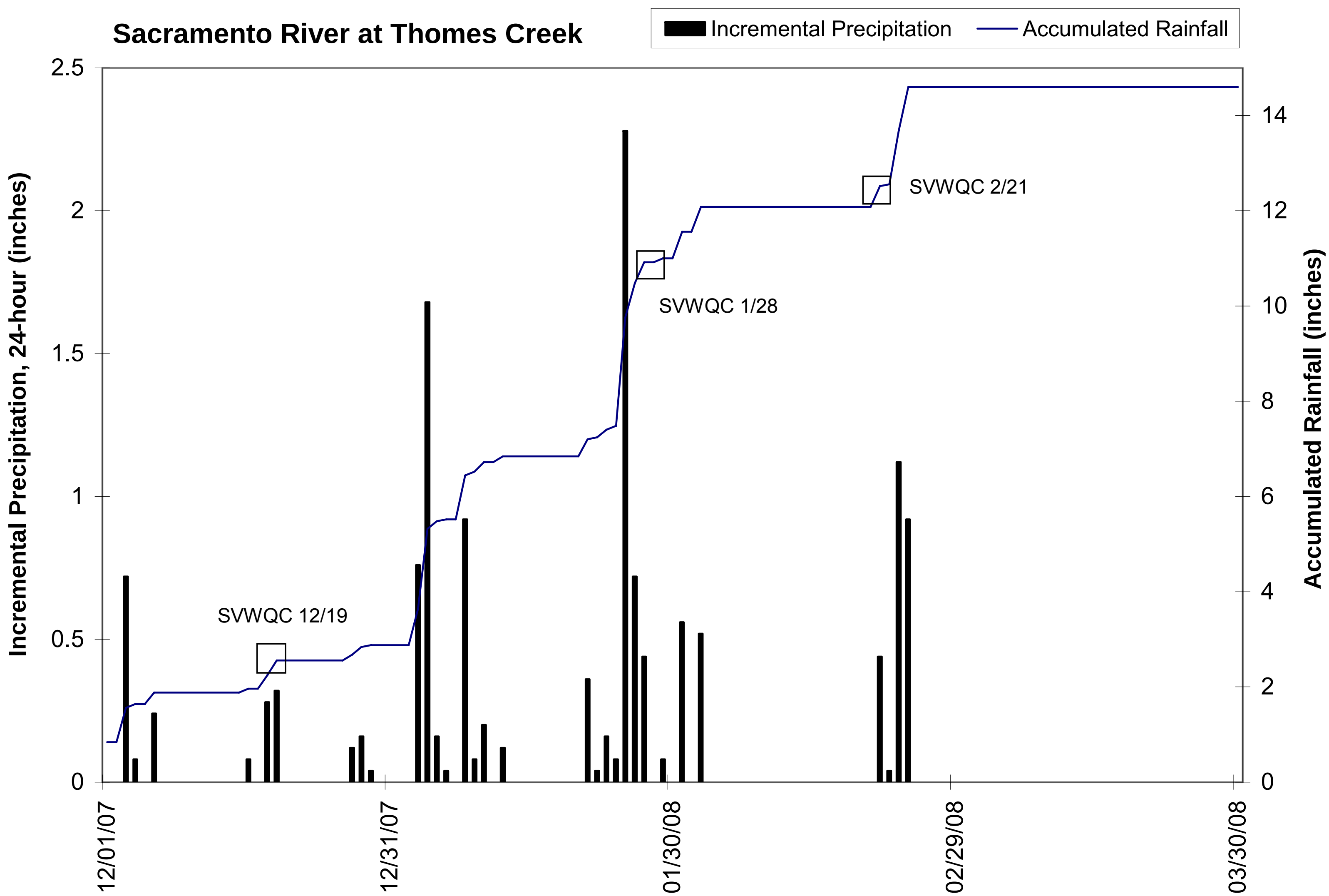

Figure 2-b. Precipitation during December 2007 – March 2008 Coalition Monitoring: Upper Sacramento Valley

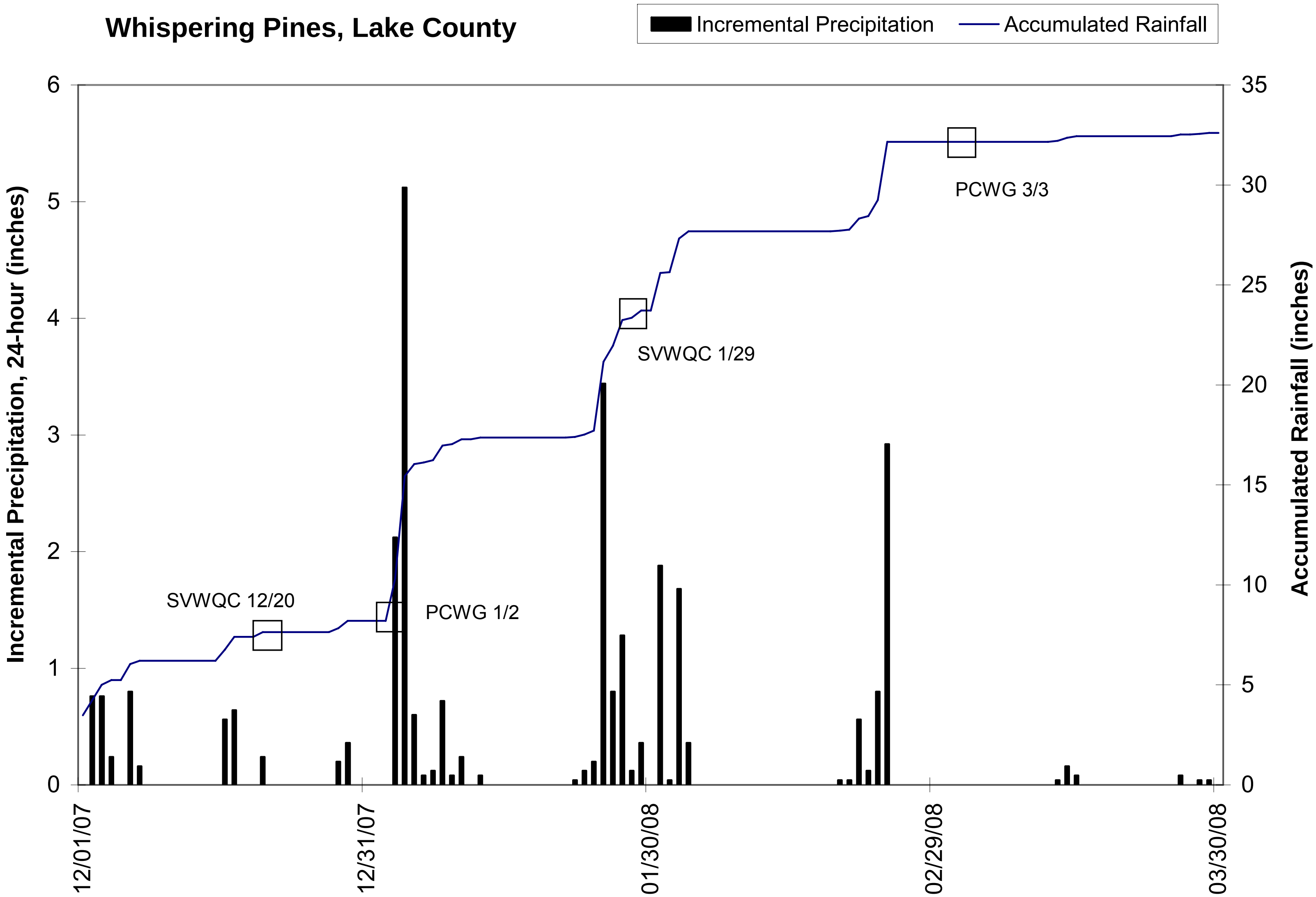

Figure 2-c. Precipitation during December 2007 – March 2008 Coalition Monitoring: Lake County

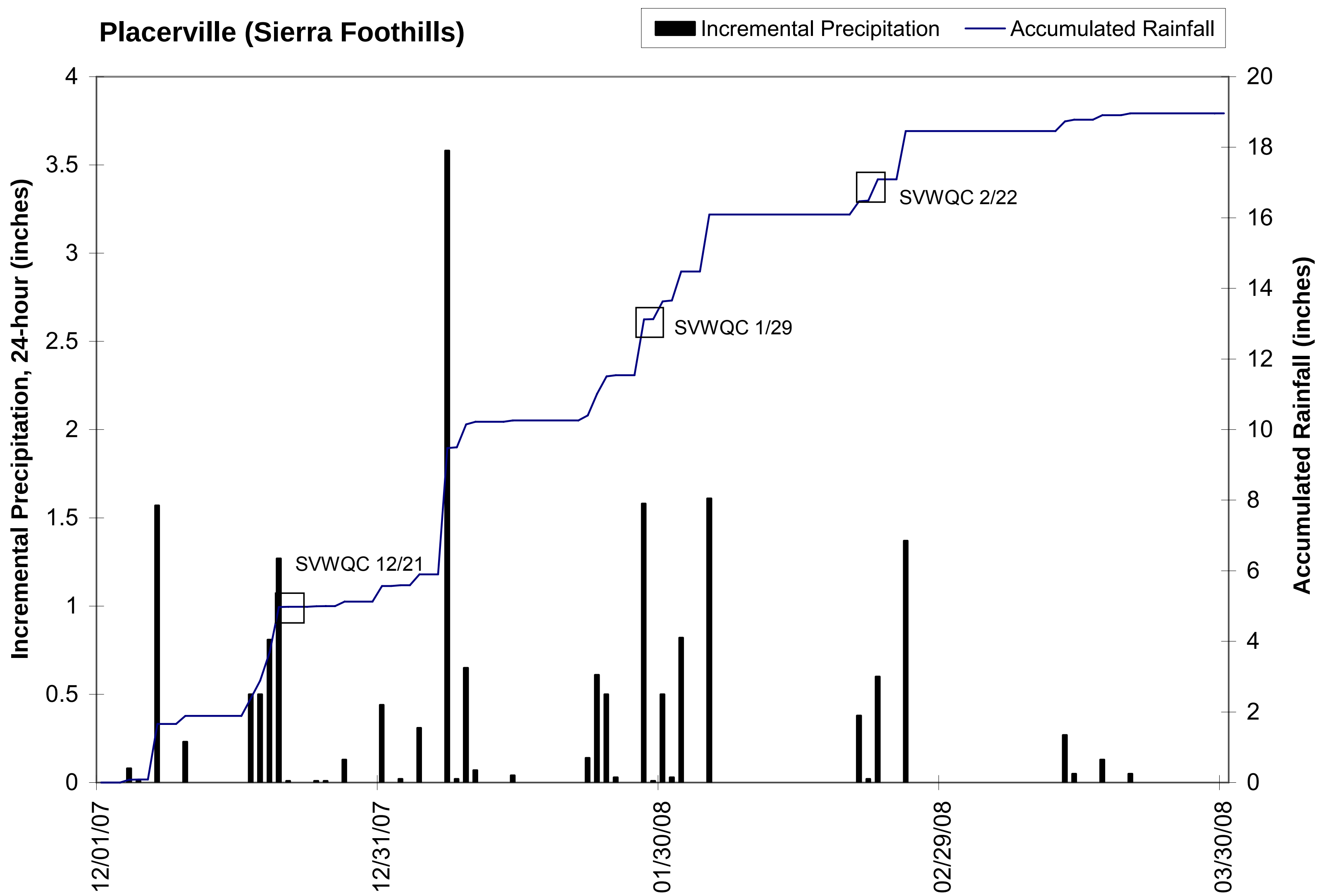

Figure 2-d. Precipitation during December 2007 – March 2008 Coalition Monitoring: Sierra Foothills

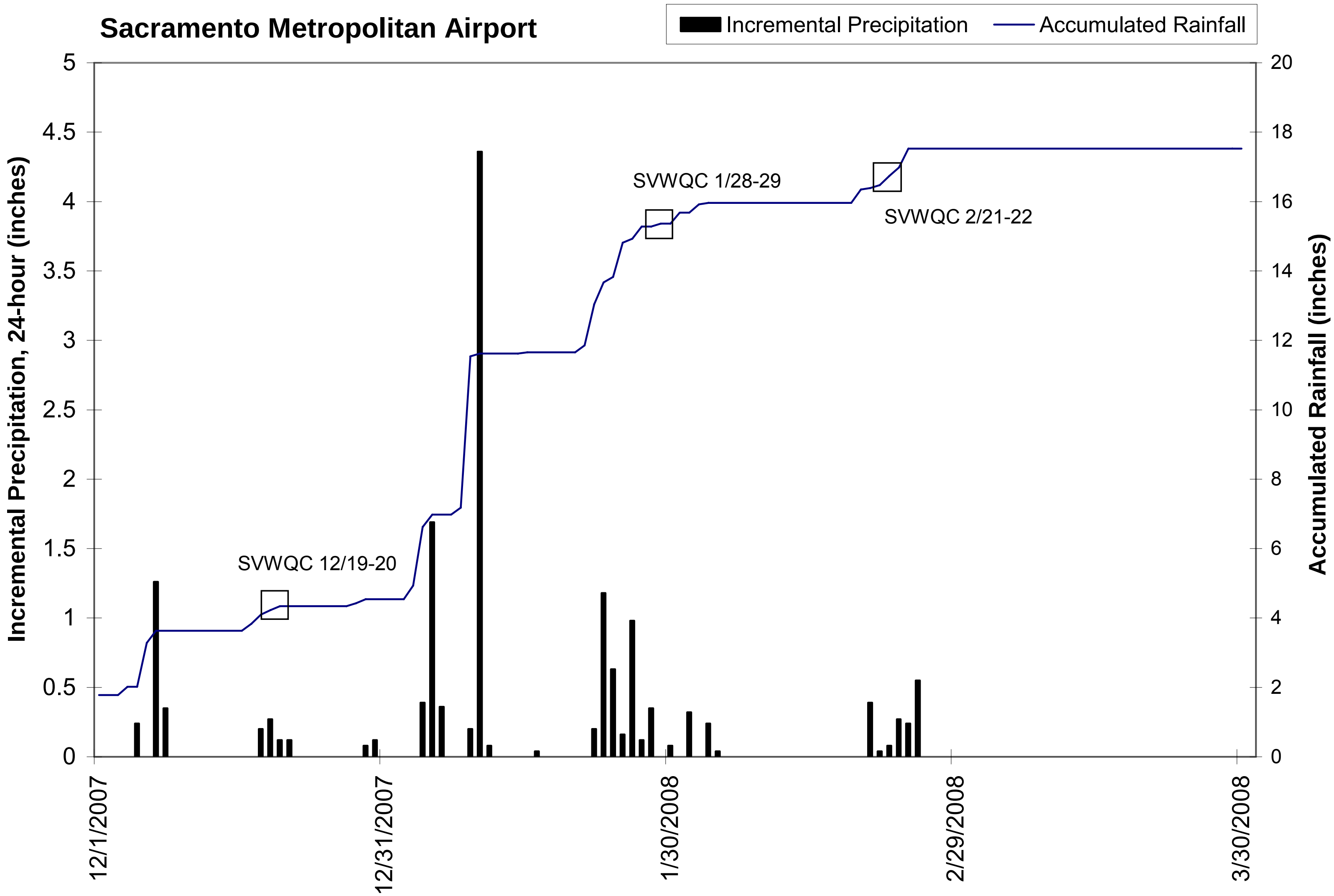

Figure 2-e. Precipitation during December 2007 – March 2008 Coalition Monitoring: Lower Sacramento Valley

