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SACRAMENTO VALLEY
WATER QUALITY COALITION

Monitoring and Reporting Program Plan

Semi-Annual Irrigation Season Monitoring Report 2007

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 *ILP* for *Irrigated Lands Program*) and subsequent amendments to the *ILP* requirements (WQO-2004-0003, SWRCB 2004, RB 2005-0833). Sampling and analytical methods used in the Coalition and subwatershed monitoring programs have been approved by the Central Valley Regional Water Quality Control Board in the Conditional Approval of Watershed Evaluation Report and Monitoring and Reporting Program Plan issued December 2, 2004 pending submittal of additional documentation which was subsequently provided on January 19, 2005.

To achieve the objectives of the MRP, the Coalition is implementing a phased Monitoring And Reporting Program Plan 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 2007 monitoring effort has been conducted in coordination with the Northeastern California Water Association, the Napa County Putah Creek Watershed Group, the Upper Feather River Watershed Group Proposition 50 Team, and the Sacramento River Watershed Program. 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 *Conditional Waiver* and subsequent amendments to the *ILP* requirements (WQO-2004-0003, SWRCB 2004, RB 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 *ILP* in effect when the Coalition 2007

monitoring program was implemented in January 2007. It is expected that this list will be modified at least annually as the Water Board continues to revise requirements of the *ILP*.

A total of 38 regular and Management Plan sites were monitored by the Coalition and coordinating subwatershed monitoring programs in 2007. A map of these sites and overall land use patterns is presented in **Figure 1**. As required by the *Conditional Waiver*, Coalition monitoring events will include storm season monitoring and irrigation season monitoring. The sites and annual frequency of samples to be collected for the Coalition's 2004-2006 Phase 1 monitoring are summarized in Table E-1.

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 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 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 2007 Irrigation Season Semi-Annual Monitoring Report under the Water Board's Irrigated Lands Program (*ILP*). The 2007 Irrigation 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 April 2007 through October 2007. To date, a total of six 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 (April 2007 – October 2007), samples were collected during 7 irrigation events, and at a total of 51 different locations, including follow-up sample sites.

To summarize, the results from the irrigation season monitoring in 2007 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 that were taken and are planned by the Coalition and its members to address these issues.

From April 2007 through Ocober 2007, 207 water column toxicity tests were conducted with three aquatic species on 97 samples from 26 different sites. Sediment toxicity tests were conducted on 36 samples with *Hyalella*. There were 17 statistically significant water column toxicity exceedances with reductions greater than 20% compared to control in Coalition Irrigation Season samples (13 *Ceriodaphnia* tests and 4 *Selenastrum* tests). In total, 7.8% of all tests and 10% of water and sediment samples exhibited a statistically significant reduction in invertebrate or fish survival or algae cell density 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 Regional Board by the Coalition in Exceedance and Communication Reports, as required by the *Conditional Waiver* and the Coalition's MRPP. Chemical results were evaluated for all of the cases of observed toxicity. In one of these cases, the toxicity to *Ceriodaphnia* was explained by concentrations of chlorpyrifos and carbofuran. In two other cases, concentrations of the herbicides thiobencarb or diuron may have contributed to the toxicity to *Selenastrum*. For the 14 samples that triggered Toxicity Identification Evaluation (TIE) procedures to investigate the cause of toxicity, toxicity was not persistent in 11 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 three TIEs indicated metabolically activated pesticides (e.g., some organophosphate and carbamate pesticides) as probable contributors to *Ceriodaphnia* toxicity, and pesticide analyses supported this result in two of TIEs.

When detected, pesticides rarely exceeded applicable objectives, and were typically not associated with toxicity. Five pesticides (carbofuran, chlorpyrifos, malathion, thiobencarb, and DDE) exceeded applicable water quality objectives in a total of 18 Irrigation Season 2007

samples. Notably, there were no observed exceedances of the Basin Plan diazinon objective in the 2007 irrigation season. Several of the pesticides specifically required to be monitored by the *ILP* have not been detected in any Coalition water sample, including paraquat and all of the pyrethroid pesticides. Glyphosate, one of the most widely used agricultural pesticides has been detected in only one Coalition sample to date. This indicates that monitoring of these pesticides in water is unlikely to provide meaningful results regarding sources or needs for changes in management practices. Based on these results, the Coalition proposed to discontinue these pesticides from water column monitoring, but is planning to continue monitoring these pesticides in 2008. Similarly, the Coalition has proposed to discontinue monitoring of most trace elements (arsenic, cadmium, lead, nickel, selenium, and zinc) in 2008 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 Coaliton is planning to continue monitoring all required trace metals in 2008.

Exceedances of adopted Basin Plan objectives and advisory limits were observed for pH, dissolved oxygen (DO), conductivity, copper, total dissolved solids, boron, selenium, and *E. coli* bacteria (**Table 20**). There were no exceedances of water quality objectives for monitored nutrient compounds. 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 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 are also being investigated through a region-wide pilot study conducted by the Coalition. The Coalition also participates in the *ILP* Technical Issues Committee (TIC) workgroups to develop procedures and guidelines for evaluation of exceedances. The TIC has worked with Water Board *ILP* staff to develop recommendations for amendments to the current *ILP* Monitoring and Reporting Program requirements and procedures. Many of these recommendations have been incorporated into the proposed revised MRP released 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 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 ILP 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 developed the MRPP and QAPP required by the *ILP*, and these documents have been submitted to the Water Board for approval. 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 2007 Coalition monitoring. The Coalition continues to adapt and improve elements of the monitoring program based on the knowledge gained through *ILP* 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) 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. 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 *ILP* 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 Irrigation 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 *ILP* for *Irrigated Lands Program*) and subsequent amendments to the *ILP* requirements (WQO-2004-0003, SWRCB 2004, RB 2005-0833).

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

- 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 Irrigation Season Semi-Annual Monitoring Report

All report elements required by the *ILP* 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 *ILP*:

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 Monitoring And Reporting Program Plan 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 *ILP* and in subsequent amendments to the *ILP* requirements (WQO-2004-0003, SWRCB 2004, RB 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 *ILP* in effect when the Coalition 2007 monitoring program was implemented in January 2007. It is expected that this list will be modified at least annually as the Water Board continues to revise requirements of the *ILP*.

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 *ILP* 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.

SAMPLING SITE LOCATIONS AND LAND USES

The sites monitored by the Coalition in 2007 are listed in **Table 2**. All sites monitored before 2007 have been approved by the Water Board as *ILP* compliance sites. The Coalition Monitoring Plan in place for 2007 has not yet been approved by the Water Board, including sites newly implemented in 2007. 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, 2007