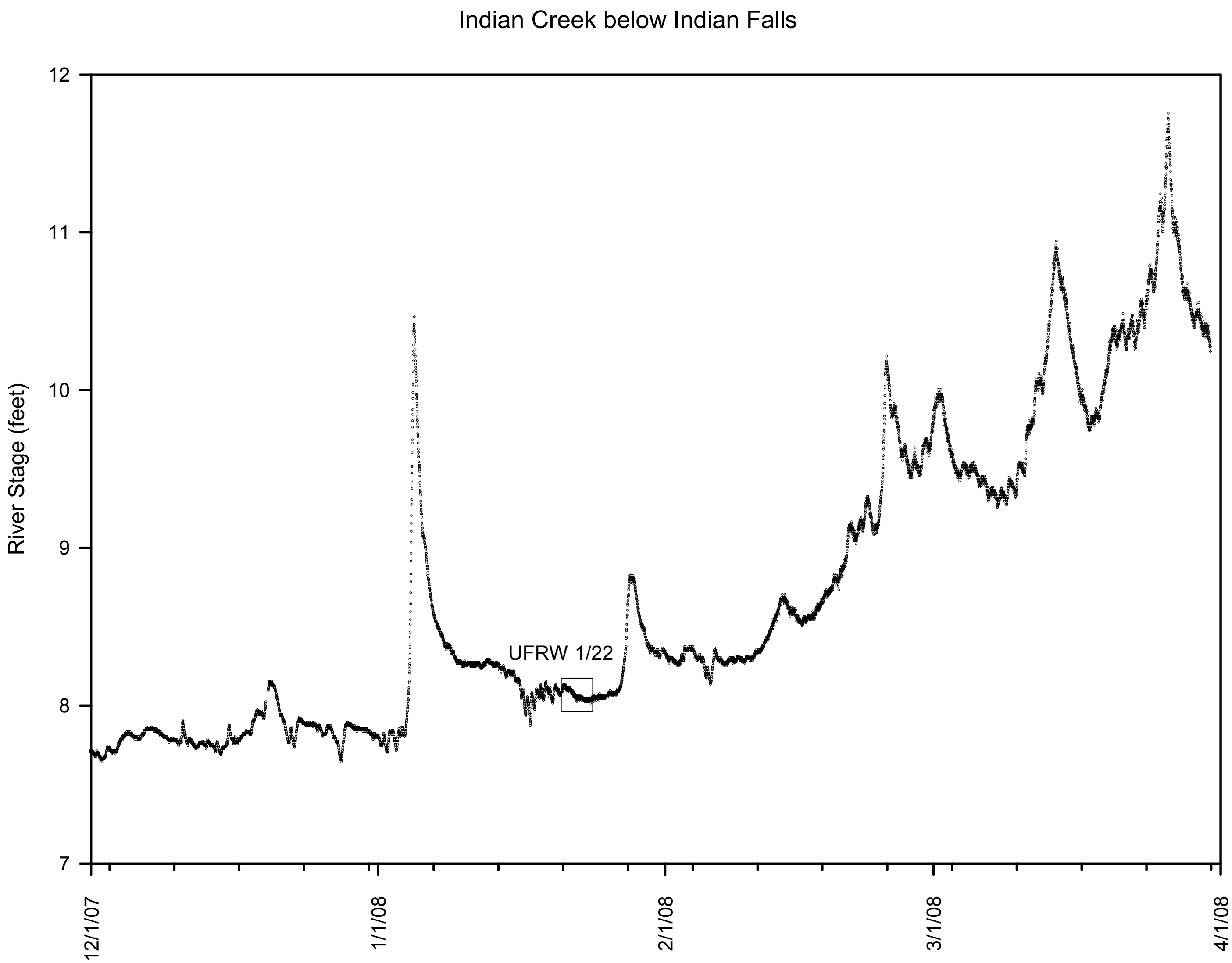

Figure 3-a. Flows during December 2007 – March 2008 Coalition Monitoring: Plumas County

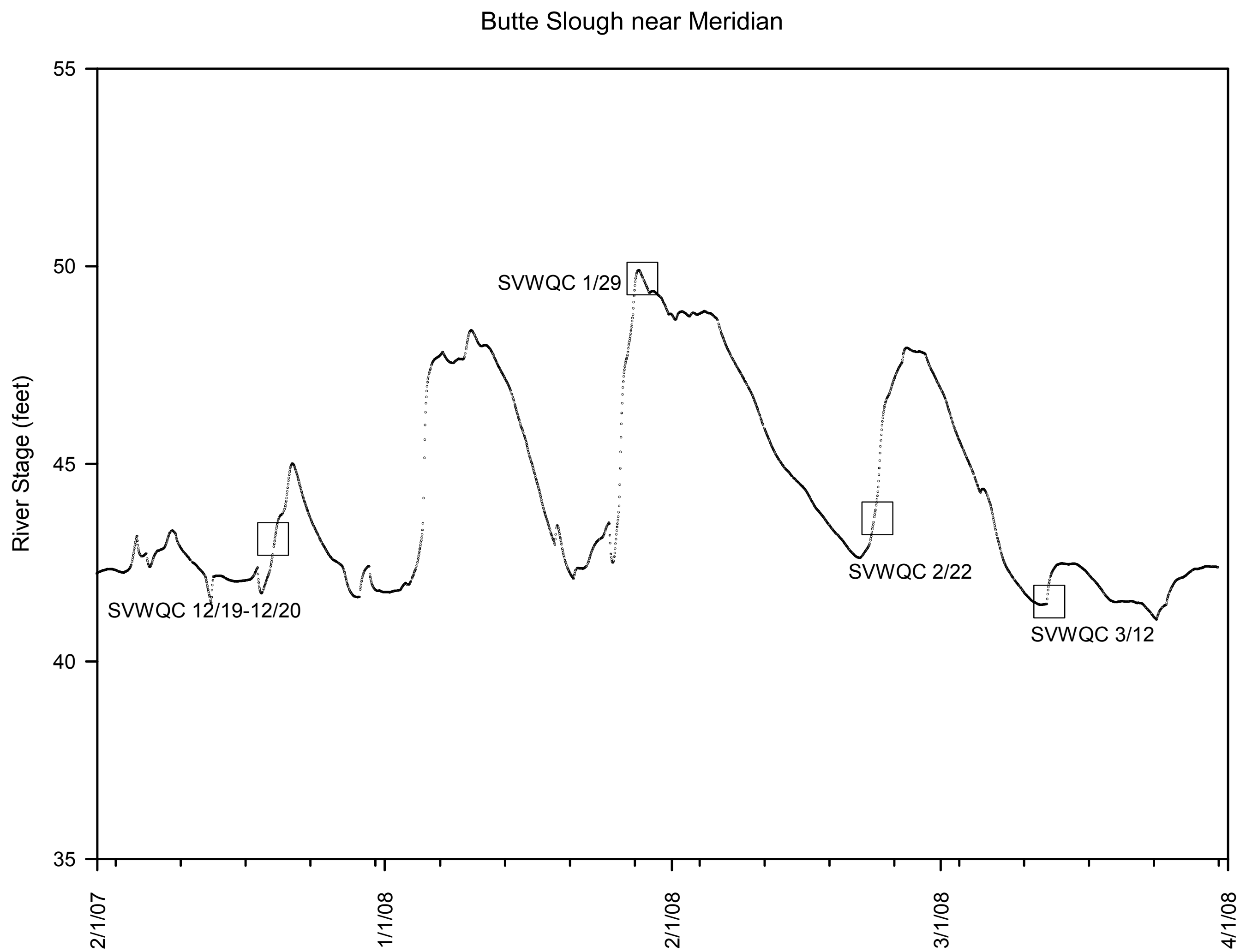

Figure 3-b. Flows during December 2007 – March 2008 Coalition Monitoring: East Sacramento Valley

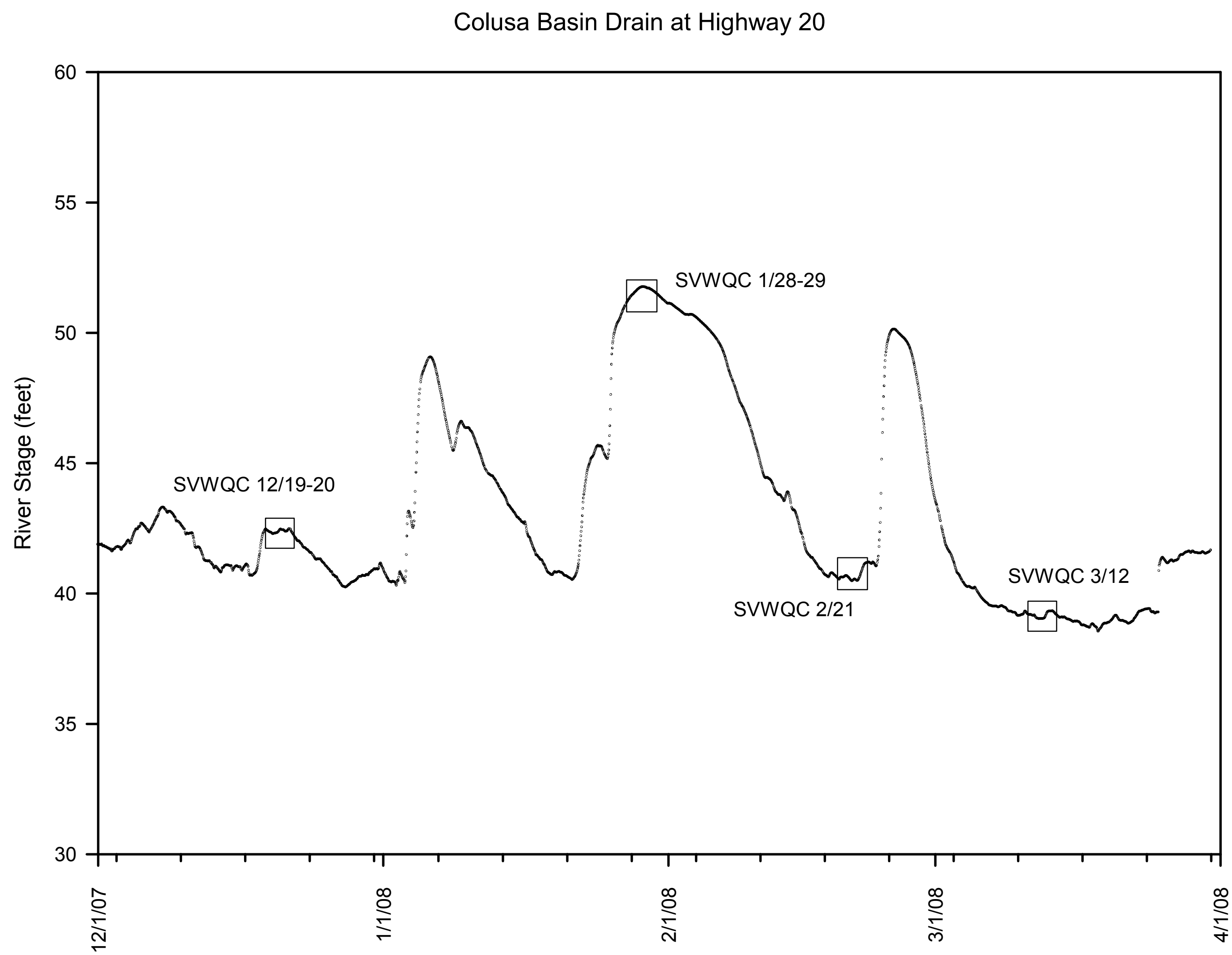

Figure 3-c. Flows during December 2007 – March 2008 Coalition Monitoring: West Sacramento Valley

Consumnes River at Michigan Bar

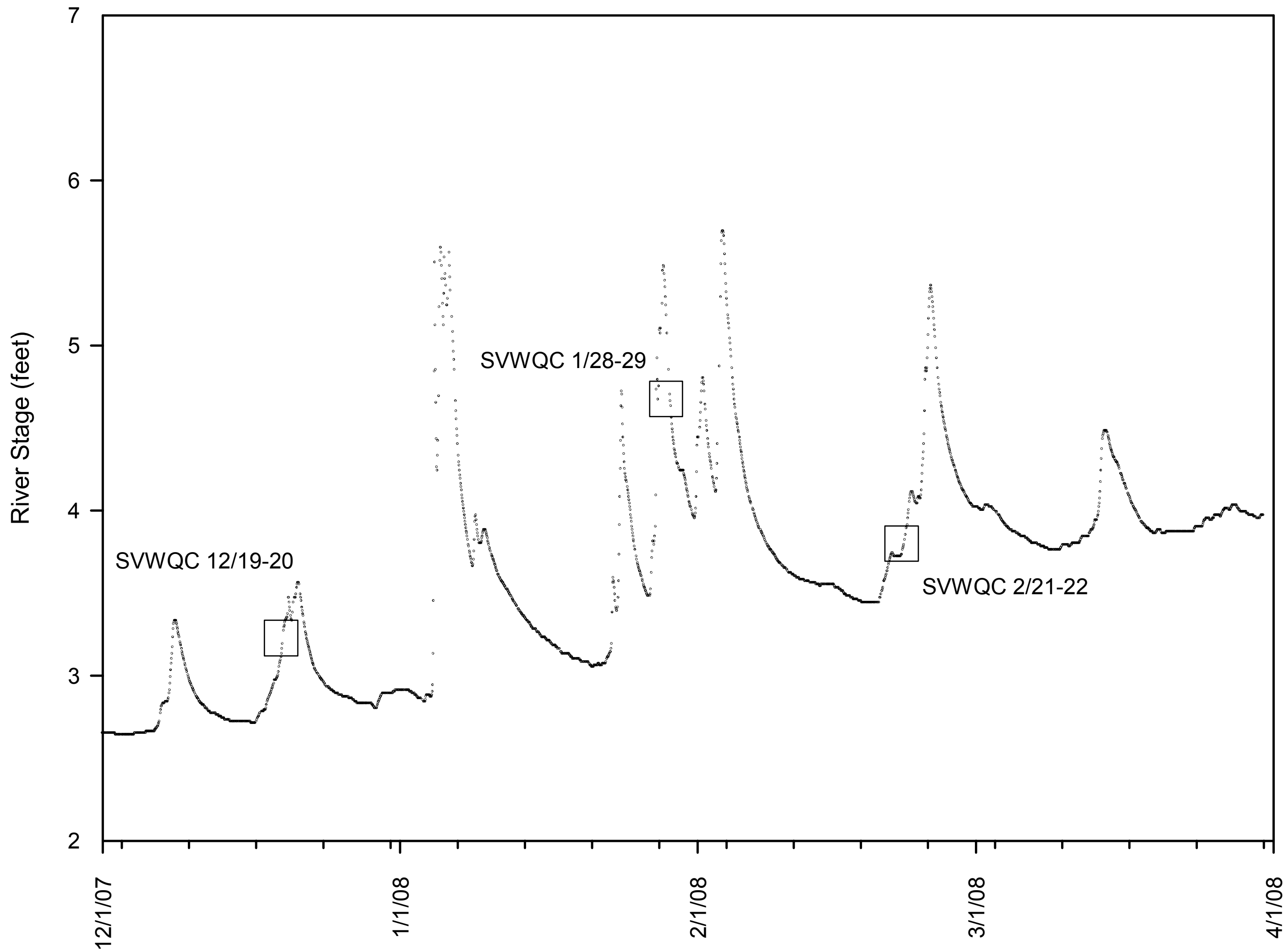

Figure 3-d. Flows during December 2007 – March 2008 Coalition Monitoring: Lower Sacramento Valley

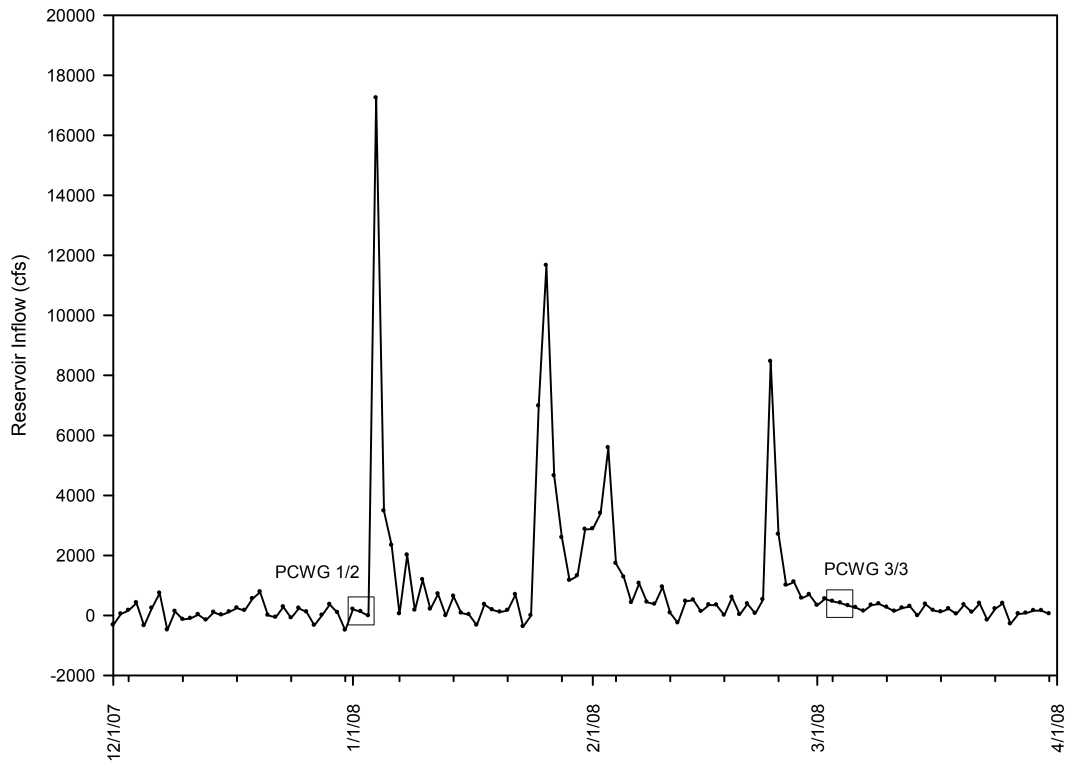

Figure 3-e. Flows during December 2007 – March 2008 Coalition Monitoring: Lake Berryessa (Reservoir Inflow)[2]

[2] These data are provisional data obtained from the California Data Exchange Center (CDEC, available at: http://cdec.water.ca.gov/), and they have not been reviewed for quality assurance. The 2/27/2007 data point was originally -3403 cfs. Based on preceding and subsequent values, this data point was changed to 3403 cfs. Other negative values in the data set have not been changed.

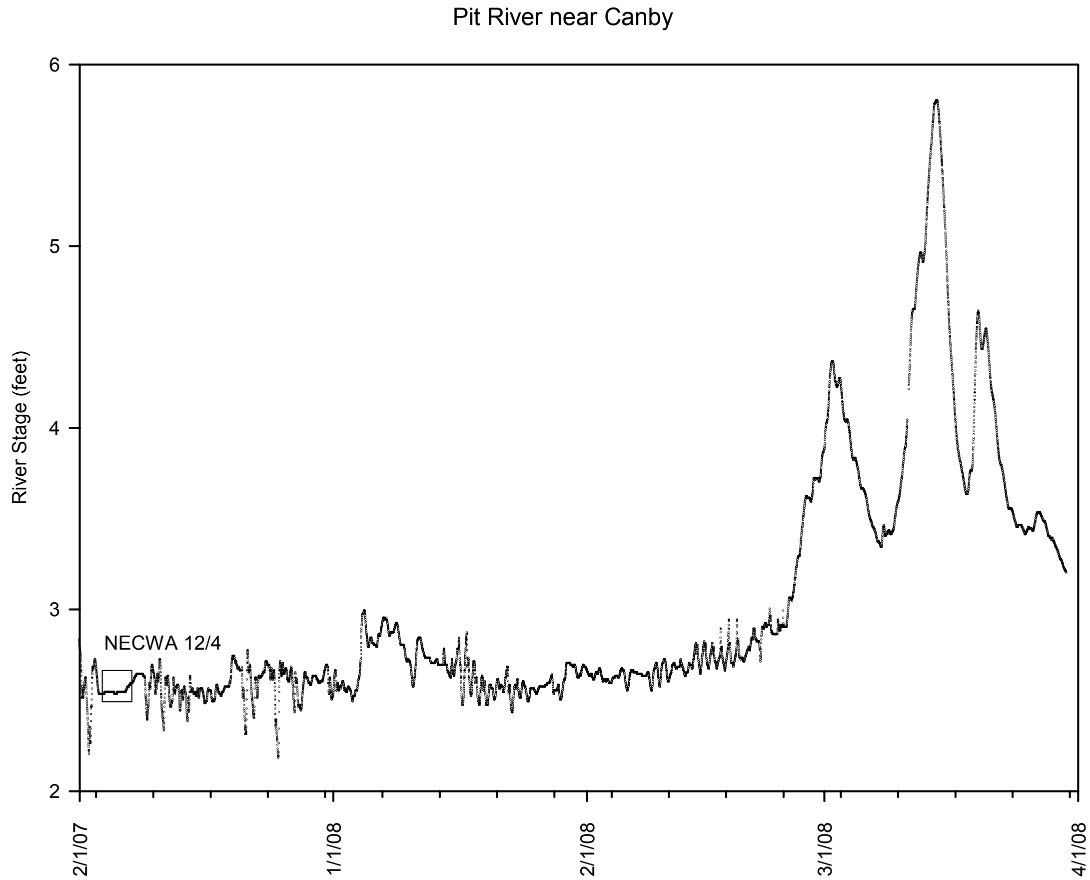

Figure 3-f. Flows during December 2007 – March 2008 Coalition Monitoring: Pit River near Canby

ASSESSMENT OF DATA QUALITY OBJECTIVES

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

The results of these evaluations were summarized previously in Table 7 through **Table 13**.

EXCEEDANCES OF RELEVANT WATER QUALITY OBJECTIVES

Coalition and subwatershed monitoring data were compared to applicable narrative and numeric water quality objectives in the Central Valley Basin Plan (CVRWQCB 1995) and subsequent adopted amendments and the California Toxics Rule (USEPA 2000). Observed exceedances of these recognized regulatory thresholds are the focus of this discussion. Other relevant water quality thresholds (e.g., recommended toxicity-based criteria or non-regulatory toxicity thresholds) were considered for the purpose of identifying potential causes of observed toxicity. It should be noted that these unadopted limits are not appropriate criteria for determining exceedances for the purpose of the Coalition's monitoring program and evaluating compliance with the *ILRP*. The additional thresholds considered include USEPA aquatic life criteria (USEPA 1999) that were not included in the California Toxics Rule, USEPA Maximum Contaminant Levels (MCL) for drinking water, and minimum toxic thresholds from USEPA's Office of Pesticide Programs (OPP) Ecotoxicity database (USEPA 2002c). Water quality objectives and other relevant water quality thresholds discussed in this section are summarized in **Table 15** and **Table 16**. Monitored analytes without relevant water quality objectives are listed in **Table 17**.

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 15. Basin Plan and California Toxics Rule Objectives for Analytes Monitored for the 2008 Storm Season

Analyte	Most Stringent Objective[1]	Units	Objective Source[2]
Ammonia, Total as N	narrative	mg/L	Basin Plan
Arsenic, dissolved	150	ug/L	CTR
Arsenic, total	50	ug/L	CA 1˚ MCL
Atrazine	1	ug/L	CA 1˚ MCL
Cadmium, dissolved	hardness dependent[4]	ug/L	CTR
Carbofuran	0.4	ug/L	Basin Plan
Chlorpyrifos	0.015	ug/L	Basin Plan Amendment
Color	15[3]	CU	CA 1˚ MCL
Copper, dissolved	hardness dependent[4]	ug/L	CTR
DDD (o,p' and p,p')	0.00083	ug/L	CTR
DDE (o,p' and p,p')	0.00059	ug/L	CTR
DDT (o,p' and p,p')	0.00059	ug/L	CTR
Diazinon	0.10	ug/L	Basin Plan Amendment
Dieldrin	0.00014	ug/L	CTR
Dissolved Oxygen	5	mg/L	Basin Plan
Endrin	0.036	ug/L	CTR
Fecal coliform	400	MPN/100mL	Basin Plan
Glyphosate	700	ug/L	CA 1˚ MCL
Lead, dissolved	hardness dependent[4]	ug/L	CTR
Malathion	0.1	ug/L	Basin Plan
Molinate	10	ug/L	Basin Plan
Nickel, dissolved	hardness dependent[4]	ug/L	CTR
Nitrate, as N	10	mg/L	CA 1˚ MCL
Nitrite, as N	1	mg/L	CA 1˚ MCL
Oxamyl	200	ug/L	CA 1˚ MCL
Parathion, Methyl	0.13	ug/L	Basin Plan
pH	6.5-8.5	-log[H+]	Basin Plan
Selenium, total	5	ug/L	Basin Plan
Simazine	4	ug/L	CA 1˚ MCL
Temperature	narrative	ug/L	Basin Plan
Thiobencarb	1	ug/L	Basin Plan
Total Suspended Solids	narrative	mg/L	Basin Plan
Toxicity, Algae Cell Density	narrative	ug/L	Basin Plan
Toxicity, Fathead Minnow Survival	narrative	ug/L	Basin Plan
Toxicity, Water Flea Survival	narrative	ug/L	Basin Plan
Turbidity	narrative	ug/L	Basin Plan
Zinc, dissolved	hardness dependent[4]	ug/L	CTR

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

Table 16. Unadopted Water Quality Limits for Analytes Monitored for the 2008 Storm Season

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

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

Table 17. Analytes Monitored for the 2008 Storm Season without Applicable Adopted or Unadopted Limits

Analytes	
Alkalinity	Orthophosphate, dissolved, as P
Bromacil	Oryzalin
Dimethoate	Paraquat
Discharge	Phosphorus as P, Total
Diuron	Total Kjeldahl Nitrogen
Hardness	Total Organic Carbon

Toxicity and Pesticide Results

Statistically significant toxicity was observed in 11 Coalition water quality samples collected from ten different sites for all three events conducted during the 2008 Storm Season. Significant toxicity to the algae *Selenastrum* was observed in samples from five sites, significant toxicity to *Ceriodaphnia* was observed in samples from four sites, and significant toxicity to fathead minnows (*Pimephales*) was observed in samples from two sites. The majority of significant toxicity (6 cases) was observed during the first storm season event (December 19-21, 2007). Samples exhibiting statistically significant toxicity are summarized in **Table 18**.