Map Index[1]	Site ID[1]	Status[3]	Subwatershed	Site Name	Latitude	Longitude	Implementing Agency
14	PNCGR	Approved	ButteYubaSutter	Pine Creek at Nord Gianella Road	39.7811	-121.9877	SVWQC
15	SACSL	Approved		Sacramento Slough	38.7833	-121.6338	SRWP
33	GILSL	Approved		Gilsizer Slough at George Washington Road	39.0090	-121.6716	SVWQC
39	GRHPR	Pending		Grasshopper Slough at Forty Mile Road [4]	38.9938	-121.4898	SVWQC
40	LSNKR	Pending		Lower Snake R. at Nuestro Rd [4]	39.1853	-121.7036	SVWQC
13	WADCN	Approved		Wadsworth Canal at South Butte Rd [5]	39.1534	-121.7344	SVWQC
5	STYHY	Approved	ColusaGlenn	Stony Creek on Hwy 45 near Rd 24	39.7101	-122.0040	SVWQC
9	COLDR	Approved		Colusa Basin Drain above KL	38.8121	-121.7741	SRWP
41	FRSHC	Pending		Freshwater Creek at Gibson Rd [4]	39.1766	-122.1892	SVWQC
42	LGNCR	Pending		Logan Creek at 4 Mile-Excelsior Rd [4]	39.3653	-122.1161	SVWQC
43	LRLNC	Pending		Lurline Creek at 99W [4]	39.2122	-122.1833	SVWQC
44	WLKRC	Pending		Walker Creek at Co Rd 48 [4]	39.5388	-122.1762	SVWQC
6	CODMR	Approved		Colusa Drain near Maxwell Rd [5]	39.2756	-122.0862	SVWQC
25	NRTCN	Approved	ElDorado	North Canyon Creek	38.7604	-120.7102	SVWQC
45	COONH	Pending		Coon Hollow Creek [4]	38.7534	-120.7240	SVWQC
23	PCULB	Approved	LakeNapa	Pope Creek upstream from Lake Berryessa	38.6464	-122.3642	PCWG
24	CCULB	Approved		Capell Creek u/s from Lake Berryessa	38.4825	-122.2411	PCWG
38	MDLCR	Pending		Middle Creek u/s from Highway 20 [4]	39.1635	-122.9161	SVWQC
22	MGSLU	Approved		McGaugh Slough at Finley Road East [5]	39.0042	-122.8623	SVWQC
1	PRPIT	Approved	PitRiver	Pit River at Pittville	41.0454	-121.3317	NECWA
2	FRRRB	Approved		Fall River at Fall River Ranch Bridge	41.0351	-121.4864	NECWA
3	PRCAN	Approved		Pit River at Canby Bridge	41.4017	-120.9310	NECWA
46	CCBRW	Pending	Placer-Nevada-SSutter-NSac.	Coon Creek at Brewer Road [4]	38.9340	-121.4518	SVWQC
11	CCSTR	Approved		Coon Creek at Striplin Rd [5]	38.8661	-121.5803	SVWQC
27	DCGLT	Approved	SacramentoAmador	Dry Creek at Alta Mesa Road	38.2480	-121.2260	SVWQC
47	LAGAM	Pending		Laguna Creek at Alta Mesa Road [4]	38.3110	-121.2263	SVWQC
30	ACACR	Approved	ShastaTehama	Anderson Creek at Ash Creek Road	40.4180	-122.2136	SVWQC
48	COYTR	Pending		Coyote Creek at Tyler Road [4]	40.0926	-122.1590	SVWQC
49	WLSBP	Pending	SolanoYolo	Willow Slough Bypass at SP [4]	38.5994	-121.7528	SVWQC
50	CCCPY	Pending		Cache Cr. at Diversion Dam [4]	38.7137	-122.0851	SVWQC
29	SSLIB	Approved		Shag Slough at Liberty Island Bridge	38.3068	-121.6934	SVWQC
32	UCBRD	Approved		Ulatis Creek at Brown Road	38.3070	-121.7940	SVWQC
18	TCHWY	Approved		Tule Canal @ I-80 [5]	38.5700	-121.5800	SVWQC
16	ZDDIX	Approved		Z-drain – Dixon RCD [5]	38.4157	-121.6752	SVWQC
20	MFFRA	Approved	UpperFeatherRiver	Middle Fork Feather River at County Rd A-23	39.8189	-120.3918	UFRW
53	MFFGR	Approved		Middle Fork Feather River above Grizzly Cr.	39.8160	-120.4260	UFRW
36	INDAB	Approved		Indian Creek at Arlington Bridge	40.0846	-120.9161	UFRW
37	SPGRN	Approved		Spanish Creek below Greenhorn Creek	39.9735	-120.9103	UFRW

(1) Numbered indices for the SVWQC site-specific drainage maps in Appendix F

(2) Site Identification codes for the SVWQC monitoring site map (**Figure 1**)

(3) "Approved" indicates site was approved as an *ILP* compliance site by the Water Board.
"Pending" indicates site approval as an *ILP* compliance site is pending Water Board review of the Coalition's 2007 Monitoring Plan.

(4) New sites implemented in 2007.

(5) Sites will only be monitored twice in 2007 for an *E. coli* source study (February and May).

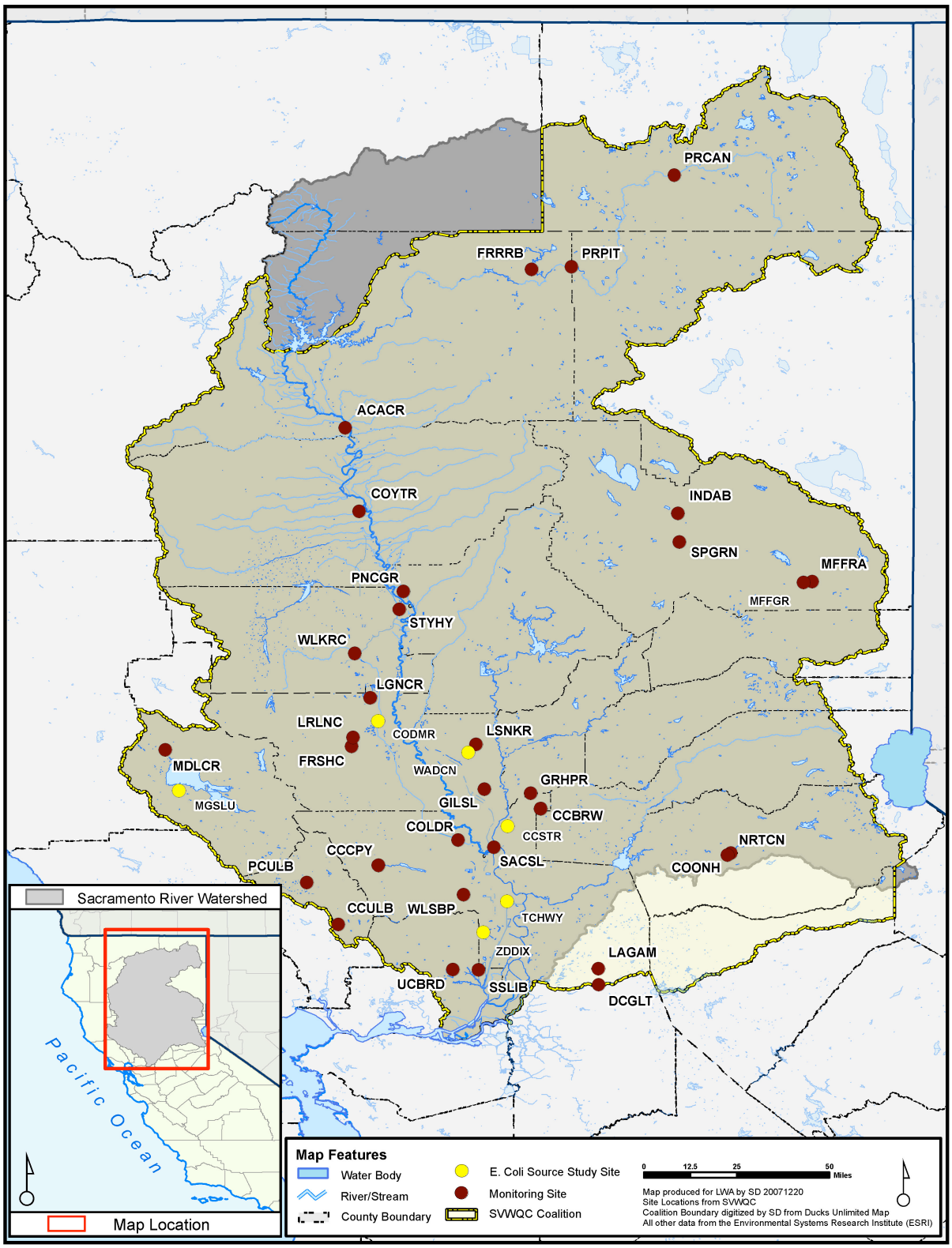

Figure 1. Coalition Monitoring Sites

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

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 administered by the Sacramento River Watershed Program.

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.

*Wadsworth Canal at South Butte Road (Weir #4) (***E. coli** *study only)*

This site will test water downstream of approximately 22,000 irrigated acres in the Wadsworth drainage as shown in the Butte-Sutter-Yuba subwatershed map. This area includes primarily prunes with some acreage of peaches, walnuts, pasture, wheat, and almonds.

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 administered by the Sacramento River Watershed Program.

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.

*Colusa Drain at Maxwell Road (*E. coli *study only)*

This site is just downstream from the original site, Upper Colusa Drain. It captures additional drainage from the federal wildlife refuge. The site receives water from central Glenn County and northeast Colusa County. The contributing drainage areas include Willow Creek, Upper Colusa Drain, and the Provident Area as indicated on the Colusa Glenn subwatershed map. This area has considerable acreages of almonds, walnuts, wheat, pasture, and corn.

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.

*McGaugh Slough at Finley Road East (*E. coli *study only)*

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

*Coon Creek at Striplin Road (*E. coli *study only)*

This site captures drainage from the Middle and Lower 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 one mile downstream of the confluence with Ping Slough. The site drains approximately 25,000 irrigated acres of orchards, pasture, and wheat. It is recognized that there may be urban contributions at this site, but many of the growing cities in Western Placer County are conducting monitoring to identify potential urban impacts and are prepared to work closely with the Coalition in analyzing results and determining sources.

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.

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 SP

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

The Liberty Island Bridge site is approximately 2.5 to 3 miles southwest of the Toe Drain in Shag Slough and is within the South Yolo Bypass drainage area. 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.

*Tule Canal at North East corner of I-80 (***E. coli** *study only)*

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

*Z-Drain (Dixon RCD) (***E. coli** *study only)*

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

Upper Feather River Watershed

Agriculture in this subwatershed is localized in mountain valleys that are suitable for grazing and growing alfalfa 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 at County Rd. A-23

This site drains Sierra Valley, the largest irrigated agricultural region in this subwatershed. The three major creeks that drain into the Sierra Valley (Smithneck Creek, Cold Stream Creek, and Last Chance Creek) ultimately drain to the north towards this monitoring point and the headwaters of the Middle Fork Feather River. Monitoring conducted at this site in the first year provides a solid baseline for potential upstream monitoring on these other streams. This site captures approximately 30,000-35,000 irrigated acres, which is almost exclusively native pasture.

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 Monitoring Plan. 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 *ILP* 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 2007 monitoring are summarized in **Table 3**.

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 2007. These changes in the *ILP* 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 to the Regional Board MRP are also expected to include numerous technical changes in monitoring requirements, and may implement 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 will be 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.

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 3. Coalition 2007 Monitoring: Planned Annual Sampling Frequency

				Physical, Chemical, and Microbiological											Toxicity				
Subwatershed	Location	Water Column Sample Events	Sediment Sample Events	pH, conductivity, DO, temperature, Q	Color, Turbidity, TDS, TSS, TOC	Nutrients	Trace metals	Organophosphate pesticides	Triazines	Organonochlorines	Pyrethroids in toxic sediments	Glyphosate, Paraquat	Carbamate and Urea Pesticides	Pathogen Indicators: *E. Coli*	Ceriodaphnia, 96-h acute	Pimephales, 96-h acute	Selenastrum, 96-h short-term chronic	Hyalella, 10-day short-term chronic	Implementation
Butte-Sutter-Yuba	Grasshopper Sl. at Forty Mile Rd	8	2	8	8	8	8	8	8	8	2	8	8	8	8	ns	8	2	SVWQC
	Lower Snake R. at Nuestro Rd	8	2	8	8	8	8	8	8	8	2	8	8	8	8	ns	8	2	SVWQC
	Pine Creek at Nord Gianelli Rd	8	2	8	8	8	ns	8	ns	ns	2	ns	ns	ns	8	ns	ns	2	SVWQC
	Gilsizer Sl. at G. Washington Rd	8	ns	8	8	8	8	8	8	8	ns	8	8	8	ns	ns	ns	ns	SVWQC
	Sacramento Slough	7	ns	7	7	7	ns	7	7	ns	ns	ns	5	7	7	7	7	ns	SRWP
Colusa Glenn	Freshwater Creek at Gibson Rd	8	2	8	8	8	8	8	8	8	2	8	8	8	8	ns	8	2	SVWQC
	Logan Cr. at 4 Mile-Excelsior Rd	8	2	8	8	8	8	8	8	8	2	8	8	8	8	ns	8	2	SVWQC
	Lurline Creek at 99W	8	2	8	8	8	8	8	8	8	2	8	8	8	8	ns	8	2	SVWQC
	Walker Creek at Co Rd 48	8	2	8	8	8	8	8	8	8	2	8	8	8	8	ns	8	2	SVWQC
	Stony Cr. on Hwy 45 near Rd 24	2	ns	2	ns	ns	ns	2	2	ns	ns	ns	ns	ns	2	ns	2	ns	SVWQC
	Colusa Drain above KL	7	ns	7	7	7	ns	7	5	ns	ns	ns	5	7	7	7	7	ns	SRWP
El Dorado	North Canyon Creek	4	ns	4	4	ns	ns	4	ns	4	ns	ns	ns	4	ns	ns	ns	ns	SVWQC
	Coon Hollow Creek	8	2	8	8	8	8	8	ns	8	2	ns	ns	8	8	ns	8	2	SVWQC
Lake-Napa	Middle Creek u/s Hwy 20	3	2	3	3	3	3	3	3	3	2	ns	ns	3	3	ns	3	2	SVWQC
	Pope Cr u/s from L. Berryessa	3	ns	3	3	ns	ns	ns	ns	ns	ns	ns	ns	3	ns	ns	ns	ns	PCWG
	Capell Cr u/s from L. Berryessa	3	ns	3	3	ns	ns	ns	ns	ns	ns	ns	ns	3	ns	ns	ns	ns	PCWG
Pit River	Pit River at Pittville	8	ns	8	8	8	ns	ns	ns	ns	ns	ns	ns	8	ns	ns	ns	ns	NECWA
	Fall R. at Fall R. Ranch Bridge	8	ns	8	8	8	ns	ns	ns	ns	ns	ns	ns	8	ns	ns	ns	ns	NECWA
	Pit River at Canby Bridge	8	ns	8	8	8	ns	ns	ns	ns	ns	ns	ns	8	ns	ns	ns	ns	NECWA
Placer-NSac-Nev-SSutter	Coon Creek at Brewer Rd	8	2	8	8	8	8	8	8	8	2	8	8	8	8	ns	8	2	SVWQC
Sac-Amador	Laguna Creek at Alta Mesa Rd	8	2	8	8	8	8	8	8	8	2	8	8	8	8	ns	8	2	SVWQC
	Dry Creek at Alta Mesa Road	8	ns	8	8	8	8	8	8	8	ns	8	8	8	2	ns	ns	ns	SVWQC
Shasta-Tehama	Coyote Creek at Tyler Rd	8	2	8	8	8	8	8	ns	ns	2	ns	8	8	8	ns	8	2	SVWQC
	Anderson Cr. at Ash Creek Rd	8	ns	8	8	ns	8	ns	ns	ns	ns	ns	ns	2	ns	ns	ns	ns	SVWQC
Solano-Yolo	Willow Sl. Bypass at SP	8	2	8	8	8	8	8	8	8	2	8	8	8	8	ns	8	2	SVWQC
	Cache Cr. at Diversion Dam	8	2	8	8	8	8	8	8	8	2	8	8	8	8	ns	8	2	SVWQC
	Ulatis Creek at Brown Road	8	ns	8	8	8	8	8	8	8	ns	8	8	8	2	ns	2	ns	SVWQC
	Shag Sl. at Liberty Island Bridge	8	2	8	8	8	8	8	8	2	2	8	8	8	8	ns	8	2	SVWQC
Upper Feather	Spanish Cr. below Greenhorn Cr	7	2	7	7	7	ns	ns	ns	ns	ns	ns	ns	7	2	2	2	1	UFRW
	Indian Creek at Arlington Bridge	7	2	7	7	7	ns	ns	ns	ns	ns	ns	ns	7	2	2	2	1	UFRW
	Mid. Fk Feather at Co. Rd A-23	1	1	1	1	1	ns	ns	ns	ns	ns	ns	ns	1	2	2	2	1	UFRW
	Mid. Fk Feather above Grizzly Cr	6	ns	6	6	6	ns	ns	ns	ns	ns	ns	ns	6	ns	ns	ns	ns	UFRW

Notes: Tabled values indicate number of regular samples planned for 2007. “ns” indicates parameters are not sampled. “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 Sacramento River Watershed Program (SRWP).