The observations of toxicity to *Ceriodaphnia*, and *Selenastrum* 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*."). The toxicity to Pimephales observed in two samples collected in February were due to test interferences and were not considered exceedances of the narrative objective. All of these statistically significant results for samples collected during the Coalition Storm Season monitoring were reported to the Water Board by the Coalition in "Exceedance Reports" and "Communication Reports" as required by the *ILRP* and the Coalition's MRPP. The Exceedance and Communication Reports detailing these results and required follow-up testing and results are provided in **Appendix D**. The results of these reports and of the follow-up testing conducted on the samples are summarized by event below.

Event 025

Ulatis Creek at Brown Road (UCBRD)

In toxicity tests conducted with *Selenastrum*, the Coalition observed reductions in cell density of 25% compared to the control. Follow-up sampling was not conducted for this event.

The UCBRD sample was tested for organophosphate and carbamate insecticides, triazine and urea herbicides, molinate, thiobencarb, paraquat, glyphosate, and trace metals. Eight different herbicides and 2 insecticides were detected. The herbicide simazine (8.61 ug/L) exceeded the Basin Plan narrative limit (California Primary MCL) of 4 mg/L. The concentration of diuron (12 ug/L) was sufficient to explain the observed toxicity to *Selenastrum*. Other herbicides (bromacil, glyphosate, oryzalin, pendimethalin, prometon, and tebuthiuron) were present but did not approach concentrations that were expected to adversely affect *Selenastrum*. Trace metals detected in the UCBRD sample did not exceed water quality objectives and did not approach concentrations toxic to *Selenastrum*.

Sweany Creek at Weber Road (SWNWR)

In toxicity tests conducted with *Selenastrum*, the Coalition observed reductions in cell density of 80.1% compared to the control. A TIE was initiated, and toxicity was persistent in the original sample. The toxicity was removed in the Chelex treated sample, suggesting that trace metals were at least partly responsible for the toxicity. There was some blank interference in the blanks for the Centrifugation + C8SPE and the Chelex TIE treatments, but this did not effect the conclusion that Chelex removed toxicity in the SWNWR sample. The SWNWR location is an upstream follow-up site for UCBRD. Trace metals were analyzed in the UCBRD sample and found not to exceed WQOs or approach concentrations expected to be toxic to *Selenastrum*.

Trace metals analyses were not originally planned for the SWNWR sample because metals were not previously indicated as a potential toxicant in this drainage. To further evaluate the potential that trace metals were the source of the toxicity in the SWNWR sample, the sample was eluted from the TIE Chelex column, reconstituted to the original volume, and sent to the laboratory for analysis of trace metals. Based on the results of this analysis, trace metals in the sample recovered from the SWNWR Chelex treatment were not elevated and trace metals were not likely to be the cause of the toxicity. Dissolved copper (2.4 ug/L) and nickel (4.9 ug/L) concentrations in this sample were elevated above the concentrations in the Chelex blank, but did not approach concentrations toxic to *Selenastrum* (>19 ug/L and >110 ug/L, for copper and nickel, respectively, based on a sample hardness of 238 mg/L).

In the SWNWR sample, one insecticide (diazinon), one nematicide/fungicide (benomyl), and three herbicides (diuron, oryzalin, simazine) were detected. Diazinon was elevated (0.154 ug/L) and exceeded the Basin Plan objective of 0.1 ug/L but is not expected to affect *Selenastrum* at concentrations below 500 ug/L. In addition, simazine (11.9 ug/L) was elevated and exceeded the Basin Plan objective of 4 mg/L (California Primary MCL). The diuron concentration (23 ug/L) was sufficient to explain the *Selenastrum* toxicity in this sample. The herbicides oryzalin and simazine were also elevated and may have contributed to the reduction in *Selenastrum* growth but were below concentrations expected to cause direct *Selenastrum* toxicity. Diuron and simazine both work by inhibiting photosynthesis in vascular plants, while oryzalin works by inhibiting cell division.

Stony Creek at 99W (STYNN)

In toxicity tests conducted with *Ceriodaphnia*, the Coalition observed reductions in cell survival of 100% compared to the control. A TIE was initiated, and toxicity was not persistent in the original sample. The TIE was therefore inconclusive. This pattern is consistent with a rapidly degrading source of toxicity, indicating that the toxicity would probably not be persistent under ambient conditions. The 100% Centrifuged + C8SPE treated sample exhibited significant toxicity due to high mortalities in 2 replicates, but there was no toxicity in the corresponding blank treatment. The increased mortality in the TIE treatment result does not have any specific diagnostic value when there is no significant toxicity in the baseline untreated sample. The STYNN sample was tested for organophosphate and triazine pesticides.

No pesticides were detected in the sample.

TIE results and results of chemical analyses were unable to provide a likely cause of the *Ceriodaphnia* toxicity in the sample. Pesticide application data and chemistry results indicated that pesticides were not a likely cause of the toxicity in this sample.

Walker Creek at County Road 48 (WLKRC)

In toxicity tests conducted with *Ceriodaphnia*, the Coalition observed reductions in cell survival of 70% compared to the control. A TIE was initiated, and toxicity was not persistent in the original sample. The TIE was therefore inconclusive. This pattern is consistent with a rapidly degrading source of toxicity, indicating that the toxicity would probably not be persistent under ambient conditions.

The WLKRC sample was tested for organophosphate and carbamate insecticides, triazine and urea herbicides, molinate, thiobencarb, paraquat, glyphosate, and trace metals. No pesticides were detected in the sample. Trace metals did not exceed objectives or approach concentrations toxic to *Ceriodaphnia.*

TIE results and results of chemical analyses were unable to provide a likely cause of the *Ceriodaphnia* toxicity in the sample. Pesticide application data and chemistry results indicated that pesticides were not a likely cause of the toxicity in this sample.

Pine Creek at Nord GIanella Road (PNCGR)

In toxicity tests conducted with *Ceriodaphnia*, the Coalition observed reductions in cell survival of 53% compared to the control. A TIE was initiated, and toxicity was not persistent in the original sample. The TIE was therefore inconclusive. This pattern is consistent with a rapidly degrading source of toxicity, indicating that the toxicity would probably not be persistent under ambient conditions.

The PNCGR sample was tested for organophosphate and carbamate insecticides and urea herbicides. No pesticides were detected in the sample.

TIE results and results of chemical analyses were unable to provide a likely cause of the *Ceriodaphnia* toxicity in the sample. Pesticide application data and chemistry results indicated that pesticides were not a likely cause of the toxicity in this sample.

Willow Slough Bypass at SP (WLSBP)

In toxicity tests conducted with *Ceriodaphnia*, the Coalition observed reductions in cell survival of 58% compared to the control. A TIE was initiated, and toxicity was not persistent in the original sample. The TIE was therefore inconclusive. This pattern is consistent with a rapidly degrading source of toxicity, indicating that the toxicity would probably not be persistent under ambient conditions.

The WLSBP sample was tested for organophosphate and carbamate insecticides, triazine and urea herbicides, molinate, thiobencarb, paraquat, glyphosate, and trace metals. Three herbicides (bromacil, diuron, simazine) and no insecticides were detected in the sample. The detected pesticides did not approach concentrations toxic to *Ceriodaphnia*.

TIE results and results of chemical analyses were unable to provide a likely cause of the *Ceriodaphnia* toxicity in the sample. Pesticide application data and chemistry results indicated that pesticides were not a likely cause of the toxicity in this sample.

Event 026

Willow Slough Bypass at Poleline (WLSPL)

In toxicity tests conducted with *Selenastrum*, the Coalition observed reductions in cell density of 45.9% compared to the control.

Ambient follow-up samples collected on February 5, 2008 at WLSPL were not toxic to *Selenastrum*. This indicates that toxicity did not persist in ambient surface waters.

In the initial WLSPL sample, diuron was elevated (3.7 ug/L) and exceeded the EPA benchmark of 2.4 ug/L for non-vascular aquatic plants. The detected diuron concentration was sufficient to explain the observed toxicity to *Selenastrum*. No other detected pesticides or other analytes approached concentrations expected to cause or contribute to the observed *Selenastrum* toxicity.

Ulatis Creek at Brown Road (UCBRD)

In toxicity tests conducted with *Selenastrum*, the Coalition observed reductions in cell density of 11.2% compared to the control.

In the UCBRD sample, diuron was elevated (3.5 ug/L) and exceeded the EPA benchmark of 2.4 ug/L for non-vascular aquatic plants. The detected diuron concentration was sufficient to explain the observed toxicity to *Selenastrum*. No other detected pesticides or other analytes approached concentrations expected to cause or contribute to the observed *Selenastrum* toxicity.

Colusa Drain above KL (COLDR)

In toxicity tests conducted with *Selenastrum*, the Coalition observed reductions in cell density of 21% compared to the control.

Ambient follow-up samples collected on February 5, 2008 at COLDR were not toxic to *Selenastrum*. This indicates that toxicity did not persist in ambient surface waters.

In the COLDR sample, no pesticides or other analytes were detected that fully explain theobserved *Selenastrum* toxicity. The herbicides, diuron, simazine and oryzalin were detected at concentrations well below their EPA benchmark for non-vascular aquatic plants. Although diuron (0.4 ug/L) was below the EPA Benchmark of 2.4 ug/L, the observed toxicity was marginal (21% reduction in cell density compared to control) and diuron may have contributed to this reduction. No other detected pesticides or other analytes approached concentrations expected to cause or contribute to the observed *Selenastrum* toxicity.

Pesticide application data reported in the COLDR for the month prior to sampling have not yet been completely reviewed. Herbicides are widely applied at this time of year in this drainage, and preliminary information from the County Agriculture Commissioners indicates this was also the case for the month prior the sample event.

Based on seasonally typical pesticide application patterns and the initial results of pesticide analyses, some unmonitored herbicides may have contributed to the *Selenastrum* toxicity observed in the COLDR sample. An amended report will be provided to confirm this when the pesticide application data for COLDR are fully evaluated.

Event 027

Coon Creek at Brewer Road (CCBRW)

In toxicity tests conducted with *Pimephales*, the Coalition observed reductions in survival of 27.5% compared to the control.

Coon Hollow Creek (COONH)

In toxicity tests conducted with *Pimephales*, the Coalition observed reductions in survival of 37.5% compared to the control.

Observed sample toxicity to *Pimephales* in the CCBRW and COONH samples was due to "pathogen-related mortality". Pathogen-related mortality (PRM) is a test interference that occurs sporadically in fathead minnow tests with ambient water samples and is caused by water-borne pathogen(s). Characteristics of PRM include high variability among replicates, nonmonotonic dose responses, and fungal growths often observed on the fish larvae. Histopathologic examinations frequently find bacterial and/or fungal infections on fish exhibiting the symptoms of PRM. The generally accepted explanation for PRM is a naturally occurring pathogen or pathogens that interfere with the toxicity test. When it occurs, the interference can invalidate tests or falsely indicate toxicity, as occurred in the CCBRW and COONH samples. PRM was confirmed by microscopic examination to be the cause of the majority of Pimephales mortalities in these two samples with significant toxicity. In the absence of PRM, survival in these samples would not have been significantly reduced, and therefore these results are not considered an exceedance of Basin Plan objectives.

Table 18. Summary of Water Column Samples Exceeding the Basin Plan Narrative Toxicity Objective, December 2007 – March 2008

Site	Date	Species	% of Control
Ulatis Creek at Brown Road	12/19/07	*Selenastrum* cell density	75%
Sweany Creek at Weber Road	12/19/07	*Selenastrum* cell density	19.9%
STYNN	12/19/07	*Ceriodaphnia* survival	0%
Walker Creek at Co Rd 48	12/19/07	*Ceriodaphnia* survival	30%
Pine Creek at Nord Gianella Rd	12/19/07	*Ceriodaphnia* survival	45%
Willow Slough Bypass at SP	12/19/07	*Ceriodaphnia* survival	42%
Willow Slough Bypass at Poleline	01/28/08	*Selenastrum* cell density	54.1%
Ulatis Creek at Brown Road	01/28/08	*Selenastrum* cell density	88.8%
Colusa Drain above KL	01/29/08	*Selenastrum* cell density	79%
Coon Creek at Brewer Road	02/22/08	*Pimephales* survival	72.5%
Coon Hollow Creek	02/22/08	*Pimephales* survival	62.5%

Pesticides Detected in Coalition Monitoring

Pesticides were analyzed in 187 individual water column samples collected from December 2007 to March 2008. Analyses were conducted for organophosphates, carbamates, organochlorines, triazines, pyrethroids, glyphosate, and paraquat. Within these categories, 19 different pesticides were detected in 61 separate samples (out of 187 individual samples) collected for Coalition monitoring conducted December 2007 to March 2008. Legacy organochlorines were detected in eight samples from six sites. There were a total of 12 pesticide exceedances of water quality objectives: only three of these were for registered pesticides with the remaining nine exceedances for legacy organochlorine pesticides with no current agricultural uses.

It should be noted that detected pesticides are not equivalent to exceedances. Two registered pesticides (diazinon and simazine) and 3 unregistered legacy organochlorine pesticides (aldrin, DDE, DDT) exceeded applicable water quality objectives in a total of 13 Storm Season 2008 samples. One pesticide (diuron) was also detected at concentrations with the potential to cause toxicity to sensitive nonvascular plant test species (algae) and was associated with significant toxicity to *Selenastrum*.

All detected pesticide concentrations for Coalition monitoring conducted between December 2007 and March 2008 are summarized in **Table 19**. Pesticides were compared to relevant numeric and narrative water quality objectives, and to concentrations in USEPA's *Ecological Risk Assessment Aquatic Life Benchmark Table*[3].