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* 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* were conducted as 96-hour static renewal tests, with sample renewal 48 hours after test initiation.
- 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 4**. Wherever possible, project QLs are lower than the proposed or existing relevant numeric water quality objectives or toxicity thresholds, as required by the *ILP*.

All analytical results between the MDL and QL are reported as numerical values and qualified as estimates ("J-values").

Table 4. 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 4 (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 2007 irrigation season (April 2007 through October 2007).

SUMMARY OF SAMPLE EVENTS CONDUCTED

This report presents irrigation season monitoring results from six Coalition Irrigation Season sampling events (Events 019-024), as well as data for events conducted by coordinating Subwatershed monitoring programs between April 2007 and October 2007. Samples collected for these events are listed in **Table 5**. Monitoring conducted by Subwatershed monitoring programs coordinating with the Coalition monitoring effort is included in this document and also summarized in **Table 5**.

The Coalition and Subwatershed monitoring events were conducted during seasonally normal dry weather. Event monitoring analyses included water chemistry and aquatic toxicity. Sediment toxicity testing was also conducted by the Coalition twice during this irrigation season (in April and August), as specified in the MRPP and QAPP. 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 April 2007 through October 2007 events are provided in **Appendix A**.

Table 5. Sampling for the Coalition Irrigation Season Monitoring: April 2007 – October 2007

Agency/Subwatershed	Site Name	Sample Count		Irrigation Season Events[1]						
		Planned	Collected	April	May	June	July	August	September	October
Sacramento Valley Water Quality Coalition (SVWQC)										
Butte-Sutter-Yuba	Grasshopper Sl. at Forty Mile Rd	6	0	**DRY**	**DRY**	**DRY**	**DRY**	**DRY**	**DRY**	—
	Lower Snake R. at Nuestro Rd	6	7	4/18, 4/19*	5/16	6/19	7/18	8/22*	9/18	—
	Pine Creek at Nord Gianelli Rd	6	5	4/17*	5/15	**DRY**	7/17	8/21	9/18	—
	Gilsizer Sl. at G. Washington Rd	6	6	4/18	5/16	6/19	7/18	8/22[3]	9/18	—
	Wadsworth Canal at S. Butte Rd [2]	1	1	—	5/16	—	—	—	—	—
Colusa Glenn	Freshwater Creek at Gibson Rd	6	8	4/18*	5/16	6/20, **6/27**	7/18, **7/18**	8/22*	9/18	—
	Logan Cr. at 4 Mile-Excelsior Rd	6	6	4/17*	5/15	6/19	7/17	8/21*	9/18	—
	Lurline Creek at 99W	6	7	4/18*	5/15	6/20, **6/27**	7/17	8/22*	9/18	—
	Walker Creek at Co Rd 48	6	13	4/17*, **4/24**	5/15, **5/16**	6/19, **6/20**	7/17, **7/19**	8/21*, **8/22**	9/18, **9/19, 9/25**	—
	Colusa Drain near Maxwell Rd. [2]	1	1	—	5/16	—	—	—	—	—
El Dorado	North Canyon Creek	1	1	4/17	—	—	—	—	—	—
	Coon Hollow Creek	6	9	4/17*, **4/25**	5/16	6/19, **6/23**	7/18, **7/18**	8/22*	9/18	—
Lake-Napa	Middle Creek u/s Hwy 20	2	2	4/18*	—	—	—	8/22	—	—
	McGaugh Slough at Finley Rd East [2]	1	1	—	5/16	—	—	—	—	—
Placer-NSac-Nev-SSutter	Coon Creek at Brewer Rd	6	7	4/18*, **4/24**	5/16	6/19	7/18	8/22*	9/18	—
	Coon Creek at Striplin Rd [2]	1	1	—	5/16	—	—	—	—	—
Sac-Amador	Laguna Creek at Alta Mesa Rd	6	8	4/17*, **4/25**	5/15	6/20, **6/28**	7/17	8/21*	9/19	—
	Dry Creek at Alta Mesa Road	6	5	4/17	5/15	6/20	7/17	8/21	**DRY**	—
Shasta-Tehama	Coyote Creek at Tyler Rd	6	7	4/17*	5/15	6/19, **6/19**	7/17	8/21**	9/18	—
	Anderson Cr. at Ash Creek Rd	6	7	4/17	5/15	6/19, **6/19**	7/17	8/21	9/18	—
Solano-Yolo	Willow Sl. Bypass at SP	6	8	4/17*, **4/24**	5/15	6/19	7/17, **7/17**	8/21*	9/19[3]	—
	Cache Cr. at Diversion Dam	6	8	4/18*	5/16	6/20, **6/27**	7/18	8/22*, **8/30**	9/19	—
	Ulatis Creek at Brown Road	6	8	4/17	5/15	6/20, **6/20**	7/17, **7/17**	8/21	9/19	—
	Shag Sl. at Liberty Island Bridge	6	7	4/17*	5/15	6/20, **6/28**	7/17	8/21*	9/19	—
	Tule Canal @ I-80 [2]	1	1	—	5/15	—	—	—	—	—
	Z-drain – Dixon RCD [2]	1	2	—	5/15, **5/16**	—	—	—	—	—

Agency/Subwatershed	Site Name	Sample Count		Irrigation Season Events[1]						
		Planned	Collected	April	May	June	July	August	September	October
Northeastern California Water Association (NECWA)										
Pit River	Pit River at Pittville	6	6	4/24	5/30	6/28	7/23	8/17	9/24	—
	Fall R. at Fall R. Ranch Bridge	6	6	4/24	5/30	6/28	7/23	8/17	9/24	—
	Pit River at Canby Bridge	6	7	4/24	5/30	6/28, **7/10**	7/23	8/17	9/24	—
Putah Creek Watershed Group (PCWG)										
Lake-Napa	Pope Cr u/s from L. Berryessa	1	1	—	5/1	—	—	—	—	—
	Capell Cr u/s from L. Berryessa	1	1	—	5/1	—	—	—	—	—
Sacramento River Watershed Program (SRWP)										
Butte-Sutter-Yuba	Sacramento Slough	6	6	4/26	5/16	6/7, 6/27	7/25	8/8	—	—
Colusa Glenn	Colusa Drain above KL	6	6	4/25	5/16	6/6, 6/27	7/25	8/8	—	—
Upper Feather River Watershed (UFRW)										
Upper Feather	Spanish Cr. below Greenhorn Cr	6	7	4/17*	5/8	6/5	7/10	8/7	9/4	10/2
	Indian Creek at Arlington Bridge	6	8	4/17*	5/8	6/5	7/10	8/7, **8/7**	9/4	10/2
	Middle Fk Feather R. at Co. Rd A-23	2	2	4/17*	5/8[4]	—	—	—	—	—
	Middle Fk Feather R. above Grizzly Ck	6	7	—	5/8	6/4	7/10	8/7, **8/7**	9/4	10/2
	Totals	**169**	**193**							

Notes:

DRY – Site was dry; therefore, no samples were collected.

* – Sediment sample collected

** – Isolated pool; sediment sample only collected

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

(2) Monitored planned twice in 2007 for an *E. coli* source study (February and May)

(3) Sampling also conducted at upstream sites

(4) Water column toxicity sample only.

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 April 2007 through October 2007 are included with the related lab reports and are provided in **Appendix B**. All COCs for *ILP* 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 6** through **Table 13** 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:

- Two E. coli analyses were initiated after the allowable hold time.

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:

- The analytical MDL and QL for 72 color analyses were elevated above the DQOs because the samples required dilution for analysis. All sample results were greater than the elevated QL and were not adversely affected or qualified.