- Aldrin (a legacy organochlorine pesticide) was detected in one sample. Aldrin exceeded the California Toxics Rule criteria (.00013 ug/L).
- Atrazine was detected in one sample. Atrazine did not exceed the California 1˚ MCL of 1 ug/L in this sample and did not exceed any of USEPA's *Aquatic Life Benchmarks.*
- Benomyl/Carbendazim was detected in one sample. Carbendazim is a breakdown product of benomyl. There is no adopted objective for benomyl or carbendazim
- Bromacil was detected in four samples from four different sites. There is no adopted objective for bromacil.
- Chlorpyrifos was detected in six samples from five different sites. Chlorpyrifos did not exceed the Basin Plan Amendment objective (.015 ug/L) in any of these samples. Chlorpyrifos was not detected at concentrations with the potential to cause toxicity to sensitive invertebrate test species and was not associated to any cases of *Ceriodaphnia* toxicity.
- DDE (p,p'), a legacy organochlorine pesticide, was detected in two samples from two different sites. Both detected concentrations exceeded the California Toxics Rule

[3] *Ecological Risk Assessment Aquatic Life Benchmark Table*, USEPA 2007. The table provides aquatic life benchmarks based on toxicity values derived from data in support of pesticide registrations. The aquatic life benchmarks are estimates of concentrations below which pesticides are *not* expected to have the potential for adverse effects on aquatic life. The benchmarks are not effect thresholds. The table can be found at http://www.epa.gov/oppefed1/ecorisk_ders/aquatic_life_benchmark.htm

criteria (.00059 ug/L). The detected concentrations of these legacy pesticides are well below concentrations with the potential to be acutely toxic to aquatic organisms.

- DDT(p,p'), a legacy organochlorine pesticide, was detected in six samples from six different sites. All detected concentrations exceeded the California Toxics Rule criteria (.00059 ug/L). The detected concentrations of these legacy pesticides are well below concentrations with the potential to be acutely toxic to aquatic organisms.
- Diazinon was detected in 15 samples from 11 different sites. Detected concentrations exceeded the Basin Plan Amendment objective of 0.10 ug/L in only one sample (Sweany Creek, 12/19/2007). Detected concentrations were also well below USEPA's *Aquatic Life Benchmarks* for invertebrates, with the exception of the one Sweany Creek sample. Although toxicity to *Selenastrum* was observed in one sample with detected diazinon (0.154 ug/L) at Sweany Creek, 12/19/2007), diazinon is not expected to affect *Selenastrum* at concentrations below 500 ug/L.
- Dimethoate was detected in one sample. The detected concentration of this organophosphate insecticide was below levels with the potential to cause adverse effects to sensitive test species (21.5 ug/L), and the detection was not associated with any observed sample toxicity. There is no adopted objective for dimethoate.
- Diuron was detected in 17 samples from 11 different sites. Four detected concentrations (Ulatis Creek and Sweany Creek, 12/19/2007, Ulatis Creek on 1/28/08, and Willow Slough on 1/208/08) exceeded levels with the potential to cause adverse effects to *Selanastrum* (2.4 ug/L) and were associated with *Selenastrum* toxicity at these sites. One additional sample exceeded 2.4 ug/L (Willow Slough on 12/19/07, but was not associated with *Selenastrum* toxicity. There is no adopted objective for diuron.
- Glyphosate was detected in five samples from four different sites. Glyphosate did not exceed the California 1˚ MCL of 700 ug/L in these samples and did not exceed any of USEPA's *Aquatic Life Benchmarks.*
- Malathion was detected in one sample. Malathion did not exceed the Basin Plan objective (0.1 ug/L) and was not associated with *Ceriodaphnia* toxicity.
- Oryzalin was detected in six samples from five different sites. The detected concentrations were below levels with the potential to cause adverse effects on sensitive test species (42 ug/L). There is no adopted objective for oryzalin.
- Oxyfluorfen was detected in one sample. Oxyfluorfen did not exceed any of USEPA's *Aquatic Life Benchmarks.* There is no adopted objective for oxyfluorfen.
- Pendimethalin (Prowl) was detected in one sample. Although *Selenastrum* toxicity was observed in this sample, the detected concentration of this herbicide was below concentrations with the potential to cause adverse effects to sensitive test species (5.4 ug/L). There is no adopted objective for pendimethalin.
- Prometon was detected in three samples from one site. Detected concentrations were below levels with the potential to cause adverse effects on sensitive test species. There is no adopted objective for prometon.

- Simazine was the most common of the pesticides detected (in 33 samples from 16 different sites). Detected simazine was below levels with the potential to cause adverse effects on sensitive test species (36 ug/L) in all samples. Simazine exceeded the California 1˚ MCL of 4 ug/L in two samples (Sweany Creek, 12/19/2007 and Ulatis Creek, 12/19/2007).
- Tebuthiuron was detected in two samples from two sites. Tebuthiuron did not exceed any of USEPA's *Aquatic Life Benchmarks.* There is no adopted objective for tebuthiuron.
- Thiobencarb was detected in one sample. Thiobencarb did not exceed the Basin Plan objective of 1.0 ug/L in this sample, was well below levels with the potential to cause adverse effects to test species, and was not associated with toxicity.
- Paraquat was not detected in any samples.

Table 19. Pesticides Detected in Coalition Monitoring, December 2007 – March 2008

Site	Date Sampled	Analyte	Result(1) (µg/L)	Water Quality Limits(2)	
Colusa Basin Drain above KL	01/29/08	Aldrin	J .0029	.00013	CTR
Ulatis Creek at Brown Rd.	02/21/08	Atrazine	.015	1	CA 1˚ MCL
Sweany Creek at Weber Rd.	12/19/07	Benomyl/Carbendazim	1.3	NA	NA
Laguna Creek at Alta Mesa Rd.	01/28/08	Bromacil	J .35	NA	NA
Lower Snake R. at Nuestro Rd.	02/22/08	Bromacil	.53	NA	NA
Ulatis Creek at Brown Rd.	12/19/07	Bromacil	J .26	NA	NA
Willow Sl. Bypass at SP	12/19/07	Bromacil	4.9	NA	NA
Colusa Basin Drain above KL	01/29/08	Chlorpyrifos	.008	.015	BPA
Grand Island Drain near Leary Rd.	01/28/08	Chlorpyrifos	.0094	.015	BPA
Grand Island Drain near Leary Rd.	02/21/08	Chlorpyrifos	.0029	.015	BPA
Lower Snake R. at Nuestro Rd.	01/29/08	Chlorpyrifos	.004	.015	BPA
Ulatis Creek at Brown Rd.	01/28/08	Chlorpyrifos	.0089	.015	BPA
Walker Creek at Co Rd. 48	01/28/08	Chlorpyrifos	.0035	.015	BPA
Coon Hollow Creek	02/22/08	DDE(p,p')	J .0046	.00059	CTR
Grand Island Drain near Leary Rd.	02/21/08	DDE(p,p')	J .0032	.00059	CTR
Colusa Basin Drain above KL	01/29/08	DDT(p,p')	J .0037	.00059	CTR
Coon Hollow Creek	01/29/08	DDT(p,p')	J .0014	.00059	CTR
Grand Island Drain near Leary Rd.	01/28/08	DDT(p,p')	.0105	.00059	CTR
Sacramento Sl. Br. near Karnak	01/29/08	DDT(p,p')	J .0048	.00059	CTR
Ulatis Creek at Brown Rd.	01/28/08	DDT(p,p')	J .0033	.00059	CTR
Walker Creek at Co Rd. 48	01/28/08	DDT(p,p')	J .0022	.00059	CTR
Colusa Basin Drain above KL	01/29/08	Diazinon	.016	0.1	BPA
Colusa Basin Drain above KL	03/12/08	Diazinon	.0564	0.1	BPA
Coyote Creek at Tyler Rd.	01/28/08	Diazinon	J .0023	0.1	BPA
Grand Island Drain near Leary Rd.	02/21/08	Diazinon	.0068	0.1	BPA
Logan Creek at 4 Mile-Excelsior Rd.	02/21/08	Diazinon	J .0022	0.1	BPA
Lower Snake R. at Nuestro Rd.	01/29/08	Diazinon	.025	0.1	BPA

Site	Date Sampled	Analyte	Result[1] (µg/L)	Water Quality Limits[2]	
Lower Snake R. at Nuestro Rd.	02/22/08	Diazinon	.0081	0.1	BPA
Sacramento Sl. Br. near Karnak	01/29/08	Diazinon	.021	0.1	BPA
Shag Sl. at Liberty Island Bridge	01/28/08	Diazinon	.0121	0.1	BPA
Shag Sl. at Liberty Island Bridge	02/21/08	Diazinon	.0108	0.1	BPA
Sweany Creek at Weber Rd.	12/19/07	Diazinon	.154	0.1	BPA
Ulatis Creek at Brown Rd.	12/19/07	Diazinon	.017	0.1	BPA
Ulatis Creek at Brown Rd.	01/28/08	Diazinon	.0098	0.1	BPA
Walker Creek at Co Rd. 48	01/28/08	Diazinon	.0132	0.1	BPA
Willow Sl. Bypass at Pole Line	01/28/08	Diazinon	.01	0.1	BPA
North Canyon Creek	12/21/07	Dimethoate	.025	NA	NA
Colusa Basin Drain above KL	01/29/08	Diuron	.4	NA	NA
Gilsizer Sl. at G. Washington Rd.	12/20/07	Diuron	.92	NA	NA
Grand Island Drain near Leary Rd.	01/28/08	Diuron	J .21	NA	NA
Grand Island Drain near Leary Rd.	01/28/08	Diuron	J .2	NA	NA
Grand Island Drain near Leary Rd.	02/21/08	Diuron	1.5	NA	NA
Laguna Creek at Alta Mesa Rd.	01/28/08	Diuron	J .36	NA	NA
Lower Snake R. at Nuestro Rd.	02/22/08	Diuron	.41	NA	NA
Shag Sl. at Liberty Island Bridge	01/28/08	Diuron	.69	NA	NA
Shag Sl. at Liberty Island Bridge	02/21/08	Diuron	J .22	NA	NA
Sweany Creek at Weber Rd.	12/19/07	Diuron	23	NA	NA
Ulatis Creek at Brown Rd.	12/19/07	Diuron	12	NA	NA
Ulatis Creek at Brown Rd.	01/28/08	Diuron	3.5	NA	NA
Ulatis Creek at Brown Rd.	02/21/08	Diuron	J .29	NA	NA
Walker Creek at Co Rd. 48	01/28/08	Diuron	.57	NA	NA
Willow Sl. Bypass at Pole Line	01/28/08	Diuron	3.7	NA	NA
Willow Sl. Bypass at Pole Line	02/21/08	Diuron	J .23	NA	NA
Willow Sl. Bypass at SP	12/19/07	Diuron	4.7	NA	NA
Gilsizer Sl. at G. Washington Rd.	12/20/07	Glyphosate	6.1	700	CA 1˚ MCL
Shag Sl. at Liberty Island Bridge	01/28/08	Glyphosate	J 4	700	CA 1˚ MCL
Ulatis Creek at Brown Rd.	12/19/07	Glyphosate	J 5	700	CA 1˚ MCL
Ulatis Creek at Brown Rd.	01/28/08	Glyphosate	J 5	700	CA 1˚ MCL
Walker Creek at Co Rd. 48	01/28/08	Glyphosate	J 5	700	CA 1˚ MCL
Ulatis Creek at Brown Rd.	12/19/07	Malathion	.01	.1	Basin Plan
Colusa Basin Drain above KL	01/29/08	Oryzalin	J .37	NA	NA
Gilsizer Sl. at G. Washington Rd.	12/20/07	Oryzalin	J .25	NA	NA
Sweany Creek at Weber Rd.	12/19/07	Oryzalin	2.8	NA	NA
Ulatis Creek at Brown Rd.	12/19/07	Oryzalin	2.5	NA	NA
Ulatis Creek at Brown Rd.	01/28/08	Oryzalin	.42	NA	NA
Walker Creek at Co Rd. 48	01/28/08	Oryzalin	.69	NA	NA
Gilsizer Sl. at G. Washington Rd.	12/20/07	Oxyfluorfen	.1026	NA	NA
Ulatis Creek at Brown Rd.	12/19/07	Pendimethalin	.2426	NA	NA
Ulatis Creek at Brown Rd.	12/19/07	Prometon	.049	NA	NA
Ulatis Creek at Brown Rd.	01/28/08	Prometon	J .006	NA	NA

Site	Date Sampled	Analyte	Result[1] (µg/L)	Water Quality Limits[2]	
Ulatis Creek at Brown Rd.	02/21/08	Prometon	J .005	NA	NA
Cache Creek at Capay Diversion Dam	02/22/08	Simazine	.011	4	CA 1˚ MCL
Colusa Basin Drain above KL	01/29/08	Simazine	.077	4	CA 1˚ MCL
Colusa Basin Drain above KL	03/12/08	Simazine	.045	4	CA 1˚ MCL
Coon Creek at Brewer Rd.	12/20/07	Simazine	.046	4	CA 1˚ MCL
Coon Creek at Brewer Rd.	01/29/08	Simazine	.029	4	CA 1˚ MCL
Coon Creek at Brewer Rd.	02/22/08	Simazine	.014	4	CA 1˚ MCL
Dry Creek at Alta Mesa Rd.	12/20/07	Simazine	.034	4	CA 1˚ MCL
Gilsizer Sl. at G. Washington Rd.	12/20/07	Simazine	.269	4	CA 1˚ MCL
Laguna Creek at Alta Mesa Rd.	01/28/08	Simazine	.075	4	CA 1˚ MCL
Laguna Creek at Alta Mesa Rd.	02/21/08	Simazine	.064	4	CA 1˚ MCL
Logan Creek at 4 Mile-Excelsior Rd.	12/20/07	Simazine	.071	4	CA 1˚ MCL
Logan Creek at 4 Mile-Excelsior Rd.	01/28/08	Simazine	.017	4	CA 1˚ MCL
Logan Creek at 4 Mile-Excelsior Rd.	02/21/08	Simazine	.012	4	CA 1˚ MCL
Lower Snake R. at Nuestro Rd.	12/20/07	Simazine	.072	4	CA 1˚ MCL
Lower Snake R. at Nuestro Rd.	01/29/08	Simazine	.134	4	CA 1˚ MCL
Lower Snake R. at Nuestro Rd.	02/22/08	Simazine	.012	4	CA 1˚ MCL
Lurline Creek at 99W	01/28/08	Simazine	.039	4	CA 1˚ MCL
Lurline Creek at 99W	02/21/08	Simazine	J .005	4	CA 1˚ MCL
Sacramento Sl. Br. near Karnak	01/29/08	Simazine	.048	4	CA 1˚ MCL
Sacramento Sl. Br. near Karnak	03/12/08	Simazine	.015	4	CA 1˚ MCL
Shag Sl. at Liberty Island Bridge	12/19/07	Simazine	.038	4	CA 1˚ MCL
Shag Sl. at Liberty Island Bridge	01/28/08	Simazine	.033	4	CA 1˚ MCL
Shag Sl. at Liberty Island Bridge	02/21/08	Simazine	.025	4	CA 1˚ MCL
Sweany Creek at Weber Rd.	12/19/07	Simazine	11.922	4	CA 1˚ MCL
Ulatis Creek at Brown Rd.	12/19/07	Simazine	8.608	4	CA 1˚ MCL
Ulatis Creek at Brown Rd.	01/28/08	Simazine	.29	4	CA 1˚ MCL
Ulatis Creek at Brown Rd.	02/21/08	Simazine	.039	4	CA 1˚ MCL
Walker Creek at Co Rd. 48	01/28/08	Simazine	.078	4	CA 1˚ MCL
Walker Creek at Co Rd. 48	02/21/08	Simazine	.014	4	CA 1˚ MCL
Walker Creek at Co Rd. 48	02/21/08	Simazine	.016	4	CA 1˚ MCL
Willow Sl. Bypass at Pole Line	01/28/08	Simazine	J .005	4	CA 1˚ MCL
Willow Sl. Bypass at Pole Line	02/21/08	Simazine	J .008	4	CA 1˚ MCL
Willow Sl. Bypass at SP	12/19/07	Simazine	.013	4	CA 1˚ MCL
Ulatis Creek at Brown Rd.	12/19/07	Tebuthiuron	J .2	NA	NA
Walker Creek at Co Rd. 48	01/28/08	Tebuthiuron	J .21	NA	NA
Lower Snake R. at Nuestro Rd.	12/20/07	Thiobencarb	.0931	1	CA 2˚ MCL

1. "J" indicates pesticide was detected below the quantitation limit (QL)
2. Water Quality Objective Basis: BP = Central Valley Basin Plan; BPA = BPA; CTR = California Toxics Rule; "CA 1˚ MCL" indicates a California Primary Maximum Contaminant Limit for drinking water (adopted by reference in the Basin Plan); "NA" indicates no applicable objective available.