- The analytical MDL and QL for 4 total dissolved solids analyses were elevated above the DQOs because the samples required dilution for analysis. All sample results were greater than the elevated QL and were not adversely affected or qualified.
- The analytical MDL and QL for 25 hardness analyses were elevated above the DQOs because the samples required dilution for analysis. All sample results were greater than the elevated QL and were not adversely affected or qualified.
- The analytical MDL and QL for 27 total suspended solids analyses were elevated above the DQOs because the samples required dilution for analysis. All sample results except one were greater than the elevated QL and were not adversely affected or qualified.
- The analytical QLs for 25 analyses for trace metals were elevated above the DQO because the samples required dilution for analysis. All associated sample results were greater than the elevated QL and were not adversely affected or qualified, with the exception of 6 results that were below the elevated QL. All analytical QLs for trace metals were adequate to assess exceedances of relevant water quality objectives.
- The analytical QL for all analyses for nitrate was elevated above the DQO and the ILP MRP target QL. All MDLs met the DQO. Most sample results were greater than the elevated QL and were not adversely affected or qualified. However, 23 additional sample results required a J-flag qualifier due to the raised QL. All analytical QLs for nitrate were adequate to assess exceedances of relevant water quality objectives.
- The analytical QLs for all azinphos methyl, phosmet, and methamidophos analyses were elevated above the DQO, but were below their ILP MRP target QLs. All MDLs met the DQO. Most sample results were below the MDL and were not adversely affected or qualified. One additional azinphos methyl and one methamidophos result required a J-flag qualifier due to the raised QLs. All 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 40 field blank analyses. Twenty-two of these results were below the QL. This resulted in 25 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 all five field blank analyses. Three analytical results required qualification as an upper limit due to potential contamination. The qualifications did not affect assessment of any exceedances.
- Total phosphorus was detected above the MDL in 3 field blank analyses. No analytical results required qualification as an upper limit due to potential contamination.

- Total organic carbon was detected above the MDL in 4 field blank analyses. One of these results was below the QL. One analytical results required qualification as an upper limit due to potential contamination.

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 3 suspended solids results. Nine environmental results were qualified as *estimated* on this basis.
- Field duplicate results exceeded the DQO for 9 trace metals results. Three environmental results were 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 24 total method blank analyses. All of the detected method blank results were below the QL. 32 analytical results were qualified as a result of potential analytical contamination. The qualifications did not affect assessment of any exceedances.
- Nitrate was detected above the MDL in 8 total method blank analyses. All of the detected method blank results were below the QL. 32 analytical results were qualified as a result of potential analytical contamination. The qualifications did not affect assessment of any exceedances.
- Organic carbon was detected above the MDL and below the QL in 1 method blank analysis. Two 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 all LCS analyses met DQOs and no results were qualified based on LCS results. With the exceptions discussed below, all surrogate recovery analyses met data quality objectives:

- The results of 8 LCS analyses for pesticides by EPA 625m were greater than the maximum acceptable recovery DQO. Because all associated environmental sample results were below detection, no data were qualified.
- The result of one LCS analyses for mexacarbate by EPA 8131 was lower than the minimum acceptable recovery DQO. Six data were qualified as *low biased*.
- The results of 7 surrogate recovery analyses for pesticides by EPA 625m were below the minimum acceptable recovery DQO. All associated samples were re-analyzed, and no data required qualification.
- The results of 10 surrogate recovery analyses for pesticides by EPA 8321 were below the minimum acceptable recovery DQO. All associated samples were re-analyzed, and no data required qualification.

Laboratory Duplicates

Laboratory Duplicates were analyzed for TDS, TSS, turbidity, and pesticides (**Table 11**). 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:

- One laboratory duplicate result for simazine exceeded the DQO. Because both results were below the quantitation limit, no data required qualification.

Matrix Spikes and Matrix Spike Duplicates

Matrix Spikes and Matrix Spike Duplicates were analyzed for trace metals, nutrients, and pesticides (**Tables 12** and **13**). 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 hardness analyses were below the DQO. Because these 2 analyses were performed in non-SVWQC matrices, no environmental data required qualification.
- Matrix Spike recoveries for 1 trace metal analysis was above the DQO. Because the associated environmental results were below detection, no environmental data required qualification.
- Matrix Spike recoveries for 3 paraquat pesticide analyses were below the DQO. This resulted in qualification of 1 environmental result as low biased.
- Matrix Spike recoveries for 44 pesticide analyses by EPA 625m were below the DQO. This resulted in qualification of 30 environmental result as low biased.
- Two Matrix Spike recoveries for aminocarb analyses were below the DQO for diuron. Because the associated environmental results were below detection, no environmental data required qualification.

- The RPD for two pair of Matrix Spike Duplicate analyses for paraquat were higher than the DQO. The associated environmental sample results were below detection and no results were qualified.
- The RPD for three pair of Matrix Spike Duplicate analyses for pesticides by EPA 625m were higher than the DQO. The associated environmental sample results were below detection and no results were qualified.
- The RPD for one pair of Matrix Spike Duplicate analyses for neburon by EPA 8321 was higher than the DQO. The associated environmental sample result was below detection and no results were qualified.

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 149 total qualified data, 29 results were qualified as *estimated* due to high variability in lab or field replicate analyses, two results were qualified as *estimated* based on holding time exceedances, 23 results were qualified as *high biased* or *low biased*, and 95 results were potentially affected by contamination and qualified as *upper limits*. Of the results qualified as *upper limits*, 54 were below the QL, and none of the data qualified as *upper limits* were exceedances. Of the 13,378 analytical results generated from April 2007 – October 2007, 149 results required qualification or rejection, resulting in 98.9% 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 5**, 162 of the 169 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 96%. An additional 33 follow-up samples were also collected and analyzed. All of the uncollected samples planned for the 2007 irrigation season (7) were due to the lack of flow at the sample sites. Planned sampling that was not completed successfully is summarized below:

- Samples planned for Grasshopper Slough were not collected because the sampling site had no flow.
- One sample planned for Dry Creek at Alta Mesa Road was not collected because the sampling site had no flow (September 2007).

Table 6. Summary of Field Blank Quality Control Sample Evaluations for SVWQC Monitoring: April 2007 – October 2007

Method	Analyte	Data Quality Objective	Number of Analyses	Number Passing	% Success
EPA 130.2	Hardness	< MDL	**6**	6	100%
EPA 200.8	Trace Metals	< MDL	91	51	56%
EPA 300	Nitrate, as N	< MDL	5	0	0%
EPA 350.2	Ammonia, as N	< MDL	6	6	100%
EPA 351.3	Total Kjeldahl Nitrogen	< MDL	6	6	100%
EPA 354.1	Nitrite, as N	< MDL	5	5	100%
EPA 365.2	Total Phosphorus, as P	< MDL	6	3	50%
EPA 365.2 (filtered)	Dissolved Orthophosphate, as P	< MDL	5	5	100%
EPA 415.1	Total Organic Carbon (TOC)	< MDL	5	1	20%
EPA 547	Glyphosate	< MDL	6	6	100%
EPA 549.2	Paraquat	< MDL	6	6	100%
EPA 625m	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	< MDL	420	419	99.8%
EPA 8321A	Carbamate Pesticides		148	148	100%
SM20-9223	E. coli	< MDL	1	1	100%
Totals			**716**	**663**	**93%**

Table 7. Summary of Field Duplicate Quality Control Sample Results for SVWQC Monitoring: April 2007 – October 2007

Method		Data Quality Objective	Number Analyses	Number Passing	% Success
EPA 110.2	Color	RPD ≤ 25%	6	5	83%
EPA 130.2	Hardness	RPD ≤ 25%	6	6	100%
EPA 160.1	Total Dissolved Solids (TDS)	RPD ≤ 25%	5	5	100%
EPA 160.2	Total Suspended Solids (TSS)	RPD ≤ 25%	6	3	50%
EPA 180.1	Turbidity	RPD ≤ 25%	6	6	100%
EPA 200.8	Trace Metals	RPD ≤ 25%	90	81	90%
EPA 300	Nitrate, as N	RPD ≤ 25%	6	6	100%
EPA 350.2	Ammonia as N	RPD ≤ 25%	6	6	100%
EPA 351.3	Total Kjeldahl Nitrogen	RPD ≤ 25%	6	6	100%
EPA 354.1	Nitrite, as N	RPD ≤ 25%	6	6	100%
EPA 365.2	Phosphate as P, Total	RPD ≤ 25%	6	6	100%
EPA 365.2 (filtered)	Dissolved Orthophosphate, as P	RPD ≤ 25%	6	6	100%
EPA 415.1	Total Organic Carbon (TOC)	RPD ≤ 25%	6	6	100%
EPA 547	Glyphosate	RPD ≤ 25%	6	6	100%
EPA 547	Paraquat	RPD ≤ 25%	6	6	100%
EPA 625m	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	RPD ≤ 25%	462	461	99.8%
EPA 8321	Carbamate Pesticides	RPD ≤ 25%	148	148	100%
Toxicity tests	Ceriodaphnia, Selenastrum, Hyalella	RPD ≤ 25%	15	15	100%
Totals			***798***	***784***	**98.2%**

Table 8. Summary of Method Blank Results for SVWQC Monitoring: April 2007 – October 2007

Method	Analyte	Data Quality Objective	Number of Analyses	Number Passing	% Success
EPA 110.2	Color	< MDL	11	11	100%
EPA 130.2	Hardness	< MDL	17	17	100%
EPA 160.1	Total Dissolved Solids	< MDL	13	13	100%
EPA 160.2	Total Suspended Solids	< MDL	13	13	100%
EPA 180.1	Turbidity	< MDL	11	11	100%
EPA 200.8	Trace Metals	< MDL	184	160	87%
EPA 300	Nitrate, as N	< MDL	12	4	33%
EPA 350.2	Ammonia as N	< MDL	14	14	100%
EPA 351.3	Total Kjeldahl Nitrogen	< MDL	16	16	100%
EPA 354.1	Nitrite, as N	< MDL	11	11	100%
EPA 365.2	Phosphate/Orthophosphate, as P	< MDL	21	21	100%
EPA 415.1	Total Organic Carbon	< MDL	12	11	92%
SM20-9223	E. coli	< MDL	15	15	100%
EPA 547	Glyphosate	< MDL	8	8	100%
EPA 549.2	Paraquat	< MDL	7	7	100%
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	< MDL	761	761	100%
EPA 8321	Carbamate Pesticides	< MDL	198	198	100%
Totals			**1324**	**1289**	**97.4%**

Table 9. Summary of Lab Control Spike Results for SVWQC Monitoring: April 2007 – October 2007

Method	Analyte	DQO	Number of Analyses	Number Passing	% Success
EPA 110.2	Color	80-120%	8	8	100%
EPA 130.2	Hardness	80-120%	16	16	100%
EPA 160.1	Total Dissolved Solids	80-120%	13	13	100%
EPA 160.2	Total Suspended Solids	80-120%	12	12	100%
EPA 200.8	Trace Metals	80-120%	184	184	100%
EPA 350.2	Ammonia as N	80-120%	12	12	100%
EPA 351.3	Total Kjeldahl Nitrogen	80-120%	14	14	100%
EPA 300	Nitrate, as N	80-120%	11	11	100%
EPA 354.1	Nitrite, as N	80-120%	11	11	100%
EPA 365.2	Phosphate/Orthophosphate, as P	80-120%	20	20	100%
EPA 415.1	Total Organic Carbon	80-120%	11	11	100%
EPA 547	Glyphosate	78-128%	16	16	100%
EPA 549.2	Paraquat	42-104%	14	14	100%
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	(1)	154	146	95%
EPA 8321	Carbamate Pesticides	(1)	198	197	99%
Totals			**686**	**677**	**99%**

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 10. Summary of Surrogate Recovery Results for SVWQC Monitoring: April 2007 – October 2007

Method	Analyte	Data Quality Objective	Number of Analyses	Number Passing	% Success
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	(1)	560	553	99%
EPA 8321	Carbamate Pesticides	(1)	236	226	96%
Totals			**796**	**779**	**98%**

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 11. Summary of Lab Duplicate Results for SVWQC Monitoring: April 2007 – October 2007

Method	Analyte	Data Quality Objective	Number of Pairs Analysed	Number Passing	% Success
EPA 110.2	Color	≤20% RPD	9	9	100%
EPA 160.1	Total Dissolved Solids	≤20% RPD	12	12	100%
EPA 160.2	Total Suspended Solids	≤20% RPD	11	11	100%
EPA 180.1	Turbidity	≤20% RPD	9	9	100%
EPA 547	Glyphosate	78-128%	8	8	100%
EPA 549.2	Paraquat	42-104%	7	7	100%
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	≤30% RPD	561	560	99.8%
Totals			**617**	**616**	**99.8%**

Table 12. Summary of Matrix Spike Recovery Results for SVWQC Monitoring: April 2007 – October 2007

Method	Analyte	Data Quality Objective	Number of Analyses	Number Passing	% Success
EPA 130.2	Hardness	80-120%	26	24	92%
EPA 200.8	Trace Metals	80-120%	346	345	99.7%
EPA 350.2	Ammonia as N	80-120%	24	24	100%
EPA 351.3	Total Kjeldahl Nitrogen	80-120%	28	28	100%
EPA 300	Nitrate, as N	80-120%	20	20	100%
EPA 354.1	Nitrite, as N	80-120%	18	18	100%
EPA 365.2	Phosphate/Orthophosphate, as P	80-120%	34	34	100%
EPA 415.1	Total Organic Carbon	80-120%	32	32	100%
EPA 547	Glyphosate	78-128%	10	10	100%
EPA 549.2	Paraquat	50-126%	12	9	75%
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	(1)	816	772	95%
EPA 8321	Carbamate Pesticides	(1)	246	244	99%
Totals			**1612**	**1560**	**96.8%**

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 13. Summary of Matrix Spike Duplicate Precision Results for SVWQC Monitoring: April 2007 – October 2007

Method	Analyte	Data Quality Objective	Number of Pairs Analyzed	Number Passing	% Success
EPA 130.2	Hardness	80-120%	3	3	100%
EPA 200.8	Trace Metals	≤20% RPD	60	60	100%
EPA 350.2	Ammonia as N	≤20% RPD	4	4	100%
EPA 351.3	Total Kjeldahl Nitrogen	≤20% RPD	4	4	100%
EPA 300	Nitrate, as N	≤20% RPD	2	2	100%
EPA 354.1	Nitrite, as N	≤20% RPD	2	2	100%
EPA 365.2	Phosphate/Orthophosphate, as P	≤20% RPD	3	3	100%
EPA 415.1	Total Organic Carbon	≤20% RPD	4	4	100%
EPA 547	Glyphosate	≤20% RPD	4	4	100%
EPA 549.2	Paraquat	≤20% RPD	6	4	67%
EPA 625(m)	Organophosphorus, Organochlorine, Triazine, and Pyrethroid Pesticides	≤30% RPD	408	405	99.3%
EPA 8321	Carbamate Pesticides	≤25% RPD	123	122	99%
Totals			**623**	**617**	**99%**

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 *ILP* requires pesticide use reporting in the annual monitoring report. Previous reports focused upon sampling results and use reports for the six priority pesticides that met these criteria. The six pesticides specifically analyzed for the Phase 1 Coalition monitoring were azinphos-methyl, carbofuran, chlorpyrifos, diazinon, malathion, and, methyl parathion.

Twenty-one sites were monitored regularly for these constituents during Coalition sampling events in the 2007 Irrigation Season. Chlorpyrifos and diazinon were detected in 8 and 5 samples, respectively. Azinphos-methyl and methyl parathion were each detected in one sample; malathion was detected in four samples; and carbofuran was detected in only one sample. Monitoring for organochlorine pesticides was conducted at 16 sites, and monitoring for carbamate, triazine and other herbicides was conducted at 17 sites. Legacy organochlorines were detected in 11 samples from six sites during this period.