Other Coalition-Monitored Water Quality Parameters

Exceedances of adopted Basin Plan objectives and advisory limits were observed for boron, conductivity, dissolved oxygen, *E. coli*, nitrate as N, pH, selenium, and total dissolved solids (**Table 20**).

Dissolved Oxygen

During the 2008 Storm Season, dissolved oxygen was measured in 62 samples from 35 Coalition sites. In these samples, dissolved oxygen concentrations were below the Basin Plan lower limit of 5.0 mg/L for waterbodies with a WARM designated beneficial in one sample collected from Capell Creek. Low flow and extensive aquatic vegetation (duckweed and water primrose) in and adjacent to the channel were determined to be the likely causes of this exceedance.

pH

During the 2008 Storm Season, pH was measured in 62 samples from 35 Coalition sites. In these samples, pH exceeded the Basin Plan maximum of 8.5 Standard Units (-log[H+]) in three Coalition samples collected from three different sites (Pine Creek at Nord Gianella Road; Laguna Creek at Alta Mesa Road; and Coon Creek at Brewer Road).

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.

In general, the reason for these pH exceedances was not immediately obvious or easily determined. The Pine Creek exceedance may have been influenced by instream respiration processes of vegetation present in the channel margins. The exceedances observed at Laguna Creek and Coon Creek were not likely to have been caused by instream algae respiration. Because there was no significant agricultural activity occurring in these drainages during this period, there was no apparent likely agricultural source of the exceedances. The elevated pH at both of these sites was approximately 1 pH unit above the relatively high average pH observed at these sites (approximately 7.6 and 8.0, respectively for Laguna Creek and Coon Creek), and the pH measured in February, 2008 may not be unusual or extreme values for these water bodies.

E. coli *bacteria*

E. coli bacteria were monitored in 62 samples from 35 sites. Coliform bacteria numbers exceeded the single sample maximum objectives for *E. coli* (235 MPN/100mL) in 20 samples from 16 different Coalition locations. The Basin Plan objectives are intended to protect contact recreational uses where ingestion of water is probable (e.g., swimming). Agricultural lands commonly support a large variety (and sometimes very large numbers) of birds and other wildlife. These avian and wildlife resources are expected to be significant sources of *E. coli* and other bacteria in agricultural runoff and irrigation return flows. Other sources include cattle, horses, and septic systems.

Conductivity and Total Dissolved Solids

Conductivity was monitored in 62 samples from 35 Coalition sites. Conductivity exceeded the California recommended 2˚ MCL (900 uS/cm) for drinking water in six samples and the unadopted UN Agricultural Goal (700 uS/cm) in a total of 11 samples collected from seven different sites (Cache Creek, Freshwater Creek, Grand Island Drain, Logan Creek, Lurline Creek, Ulatis Creek, and Willow Slough Bypass). Total dissolved solids (TDS) were monitored in 62 samples from 35 Coalition sites. TDS exceeded the California recommended 2˚ MCL (500 mg/L) for drinking water in seven samples collected from five sites, five of which also exceeded the conductivity objective (Colusa Drain, Freshwater Creek, Grand Island Drain, Ulatis Creek, and Willow Slough Bypass). The conductivity and TDS objectives are intended to apply to treated drinking water and are based on aesthetic acceptance by consumers of the water.

Trace Metals

Total and dissolved trace metals required for *ILRP* monitoring included arsenic, boron, cadmium, copper, lead, nickel, selenium, and zinc. Trace metals were monitored in 102 samples collected from 20 Coalition sites. Selenium exceeded the Basin Plan objective of 5 ug/L in one sample from Willow Slough Bypass. Total boron exceeded the unadopted UN Agricultural Supply Goal (700 ug/L) in three samples from Cache Creek at Capay Diversion Dam and two samples from Willow Slough Bypass (all in the Solano/Yolo subwatershed). Boron is naturally high in the soil and groundwater in this drainage. Boron exceedances are being evaluated and addressed by a regional management plan for Yolo County. There were no exceedances of objectives for arsenic, cadmium, copper, lead, nickel, or zinc.

Nutrients

Nutrients monitored during the 2008 Storm Season included nitrate, nitrite, total Kjeldahl nitrogen (TKN), ammonia, total phosphorus, and dissolved orthophosphate. Nutrients were monitored in 56 samples at 25 different Coalition sites. One exceedance of the California 1˚ MCL of 10 ug/L was observed for nitrate as N at Grand Island Drain at Leary Road . Ammonia concentrations were typically below detection and did not exceed the temperature- and pH-dependent national water quality criterion for this parameter in any sample. There are no water quality objectives (adopted or unadopted) for TKN, total phosphorus, or orthophosphate.

Table 20. Other Physical, Chemical, and Microbiological Parameters Observed to Exceed Numeric Objectives in Coalition Monitoring, 2008 Storm Season

Site ID	Sample Date	Analyte	Units	Result	WQO[1]	WQO Basis[2]	Mgt Plan[3]
COLDR	01/29/08	Aldrin	ug/L	J .0029	.00013	CTR	(6)
WLSBP	12/19/07	Boron, Total	ug/L	2300	700	A&W	YES
CCCPY	12/20/07	Boron, Total	ug/L	2300	700	A&W	YES
CCCPY	01/29/08	Boron, Total	ug/L	980	700	A&W	YES
WLSPL	02/21/08	Boron, Total	ug/L	2200	700	A&W	YES
CCCPY	02/22/08	Boron, Total	ug/L	1800	700	A&W	YES
WLSBP	12/19/07	Conductivity	uS/cm	1136	700	A&W	YES
CCCPY	12/20/07	Conductivity	uS/cm	793	700	A&W	YES
LRLNC	12/20/07	Conductivity	uS/cm	791	700	A&W	(6)
GIDLR	01/28/08	Conductivity	uS/cm	1187	700	A&W	YES
FRSHC	02/21/08	Conductivity	uS/cm	968	700	A&W	(6)
GIDLR	02/21/08	Conductivity	uS/cm	902	700	A&W	YES
LGNCR	02/21/08	Conductivity	uS/cm	751	700	A&W	(6)
LRLNC	02/21/08	Conductivity	uS/cm	841	700	A&W	(6)
UCBRD	02/21/08	Conductivity	uS/cm	1028	700	A&W	YES
WLSPL	02/21/08	Conductivity	uS/cm	957	700	A&W	YES
CCCPY	02/22/08	Conductivity	uS/cm	812	700	A&W	YES
COONH	02/22/08	DDE(p,p')	ug/L	J .0046	.00059	CTR[(4)]	(6)
GIDLR	02/21/08	DDE(p,p')	ug/L	J .0032	.00059	CTR[(4)]	(6)
COLDR	01/29/08	DDT(p,p')	ug/L	J .0037	.00059	CTR[(4)]	(6)
COONH	01/29/08	DDT(p,p')	ug/L	J .0014	.00059	CTR[(4)]	(6)
GIDLR	01/28/08	DDT(p,p')	ug/L	.0105	.00059	CTR[(4)]	(6)
SSKNK	01/29/08	DDT(p,p')	ug/L	J .0048	.00059	CTR[(4)]	(6)
UCBRD	01/28/08	DDT(p,p')	ug/L	J .0033	.00059	CTR[(4)]	(6)
WLKRC	01/28/08	DDT(p,p')	ug/L	J .0022	.00059	CTR[(4)]	(6)
SWNWR	12/19/07	Diazinon	ug/L	.154	0.1	BPA	YES
CCULB	01/02/08	Dissolved Oxygen	mg/L	3.49	7	BP	(6)
PNCGR	12/19/07	E. Coli	MPN/100mL	> 2400[(5)]	235	BPA	YES
UCBRD	12/19/07	E. Coli	MPN/100mL	> 2400[(5)]	235	BPA	YES
CCBRW	12/20/07	E. Coli	MPN/100mL	820	235	BPA	YES
DCGLT	12/20/07	E. Coli	MPN/100mL	520	235	BPA	YES
GILSL	12/20/07	E. Coli	MPN/100mL	> 2400[(5)]	235	BPA	YES
LSNKR	12/20/07	E. Coli	MPN/100mL	580	235	BPA	YES
NRTCN	12/21/07	E. Coli	MPN/100mL	290	235	BPA	YES
COYTR	01/28/08	E. Coli	MPN/100mL	290	235	BPA	(6)
LAGAM	01/28/08	E. Coli	MPN/100mL	> 2400[(5)]	235	BPA	YES
LRLNC	01/28/08	E. Coli	MPN/100mL	330	235	BPA	YES
SSLIB	01/28/08	E. Coli	MPN/100mL	340	235	BPA	(6)
UCBRD	01/28/08	E. Coli	MPN/100mL	1400	235	BPA	YES
WLKRC	01/28/08	E. Coli	MPN/100mL	1000	235	BPA	(6)

Site ID	Sample Date	Analyte	Units	Result	WQO[1]	WQO Basis[2]	Mgt Plan[3]
WLSPL	01/28/08	E. Coli	MPN/100mL	550	235	BPA	(6)
COLDR	01/29/08	E. Coli	MPN/100mL	300	235	BPA	(6)
SSKNK	01/29/08	E. Coli	MPN/100mL	520	235	BPA	(6)
GIDLR	02/21/08	E. Coli	MPN/100mL	1300	235	BPA	(6)
LRLNC	02/21/08	E. Coli	MPN/100mL	250	235	BPA	(6)
CCBRW	02/22/08	E. Coli	MPN/100mL	> 2400[(5)]	235	BPA	YES
LSNKR	02/22/08	E. Coli	MPN/100mL	260	235	BPA	YES
GIDLR	01/28/08	Nitrate as N	mg/L	12	10	CA 1˚ MCL	NO
PNCGR	12/19/07	pH	-log[H+]	8.6	6.5-8.5	BP	(6)
LAGAM	02/21/08	pH	-log[H+]	8.74	6.5-8.5	BP	(6)
CCBRW	02/22/08	pH	-log[H+]	8.87	6.5-8.5	BP	(6)
WLSBP	12/19/07	Selenium	ug/L	11	5	CTR	(6)
SWNWR	12/19/07	Simazine	ug/L	11.922	4	CA 1˚ MCL	NO
UCBRD	12/19/07	Simazine	ug/L	8.608	4	CA 1˚ MCL	NO
WLSBP	12/19/07	TDS	mg/L	750	500	BPN	YES
GIDLR	01/28/08	TDS	mg/L	940	500	BPN	YES
FRSHC	02/21/08	TDS	mg/L	550	500	BPN	(6)
GIDLR	02/21/08	TDS	mg/L	640	500	BPN	(6)
UCBRD	02/21/08	TDS	mg/L	590	500	BPN	YES
WLSPL	02/21/08	TDS	mg/L	580	500	BPN	YES
COLDR	03/12/08	TDS	mg/L	580	500	BPN	(6)

Notes:

NA = Not applicable

1. Water Quality Objective or Narrative Interpretation Limit
2. WQO Basis: Sources of Adopted Objectives: BP = Central Valley Basin Plan; CTR = California Toxics Rule; Sources of unadopted limits used to interpret Basin Plan narrative objectives: BPA = BPA (unapproved); A&W = UN Agricultural Supply Goal (Ayers and Westcott, 1986); BPN = other narrative interpretation limits, including recommended 2° MCLs and advisory limits;
3. Indicates whether sites and parameter are currently being addressed by an ongoing management plan, study, or TMDL.
4. Chlorinated pesticides are regulated under a narrative provision of the Basin Plan, which states that "…chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the Environmental Protection Agency or the Executive Officer." The required accuracy limits approved specifically for the ILRP MRP are 0.02 ug/l for DDD, and 0.01 ug/L for DDE and DDT. Concentrations did not exceed these MRP limits, with the exception of DDE at GIDLR.
5. The measured E. coli concentration exceeded the dilution range of the analysis.
6. Management plan under development.