Pesticide use information for the pesticides of primary concern in the Sacramento Valley watershed was acquired from the California Department of Pesticide Regulations' (CDPR) Pesticide Use Reporting (PUR) Database[1] and compiled for the subwatersheds. The information for 2000-2003, including usage trends, was summarized in the 2005 AMR. Pesticide use data were also characterized for specific monitored drainages within each subwatershed. These additional detailed tables were also provided in the 2005 AMR. Based on available data (2000-2006), these pesticides have been widely used throughout the Coalition's subwatersheds and exhibited relatively small annual variations in use overall. Total pesticide applications in the Coalition watersheds are summarized by county in **Table 14**. Pesticde application totals include low risk pesticides (such as sulfur) that are applied at relatively high rates compared to more toxic pesticides, and make up a large proportion of the total pounds applied. Within this overall pattern, there were some spatial and temporal trends evident. The usage trends for 2000 to 2003 for the specific pesticides of primary concern, with available updates for 2005 and 2006, are summarized below.

Azinphos-methyl has been used throughout the Coalition area, with the exception of the Upper Feather subwatershed. The major agricultural uses for azinphos-methyl in the Coalition watershed have been almonds, walnuts, and pears. Generally, the use of azinphos-methyl is on the decline.

Carbofuran use in the Coalition watershed has decreased dramatically (approximately 70-80%) since the 1990s. Consequently, the reported percentage of carbofuran detections in the Sacramento River watershed in CDPR's Surface Water Database has also decreased from approximately 66% of analyses in 1994, to 2.5% in 2000, with no detected carbofuran reported in 2001-2003 monitoring. These decreases correspond to changes made by the rice farming industry to pesticide application practices and in holding times for irrigation water after pesticide application. Granular formulations of carbofuran were also banned in 1994 to protect wildlife. Although carbofuran was historically used primarily on rice acreage, the majority of use in recent years has been on alfalfa and cotton. Based on data reported in the PUR database, the use

[1] Available at: http://www.cdpr.ca.gov/docs/pur/purmain.htm

of carbofuran in the Coalition subwatersheds has remained fairly stable at this lower level since 2001. Use of carbofuran statewide decreased 35% between 2005 and 2006, with the majority of the decrease attributed to the Sacramento, San Joaquin, and Imperial Valleys. Carbofuran is still used for alfalfa crops in the Yolo/Solano (Yolo County only), Butte/Sutter/Yuba (Butte County only), and Sacramento/Amador (Sacramento County only) subwatersheds.

Overall use of cholinesterase-inhibiting organophosphate insecticides has declined over the last ten years (CDPR 2003, CDPR 2006, Spurlock 2002). DPR reported that this trend has continued through 2006. In contrast, over the same period, the total number of acres planted in fruit and vegetable crops and the total pounds of all varieties of pesticides applied has increased in California (CDPR 2003). This suggests that there may be a general shift from organophosphate insecticides to other categories of pesticides, possibly in response to economic pressures, patterns of pest pressures, and pesticide resistance, as well as to significant regulatory pressures and increased label restrictions.

Within this category, *chlorpyrifos* continues to be used in all Coalition subwatersheds. While overall use in the watershed remains at relatively stable lower levels, there is much greater annual variation in subwatershed use, depending on local conditions and pest management needs. The primary agricultural uses of chlorpyrifos in recent years have been for walnuts, with smaller but significant application reported for alfalfa, almonds, and wine grapes. However, there were significant percentage increases in total applications of chlorpyrifos in 2005 and/or 2006 within the El Dorado; Lake/Napa; Placer/Nevada/South Sutter/North Sacramento; Shasta/Tehama; and Solano/Yolo subwatersheds (see **Appendix E**). Between 2005 and 2006, the total acreage treated with insecticides decreased statewide; this decrease was associated in part with the decreased use (-19%) of chlorpyrifos. Within the entire Sacramento River watershed, the use of chlorpyrifos, based on total pounds applied, increased slightly (3%) within the same time period.

The overall use of *diazinon* has also declined substantially over the past 10 years (CDPR 2003, Spurlock 2002), particularly for dormant spray applications. The predominant agricultural uses in the Sacramento Valley watersheds in recent years have been for stonefruit, almonds, tomatoes, pears, and walnuts. Diazinon continues to be used throughout the Coalition watershed, with the highest use in 2006, based on total pounds applied, in the Butte/Yuba/Sutter subwatershed. There was no overall trend apparent in total applications between 2000 and 2003, but there was a notable percent increase in applications in the Shasta/Tehama subwatershed and a decrease in the reported applications in the Napa/Lake subwatershed (see Appendix E of the 2005 AMR). Between 2004 and 2005, a 26% decrease in the total diazinon applications (based on pounds applied) was observed within the Sacramento River watershed, with a 5% increase in total diazinon applications between 2005 and 2006 (see **Appendix E**).

Malathion has exhibited a trend similar to the overall pattern observed in carbofuran use and detections. In recent years, the major agricultural uses for malathion in the Coalition watershed have been walnuts and alfalfa. Malathion has been widely used throughout the Coalition subwatersheds, with the exception of the Upper Feather subwatershed. From 2000 to 2003, malathion applications increased in the Colusa Glenn subwatershed and decreased substantially in the Pit River subwatershed, while overall applications in the Coalition watersheds remained relatively consistent (see Appendix E of the 2005 AMR). Statewide, total malathion applications (based on pounds applied) decreased approximately 3% between 2005 and 2006.

Methyl parathion use also declined throughout the Coalition area as a whole from 2000 to 2003. The majority of the decrease and the total pounds applied were reported in the Butte/Yuba/Sutter subwatershed (approximately 80%), with much smaller total applications occurring in the Solano/Yolo, Placer/Nevada/South Sutter/North Sacramento, and Colusa Glenn subwatersheds. The majority of recent methyl parathion use in the Coalition watershed has been for walnut orchards and was limited to Butte, Colusa, Sacramento, Sutter, Tehama, Yolo, and Yuba counties in 2006.

Five of the six priority pesticides discussed above – azinphos-methyl, chlorpyrifos, diazinon, malathion, and methyl parathion – were detected during the 2007 irrigation season. In addition, eight other pesticides – atrazine, DDE(p,p'), diuron, molinate, prometon, simazine, thiobencarb, and trifluralin – were detected in more than one sample and at multiple sites. Four pesticides (chlorpyrifos, malathion, thiobencarb, and DDE) exceeded applicable water quality objectives in a total of 13 Irrigation Season 2007 samples. Six pesticides (azinphos-methyl, chlorpyrifos, malathion, methomyl, methyl parathion, and thiobencarb) were detected at concentrations with the potential to cause toxicity to sensitive invertebrate test species, but only chlorpyrifos was associated with any detected significant toxicity to *Ceriodphnia*. One thiobencarb exceedance was associated with a case of significant algae toxicity.

TRENDS FOR PESTICIDES DETECTED 2003-2006

Usage information from the PUR Database was compiled to evaluate recent trends (2004-2006) in their use within the Coalition watershed for select pesticides that are either high priority or have been frequently detected in Coalition monitoring. The recent usage trends and primary agricultural uses for these eight pesticides are summarized in **Appendix E**. This information is currently limited to historical data reported through 2006 and is not yet available for the Storm Season 2007 or Irrigation Season 2007 monitoring periods. Based on these data, no overall trends were apparent for changes in total use of these eight pesticides for the 16 counties within the Coalition watershed. Four of eight pesticides had a small increase (i.e., less than 10%) in total use; three pesticides had a larger decrease (i.e., greater than 15%), and one (simazine) had a larger increase (i.e., greater than 15%) in total use.