Management Practices and Actions Taken

RESPONSE TO EXCEEDANCES

To address specific water quality exceedances, the Coalition and its partners have developed two management plans, the *Diazinon Runoff Management Plan for Orchard Growers in the Sacramento Valley* and the *Yolo Technical Report*. The Coalition has also developed a *Landowner Outreach and Management Practices Implementation Communications Process for Monitoring Results (Management Practices Process)* to address exceedances that were not included as part of either of these management plans. In addition to the Management Practices Process and as part of the MRPP, the Coalition is developing a Coalition Management Plan to address exceedances not included in the *Diazinon Runoff Management Plan for Orchard Growers in the Sacramento Valley* or the *Yolo Technical Report*. The Coalition's Management Plan will be available for Regional Board review by July 25, 2008.

Diazinon Runoff Management Plan

The Coalition submitted the *Diazinon Runoff Management Plan for Orchard Growers in the Sacramento Valley* (Plan) to the Water Board on August 31, 2005, and it was subsequently approved in March 2006. The Plan was developed in response to the Sacramento and Feather Rivers Total Maximum Daily Load (TMDL) for diazinon and as part of the Coalition's commitment to address water quality issues caused by agriculture and managed wetlands in the watershed. The Coalition has submitted three Annual Monitoring Reports summarizing the 2005-2006, 2006-2007 and 2007-2008 monitoring objectives, locations and results, outreach efforts, grower surveys, and effectiveness of management practices.

The following conclusions can be made based on the results of the three years of TMDL compliance monitoring and management completed to date.

Two of the thirty-five samples collected at the 5 compliance monitoring locations in 2008 exceeded adopted concentration-based TMDL objectives for diazinon and load-based objectives for diazinon and chlorpyrifos, as well as the USEPA national criterion (exceedances occurred at Colusa Basin Drain on February 21 and 22, 2008). The average diazinon concentration for samples collected February 21-24 at Colusa Basin Drain (1.29 ug/L) also exceeded the adopted TMDL 4-day average Basin Plan objective for diazinon (0.1 µg/L), as well as the Load Allocation for the sum of diazinon and chlorpyrifos.

Although exceedances were observed in 2008, 93 of the 95 samples collected from 2006 through 2008 and all of the 21 concentrations estimated at the Sacramento River at Verona were in compliance with the TMDL objectives. The overall results indicate that the combination of changes in diazinon use patterns, changes in management practices and modifications to labeling have been successful in reducing instream ambient diazinon and chlorpyrifos concentrations and loads below the historically observed levels that resulted in listing these waters as impaired.

Yolo Technical Report

The *Yolo Technical Report* was developed in December 2005 and revised in June 2006 and March 2007 to address boron, specific conductivity (EC), dissolved oxygen, algal toxicity, and *E. coli*.

The Coalition and the Yolo-Solano Subwatershed are implementing a work plan to identify appropriate numeric criteria for boron and EC. In August 2006, the Coalition submitted a report to the Regional Board titled *Boron, Salinity, Nutrients, and Dissolved Oxygen in the Irrigation Water within the Yolo County Flood Control and Water Conservation District*. In the Yolo County area, there is a significant amount of information available that identifies the most likely sources for high levels of salinity and boron. The farmers and resource managers in Yolo County have been successfully dealing with these issues for many decades. There is also significant information that explains dissolved oxygen exceedances. Specifically, the report shows that the quality of Clear Lake water, including concentrations of nutrients and dissolved oxygen, may impact downstream water users in Yolo County. Additionally, the report cites over 75 years of data showing elevated boron levels in groundwater above the interpreted narrative water quality objectives.

To further understand factors potentially affecting algal toxicity, the Coalition reviewed pesticides being used in both Solano and Yolo Counties that are not currently being monitored under the ILRP but could potentially be contributing to algal toxicity observed in this subwatershed (*Algal Toxicity in Yolo County*, November 2006). This evaluation identified six unmonitored herbicides that were widely applied in Yolo County: oxyfluorfen, MCPA, 2,4-D, metolachlor, imazomox, and bromoxynil. These herbicides are not specifically required to be monitored by the current ILRP MRP. Based solely on their widespread use, these unmonitored herbicides appear to have a relatively high potential to contribute to algal toxicity. However, the specific physical and toxicological characteristics of these six unmonitored herbicides indicate that they are unlikely to cause algal toxicity when standard application practices are followed. The low frequency of observed algal toxicity generally indicates that even the most widely applied herbicides have a low risk of causing algal toxicity. Although these herbicides are widely used in Yolo County, the toxicity results indicate that current application and management practices are generally effective in preventing these herbicides from getting into surface waters in concentrations that are toxic to algae.

Management Plans Under Development

The Coalition is developing a Coalition Management Plan to address exceedances not included in the *Diazinon Runoff Management Plan for Orchard Growers in the Sacramento Valley* or the *Yolo Technical Report*. Based on exceedances to date, the draft Management Plan will include exceedances for: dissolved oxygen, *E. coli*, pH, water column and sediment toxicity, chlorpyrifos, DDT and other legacy pesticides, and electrical conductivity.

Management Practices Process

To address water quality exceedances not specifically identified in existing management plans or studies, the Coalition and its partners developed the *Management Practices Process*. On May 10, 2005, the Coalition sent a letter to the Chair of the State Water Resources Control Board (State Water Board) outlining a *Management Practices Action Plan* for the Sacramento Valley. On November 14, 2006, building on both the *Management Practices Action Plan* and the *Regional Plan for Action*, the Coalition submitted a detailed plan, the *Management Practices Process* (provided in previous reports). This plan describes an aggressive approach for the Coalition and its subwatersheds to follow when there are exceedances of the water quality objectives formally adopted by the Regional Board. This approach is discussed further within the "Landowner Outreach Efforts" section.

LANDOWNER OUTREACH EFFORTS

The Coalition and its subwatersheds, working with the Coalition for Urban/Rural Environmental Stewardship (CURES), stand committed to working with the Regional Water Board and its staff to implement the *Management Practices Process* to address water quality problems identified in the Sacramento Valley. The strategic approach taken by the Coalition is to notify 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 targeted at 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 modifying the uses of specific farm and wetland inputs to prevent movement of a constituent 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, which the Coalition describes as operating in high priority lands, the Coalition starts with a topographic map and overlays a parcel map to identify the assessor parcel numbers and, subsequently, the owner. 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. In targeted areas, management practice surveys are and will continue to be distributed. In 2007 and 2008, subwatersheds with known pesticide exceedances and/or toxicity to *Ceriodaphnia*, *Selenastrum*, or *Hyallela* were targeted for outreach to growers. The information distributed to growers in the targeted subwatersheds in 2008 is summarized in Table 21.

General Outreach Efforts

Highlights of the additional outreach efforts conducted by the Coalition and its partners for specific subwatersheds between December 1, 2007 and June 25, 2008 are also included in Table 21.

Table 21. Summary of Landowner Outreach Efforts, December 2007 – March 2008

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance/on Distribution List	Document Enclosed
SVWQC	2/5/2008	SVWQC Newsletter	Regional Water Board press release, pyrethroid study, management plans, new guidelines, 2007 monitoring season results	Watershed Wide	280+	Newsletter
SVWQC	2/28/2008	SVWQC Meeting and Subwatershed Coordinator Training	Presentation/Updates	Westside Water District- Williams, CA	32+	Agenda
SVWQC	5/1/2008	SVWQC Newsletter	ILRP modifications, diazinon, long-term ILRP, mercury TMDL	Watershed Wide	280+	Newsletter
SVWQC	6/12/2008	SVWQC Meeting	Presentation/Updates	Yuba City, CA	35	Agenda
BYS	5/1/2008	CURES	BMP Handbooks	Butte/Yuba/Sutter County	1,400 orchard growers	Online
BYS	1/15/2008	BYSWQC, CURES, Yuba-Sutter FB, Sutter Co. Ag. Dept., UCCE	Options for alternative treatments and alternative spray timing. Dormant season spray regulations and container recycling. Smart Sprayer Technology™ vs. standard sprayer: field trial results and economic analysis. Water quality exceedances, the initiation of management plans for certain water quality parameters, BMPs applicable for reducing agricultural inputs to waterways. Sprayer calibration demo. Q&A about Irrigated Lands Program with Steve Thompson, Senior Field Representative for Assemblyman Rick Keene.	Sutter County Agricultural Department	40	Agenda
Colusa-Glenn	Monthly	Glenn County Farm Bureau	Program elements, monitoring results/exceedances, Q&A	Glenn County Farm Bureau, City of Orland	20 - 30 each month	Verbal reports only
Colusa-Glenn	Monthly	Glenn County Resource Conservation District	Program elements, monitoring results/exceedances, Q&A	Willows USDA Service Center, City of Willows	10 - 20 each month	Verbal reports mainly, agenda attached when appropriate
Colusa-Glenn	12/19/2007	Colusa Glenn Subwatershed Program	Annual Meeting Information	Willows City Council Chambers, City of Willows	16	Agenda & Draft Minutes
Colusa-Glenn	1/16/2008	Colusa Glenn Subwatershed Program	Chlorpyrifos exceedances, management plan, BMPs	Monday Afternoon Club, City of Willows	30	Exceedance notice

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance/on Distribution List	Document Enclosed
Colusa-Glenn	2/29/2008	Colusa, Glenn, and Butte County Community Members	Notice of public workshops and CEQA scoping meetings	Chico Enterprise Record, Tri Counties Newspaper, Sacramento Valley Mirror	Colusa, Glenn and Butte Counties	Press Release
Colusa-Glenn	3/29/2008	Glenn County Community Members	Program information	Best of the West, Glenn County Fairgrounds in City of Orland	1,500	N/A
Colusa-Glenn	5/21/2008	Colusa Glenn Subwatershed Program	Use of Chlorpyrifos, follow-up from 1/16/2008 workshop		135	Letter
Colusa-Glenn	5/21/2008	Murdock Elementary School (4th Grade), Teachers, & Volunteer Adults	Watersheds, they are important! Water quality demonstration	Mudd Ranch	120	N/A
Colusa-Glenn	6/5/2008	Colusa, Glenn, and Butte County Community Members	Deadline to join a coalition	Chico Enterprise Record, Tri Counties Newspaper, Sacramento Valley Mirror	Colusa, Glenn and Butte Counties	Press Release
Colusa-Glenn	6/6/2008	Natural Resources Conservation Service (NRCS)	Upper Stony Creek Watershed - Support for Rapid Watershed Assessment Project	State NRCS Office	1	Letter of Support
Colusa-Glenn	6/25/2008	Colusa Glenn Subwatershed Program	Summary of exceedance and communication reports, SVWQC meetings, education and outreach update, etc.	Willows USDA Service Center, City of Willows		Agenda
El Dorado	1/8/2008	EDCAWG	Mailing	Placerville	366	Letter & Schedule
El Dorado	1/10/2008	EDCAWG/GAG	Meeting	Placerville	12	Minutes
El Dorado	1/14/2008	EDCAWG	Meeting	Placerville	32	Minutes
El Dorado	1/14/2008	EDCAWG/TAC	Meeting	Placerville	6	Minutes
El Dorado	1/24/2008	SVWQC	Growers Assessed Penalties	Coalition-wide	21	News Release
El Dorado	1/31/2008	EDCAWG	Mailing	Placerville	351	Letter & List
El Dorado	2/1/2008	NCWA	Grower Penalties	Coalition-wide	Unknown	Newsletter
El Dorado	2/12/2008	EDCAWG/TAC	Meeting	Placerville	8	Minutes

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance/on Distribution List	Document Enclosed
El Dorado	2/14/2008	EDCAWG/GAG	Meeting	Placerville	21	Minutes
El Dorado	2/21/2008	EDC Agriculture Council	Watershed Group update	Placerville	10	Minutes
El Dorado	Winter/Spring 2008	UCCE	Temperature. effect on runoff in irrigation	Throughout membership	Unknown	Newsletter
El Dorado	2/27/2008	UCCE	Winter Tree Fruit Meeting	Camino	20	Agenda& Handouts
El Dorado	2/28/2008	SVWQC	Subwatershed Training	Williams	15	N/A
El Dorado	2/28/2008	EDCAWG/GAG	Meeting	Placerville	12	Minutes
El Dorado	3/7/2008	EDCAWG	Coon Hollow MP	Placerville/ Camino	15	Mailing
El Dorado	3/13/2008	EDCAWG/GAG	Fee Structure	Placerville	345	Mailing
El Dorado	3/13/2008	EDCAWG/GAG	Meeting	Placerville	15	Minutes
El Dorado	Winter 2008	Farm Bureau	Ag Waiver Program update	County	Unknown	Ag Advocate
El Dorado	3/31/2008	SVWQC	Reg. Board Scoping Mtg.	Conference Call	10	N/A
El Dorado	4/4/2008	NCWA	Week In Review	Coalition-wide	N/A	Newsletter
El Dorado	4/7/2008	SVWQC/GAG	Meeting	Placerville	10	Minutes
El Dorado	4/7/2008	EDCAWG/TAC	Meeting	Placerville	7	Minutes
El Dorado	4/9/2008	Capital Press	Watershed groups face more costs	Coalition-wide	N/A	News Article
El Dorado	4/1/2008	Family Farm Alliance	Water Review	Coalition-wide	N/A	Newsletter
El Dorado	4/10/2008	EDCAWG/GAG	Meeting	Placerville	12	Minutes
El Dorado	4/21/2008	EDCAWG	Meeting	Placerville	40	Minutes
El Dorado	4/24/2008	UCCE	Pest Control Notes	El Dorado County	N/A	Newsletter
El Dorado	4/25-27/2008	RCD, NRCS	Home & Garden Show Booth	Placerville	5000	N/A
El Dorado	5/1/2008	SVWQC	Week In Review	Coalition-wide	N/A	Newsletter
El Dorado	5/8/2008	EDCAWG/GAG	Meeting	Placerville	13	Minutes
El Dorado	5/8/2008	Farm Bureau/RCD	Ag in the Classroom	Placerville	500	N/A
El Dorado	6/10/2008	SVWQC/CVRWQCB/RCD/ EDCAWG	Coon Hollow Mgmt. Plan	Rancho Cordova		Meeting
El Dorado	6/12/2008	SVWQC/EDCAWG	Subwatershed meeting			Meeting
El Dorado	6/12/2008	EDCAWG/GAG	Meeting	Placerville		Minutes

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance/on Distribution List	Document Enclosed
Napa	1/22/2008	Napa County Putah Creek Watershed Group	Annual General Membership meeting; Presentation & discussion of BMPs, review of water quality testing results	Pope Valley Farm Center, Pope Valley, CA	27	Copy of agenda
Napa	Approximately two (2) per month from 12/2007 to 5/2008	Napa County Putah Creek Watershed Group	Various emails to Steering Committee regarding ongoing program development	Distributed via email	14	N/A
Napa		Napa County Putah Creek Watershed Group	Various emails to new members about application & approval process			N/A
Pit River	12/10/2008	Northeastern California Water Association (NECWA)	NECWA Board Meeting	McArthur, CA	8	Board Meeting Agenda
Pit River	1/29/2008	Northeastern California Water Association (NECWA)	NECWA Board Meeting	McArthur, CA	10	Board Meeting Agenda
Pit River	2/13/2008	Northeastern California Water Association (NECWA)	Spoke with Ranch manager about possible new membership for new land / ranch owner. Left him with information (Application for approval by Regional Boards to join coalition) on joining the coalition.	Bieber, CA	2	N/A
Pit River	2/20/2008	Northeastern California Water Association (NECWA)	Sent invitations to the local newspapers to attend our Annual Meeting		5 local newspapers	Annual Meeting Invitation
Pit River	2/22/2008	Northeastern California Water Association (NECWA)	Attended NCWA Annual Meeting	Yuba City, CA		N/A
Pit River	2/26/2008	Northeastern California Water Association (NECWA)	NECWA Board Meeting	McArthur, CA	13	Board Meeting Agenda
Pit River	2/28/2008	Northeastern California Water Association (NECWA)	Gave Margie Read & Joe Karkowski invitations to our Annual Meeting			Annual Meeting Invitation
Pit River	2/29/2008	Northeastern California Water Association (NECWA)	Attended meeting to promote involvement with Pit River Water Quality Alliance conducting research on water quality on the Pit River.	Canby, CA	20	N/A
Pit River	3/10/2008	Northeastern California Water Association (NECWA)	Gave Margie Read tour of the Upper Pit River Watershed	Pit River Watershed area	4	N/A

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance/on Distribution List	Document Enclosed
Pit River	3/11/2008	Northeastern California Water Association (NECWA)	NECWA Annual Meeting-(Agenda attached)	Bieber, CA	80	Annual Meeting Invitation
Pit River	3/31/2008	Northeastern California Water Association (NECWA)	Conference Call- NCWA			N/A
Pit River	4/7/2008	Northeastern California Water Association (NECWA)	NECWA Board Meeting	McArthur, CA	13	Agenda for Meeting
Pit River	4/16/2008	Northeastern California Water Association (NECWA)	Attended meeting with Joe Karkowski, Dennis Heiman and the coalitions groups - Goose Lake, Upper Feather River and NECWA to discuss the ILRP	Quincy, CA	15	N/A
PNSSNS	10/1/07-12/31/07	Placer-Nevada- So. Sutter-No. Sacramento Subwatershed Group	Membership mailing contained Winter newsletter. Topics included toxicity test details and recent exceedance findings.	Distributed by mail	800	Newsletter
PNSSNS	2/6/08 and 2/7/08	Placer-Nevada- So. Sutter-No. Sacramento Subwatershed Group	Annual meeting held in Feb. Discussions included update on exceedances, Reg. Water. Bd. plans for rounding up folks who should have discharge waivers but are not members yet. Handouts included BMPs .	Placer County and Nevada County	75	Agenda enclosed.
PNSSNS	3/17/2008	Placer-Nevada- So. Sutter-No. Sacramento Subwatershed Group	Special board meeting to further clarify recent Reg. Water Bd. plans to reduce testing requirements.	Western Placer Waste Mgmt Authority	10	Minutes
Shasta-Tehama	5/21/2008	Shasta-Tehama Watershed Education Coalition	Events over the past year, actions being taken by SWRCB, non-profit status for organization.	Distributed by mail	15	Newsletter
Solano-Yolo	12/1/2008	Yolo County Farm Bureau Education Corporation	Newsletter	Distributed by mail	1,700	Newsletter
Solano-Yolo	3/1/2008	Yolo County Farm Bureau Education Corporation	Newsletter	Distributed by mail	1,700	Newsletter
Solano-Yolo	5/22/2008	Dixon-Solano Water Quality Coalition	An annual newsletter was sent to all current members.	Distributed by mail	668	Newsletter
Solano-Yolo	5/23/2008	Dixon-Solano Water Quality Coalition	An article announcing the opportunity for BMP (sediment traps) cost-share through Solano RCD was included in the Solano RCD Lay of the Land summer 2008 newsletter and was summarized in the Solano Irrigation District's quarterly newsletter.	Distributed by mail	900 total	Article

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance/on Distribution List	Document Enclosed
Solano-Yolo	6/1/2008	Yolo County Farm Bureau Education Corporation	Newsletter	Distributed by mail	1,700	Newsletter
UFRW	1/3/2008	Upper Feather River Watershed Group & Goose Lake Coalition	Upper Watershed MRPs	Davis Creek	5 UFRWG reps 4 Goose Lake Coalition reps	N/A
UFRW	1/22/2008	UFRW Group & UCCE	ILRP and UFRW Monitoring program	Loyalton	2 UFRWG rep, 2 UCCE Prop 50, Sierra County Supes and public	N/A
UFRW	2/1/2008	UCCE	Newsletter	UFRW		Newsletter
UFRW	2/4/2008	Water Conference	Incentives for WQ Projects, *E. coli* Research	Sparks Nv	1 UFRWG rep 1 UCCE Prop 50 Team Leader	N/A
UFRW	2/26/2008	Upper Feather River Watershed Group & UCCE	Pathogen-*E. coli* Study, 2007 Sierra Valley Forage Study, Herd Health & *E. coli*	Quincy	35	N/A
UFRW	3/11/2008	Upper Feather River Watershed Group & NECWA	NECWA Annual Meeting	Bieber	2 UFRWG reps, RB staff, and NECWA membership	N/A
UFRW	3/20/2008	Plumas- Sierra Cattlemens Assoc	ILRP program & UFRW local monitoring and WQ project implementation CCA and Ca Rangelands Program	Cromberg	35	N/A
UFRW	4/9/2008-4/10/2008	UCCE Prop 50 Team	Ranch Planning Workshops	Quincy	7 to 10	UFRW Irrig Land Survey
UFRW	4/15/2008	Upper Feather River Watershed Group Board	WQ Project Implementation, Membership Outreach Planning	Portola	5	N/A
UFRW	4/16/2008	Upper Feather River Watershed Group, NECWA, Goose Lake, RB staff, SWRCB staff	Upper Watershed MRPs	Quincy	12	N/A
UFRW	4/22/2008	Upper Feather River Watershed Group	Membership Meeting	Blairsden	15	Agenda, Misc Handouts
UFRW	4/29/2008	Upper Feather River Watershed Group & UCCE Prop 50 Team	ILRP and County Partnerships	Quincy	2 UFRWG reps, 2 UCCE Prop 50 Team, Plumas, Sierra, Modoc & Lassen BOS	N/A

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance/on Distribution List	Document Enclosed
UFRW	6/4/2008	RCD Meeting	ILRP Water Quality Project Implementation, Weeds Project, Ag Workshop	Portola	8	N/A
UFRW	6/9/2008	Upper Feather River Watershed Group & Prop 50 Monitoring Team	Staff Meeting- 2008 Monitoring and Special DO/pH study, UFRWG outreach, WQ Ranch Field Days	Quincy	5	N/A

Conclusions and Recommendations

The Coalition submits this 2008 Storm Season Semi-Annual Monitoring Report under the Water Board's Irrigated Lands Regulatory Program (*ILRP*). The 2008 Storm Season SAMR 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 storm season monitoring in 2008 continue to indicate that there are not major water quality problems with agricultural and managed wetlands discharges in the Sacramento River Basin. Statistically significant toxicity was observed in 11 of the 139 water column toxicity tests performed on 55 samples in the 2008 Storm Season. Nine of these results were considered exceedances of the Basin Plan narrative objective (6.5%), with the remaining two cases being the result of test interferences. For the sites with observed toxicity, the Coalition and its subwatersheds took the appropriate actions to address these issues. By its nature, the SAMR focuses in detail on the small number of sites and samples that exhibited toxicity and exceedances of conventional and microbiological parameters, as well as the actions taken and planned by the Coalition and its members to address these issues.

This SAMR characterizes potential water quality impacts of agricultural drainage from a broad geographic area in the Sacramento Valley from December 2007 through March 2008. Through March 2008, a total of 9 Coalition storm season sampling events and 18 irrigation season events have been completed, with additional events collected by coordinating programs. For the period of record in this Semi-Annual Report (December 2007 – March 2008), samples were collected during 3 storm season events, and at a total of 35 different locations.

From December 2007 through March 2008, 139 water column toxicity tests were conducted with three aquatic species on 55 samples from 23 different sites. There were 10 statistically significant water column toxicity exceedances with reductions greater than 20% compared to control in Coalition Irrigation Season samples (4 *Ceriodaphnia* tests, 2 *Pimephales* tests, and 4 *Selenastrum* tests). The results of the two *Pimephales* tests (fathead minnows) were affected by pathogen-related mortality (a test interference) and were not considered exceedances. In total, 5.8% of all tests and 15% of water samples exhibited a statistically significant reduction in invertebrate or fish survival or algae cell density of greater than 20% compared to the control.

Chemical results were evaluated for all of the cases of observed toxicity. In four cases, concentrations of the herbicide diuron caused or contributed to the toxicity to *Selenastrum*. There were five samples that triggered TIE procedures to investigate the cause of toxicity. Toxicity was not persistent in four of the samples (i.e., there was no significant toxicity in the untreated baseline TIE sample), indicating a rapid breakdown of the source of toxicity, and therefore probably a short duration of toxicity in ambient waters. The remaining TIE indicated that divalent cations caused or contributed to the *Selenastrum* toxicity in one sample, but this conclusion was not supported by the chemical results which indicated that metals were not elevated in the sample.

When detected, pesticides rarely exceeded applicable objectives, and were typically not associated with toxicity. Two registered pesticides (diazinon and simazine) and 3 unregistered legacy organochlorine pesticides (aldrin, DDE, DDT) exceeded applicable water quality objectives in a total of 13 Storm Season 2008 samples. Notably, there was only one observed exceedance of the Basin Plan diazinon objective in the 2008 storm season, and this exceedance was not associated with toxicity. Many of the pesticides specifically required to be monitored by the *ILRP* have rarely been detected in Coalition water samples, including Glyphosate, paraquat, and all of the pyrethroid pesticides. Glyphosate, one of the most widely used agricultural pesticides, has been detected in six Coalition samples to date, and hase never approached concentrations likely to cause toxicity to sensitive test species. Over 98% of all pesticide analyses performed to date for the Coalition are below detection. This indicates that monitoring of many of these pesticides in water is unlikely to provide meaningful results regarding sources or needs for changes in management practices. Based on these results, the Coalition will propose much more focused monitoring of ILRP pesticides in 2009 when the recently adopted revised ILRP MRP will be implemented. Similarly, the Coalition will propose to conduct much more focused monitoring of most trace elements (arsenic, cadmium, lead, nickel, selenium, and zinc) in 2009 because Coalition monitoring has demonstrated that these metals do not exceed objectives and are not likely to cause adverse impacts to aquatic life or human health in waters receiving agricultural runoff in the Coalition watershed.

The majority of exceedances of adopted numeric objectives consisted of pH, conductivity, dissolved solids, and *E. coli*. Although agricultural runoff and irrigation return flows may contribute to exceedances of these objectives, all of these parameters are controlled or significantly affected by natural processes and sources that are not controllable by agricultural management practices. Follow-up strategies to evaluate causes of pH and dissolved oxygen exceedances were implemented by the Coalition in the 2006 irrigation season. Sources of *E. coli* exceedances have been investigated through a region-wide pilot study conducted by the Coalition. The Coalition also participates in the *ILRP* Technical Issues Committee (TIC) workgroups to develop procedures and guidelines for evaluation of exceedances. The TIC has worked with Water Board *ILRP* staff to develop recommendations for amendments to the current *ILRP* Monitoring and Reporting Program requirements and procedures. Many of these recommendations have been incorporated into the revised MRP adopted by the Water Board in 2007.

The Coalition initiated some Phase 2 monitoring elements during the 2005 irrigation season, concurrent with the Phase 1 irrigation season monitoring, and has continued these elements for most of the current monitoring sites. The Phase 2 elements monitored include additional pesticide analyses, trace elements, and nutrients. The Coalition implemented a strategy of monitoring Phase 1 and Phase 2 constituents concurrently for new monitoring sites implemented in 2007.

The Coalition has implemented the required elements of the ILRP since 2004. The Coalition developed a Watershed Evaluation Report (WER) which set the priorities for development and implementation of the Monitoring and Reporting Program Plan (MRPP). The Coalition successfully developed the MRPP and QAPP required by the *ILRP*, and these documents have been approved by the Water Board. Subsequent revisions requested by the Water Board have been incorporated into these documents and were implemented during the 2006 irrigation season monitoring, and continued for 2008 Coalition monitoring. The Coalition continues to adapt and improve elements of the monitoring program based on the knowledge gained through *ILRP* monitoring efforts.

The Coalition has implemented the approved monitoring program in coordination with its subwatershed partners, and has initiated follow-up activities to address observed exceedances.

The Coalition has also completed a Management Practice Action Plan (provided in previous reports) designed to communicate information and monitoring results within the Coalition, to track implementation of management practices in the watershed, and to evaluate effectiveness of management practices. The Coaltion is currently in the process of developing a revised MRPP and management plans to meet the requirements of the new ILRP MRP. 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 semi-annual monitoring report is documentation of the success and continued progress of the Coalition in achieving these objectives.

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Appendices

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

Appendix A: Field Log Copies

Appendix B: Lab Reports and Chains-of-Custody

Appendix C: Tabulated Monitoring Results

Appendix D: Exceedance and Communication Reports

Appendix E: Pesticide Use Trends for Monitored Drainages

Appendix F: Site-Specific Drainage Maps