Table 14. Total Pesticide Applications in Sacramento Valley Water Quality Coalition Counties

County[1]	Pounds Applied, 2003	Pounds Applied, 2004	Pounds Applied, 2005	Pounds Applied, 2006	Pounds Applied, 2007[2]
Amador	101,889	117,736	150,022	92,679	
Butte	3,062,292	2,962,210	3,142,996	3,445,277	
Colusa	2,088,248	1,809,678	1,908,137	2,100,392	
El Dorado	103,487	105,982	129,673	113,738	
Glenn	2,284,461	2,399,082	2,207,066	2,476,359	
Lake	786,874	704,033	757,574	525,120	
Napa[3]	1,934,856	2,236,410	2,338,185	1,505,776	
Placer	267,931	374,618	318,128	327,779	
Plumas	14,447	11,931	7,352	7,047	
Sacramento	3,583,177	3,283,459	3,887,613	3,294,073	
Shasta	293,445	294,416	217,830	371,317	
Sierra	4,812	3,727	2,360	6,661	
Solano	1,089,607	1,025,269	1,013,223	791,365	
Sutter	3,305,776	3,624,764	3,307,058	3,156,692	
Tehama	659,978	596,303	858,989	823,095	
Yolo	2,644,303	2,665,655	2,823,694	2,648,416	
Yuba	1,427,355	1,398,577	1,499,642	1,390,902	
Totals	**23,648,126**	**23,610,123**	**24,567,182**	**23,070,027**	

Notes: Pesticde application totals for all counties include low risk pesticides (such as sulfur) that are applied at relatively high rates compared to more toxic pesticides. These high-application rate pesticides make up a large proportion of the total pounds applied.

1. The tabled values provided are total pesticide use for each county and include acreage outside of the Coalition boundary. Total pesticide use in the specific drainages monitored for the *ILP* is a fraction of the totals cited in this table. For example, Napa County includes acreage in the Western portion of the county that is outside of the Sacramento Valley watershed and under the Jurisdiction of Region 2 (San Francisco Bay Regional Water Quality Control Board). The Putah Creek drainage monitored for the ILP in this subwatershed contains approximately 8% of the total irrigated acreage in County and uses an even lower percentage of the total pesticides applied in the County.
2. This information is not yet available and will be included in the 2008 Semi-Annual Irrigation Season Monitoring Report.
3. The area of irrigated acreage in Napa County that is in Region 5 (3,400 acres) is about 7.5% of the total irrigated acres in Napa.

Data Interpretation

SUMMARY OF SAMPLING CONDITIONS

Sample collection for the April 2007 – October 2007 Coalition irrigation season was characterized by predominantly dry weather with above average temperatures (mean temperature, April through August; September and October had below average mean temperatures.).[2] The 2007 Irrigation Season began early due to below-average precipitation during the 2007 Storm Season. Based on climatic data available for the Sacramento Executive Airport weather station, 1.34 inches of rain fell in April, and a record total of 0.41 inches in May (more than half of this amount occurred during a 24-hour period spanning May 3-4). A trace amount of precipitation occurred on July 11, and no precipitation occurred in June or August. A record-setting 0.06 inches of rain fell in September, and 1.05 inches fell in October (all rainfall occurred after the UFRW sampling event on October 2).[3] The maximum temperature exceeded 90 degrees Fahrenheit on one day in April, four days in May, 12 days in June, 20 days in July, 21 days in August, and five days in September. Record-setting high temperatures occurred throughout the Sacramento Valley in July and August; the average maximum temperatures at the Sacramento Executive Airport were 91.5 and 91.8 degrees Fahrenheit, respectively.

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 25). Based on these evaluations, the program data quality objectives of completeness, representativeness, precision, and accuracy of monitoring data have largely been achieved. These results indicate that the data collected are valid and adequate to support the objectives of the monitoring program, and demonstrate compliance with the requirements of the *ILP*.

The results of these evaluations were summarized previously in **Table 6** 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 *ILP*. The additional thresholds considered include USEPA aquatic life criteria (USEPA 1999) that were not included in the California Toxics Rule, USEPA Maximum Contaminant

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

[3] Climate data for Sacramento Executive Airport available at: http://www.weather.gov/climate/index.php?wfo=sto

Levels (MCL) for drinking water, and minimum toxic thresholds from USEPA's Office of Pesticide Programs (OPP) Ecotoxicity database (USEPA 2002). Also considered are the recently finalized National Water Criteria for diazinon (USEPA 2006). Water quality objectives and other relevant water quality thresholds discussed in this section are summarized in **Tables 15** and **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. Adopted Basin Plan and California Toxics Rule Objectives for Analytes Monitored for the 2007 Irrigation 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 2007 Irrigation Season

Analyte	Unadopted Limit[1]	Units	Limit Source
Boron, total	700	ug/L	UN Agricultural Supply Goal
Chlorpyrifos	0.014	ug/L	National Criterion
Conductivity	900	uS/cm	CA Recommended 2° MCL
Diazinon	0.17	ug/L	USEPA 2006
E. coli [1]	235	MPN/100mL	Basin Plan Amendment
Conductivity	700	uS/cm	UN Agricultural Supply Goal
Total Dissolved Solids	500	mg/L	CA Recommended 2° MCL
Total Dissolved Solids	450	mg/L	UN Agricultural Supply Goal

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

Table 17. Analytes Monitored for the 2007 Irrigation 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 19 Coalition water quality samples collected from ten different sites for five of six events conducted during the 2007 Irrigation Season. Significant toxicity to the algae *Selenastrum* was observed at five sites, and significant toxicity to *Ceriodaphnia* was observed at seven sites. No significant toxicity to fathead minnows (*Pimephales*) was observed in any of the Upper Feather river watershed samples tested with this species. The majority of significant toxicity (10 cases) was observed during the first irrigation season event in April 2007. Samples exhibiting statistically significant toxicity are summarized in **Table 18**. Sediment samples collected in April and August were also tested for toxicity to *Hyalella azteca*. Only one sediment sample exhibited statistically significant toxicity, and none of the sediment samples exhibited reductions in survival of greater than 20% compared to controls.

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*."), and the results for samples collected during the Coalition Irrigation Season monitoring were reported to the Water Board by the Coalition in "Exceedance Reports" and "Communication Reports" as required by the *ILP* 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 019

Coon Creek at Brewer Road (CCBRW)

In a toxicity test conducted with *Selenastrum*, the Coalition observed a reduction in cell growth of 53% compared to the control. There was no significant *Selenastrum* toxicity in the follow-up samples collected on 4/24/07 from the CCBRW or CCDOW locations, indicating that toxicity was not persistent in ambient waters. The results of the follow-up evaluations did not identify any potential causes or sources of the toxicity to *Selenastrum*. The chemical analyses did not detect any pesticides or other chemicals at concentrations toxic to *Selenastrum* in the initial samples or the follow-up samples in this drainage.

Coon Hollow Creek (COONH)

In a toxicity test conducted with *Ceriodaphnia*, the Coalition observed a reduction in survival of 85% compared to the control. There was significant *Ceriodaphnia* toxicity in both of the follow-up samples collected on 4/25/07 in the Coon Hollow Creek drainage. The TIE results were inconclusive and chemical analyses did not detect any pesticides or other chemicals at concentrations toxic to *Ceriodaphnia* in the initial samples or the follow-up samples. Results of the follow-up sampling suggested that the source of toxicity in these samples was from the upper part of the Coon Hollow Creek drainage, which has limited agricultural acreage. These results suggest that the toxicity is probably not from an agricultural source.

Laguna Creek at Alta Mesa Rd (LAGAM)

In a toxicity test conducted with *Ceriodaphnia*, the Coalition observed a reduction in survival of 75% compared to the control. There was significant *Ceriodaphnia* toxicity in both of the follow-up samples collected on 4/25/07 in the Laguna Creek drainage at the initial location and one upstream location. This suggests that toxicity in these samples originated from the upper part of the drainage above the upstream location.

Walker Creek at Co Rd 48 (WLKRC)

In a toxicity test conducted on water samples with *Ceriodaphnia*, the Coalition observed a reduction in survival of 54% compared to the control. However, the control survival for this test was below the test acceptance criterion and the sample was retested. The results of this retest met test acceptance criteria and confirmed the apparent toxicity observed in the initial test, with a reduction in survival of 83% compared to the control. There was no significant *Ceriodaphnia* toxicity in the follow-up samples collected on 4/24/07 in the Walker Creek drainage, indicating that toxicity was not persistent in ambient waters. The TIE results indicated that a metabolically-activated particulate-associated compound was the primary cause of the *Ceriodaphnia* toxicity observed in the 4/17/07 sample. Chemical analyses detected malathion and diazinon at concentrations below levels acutely toxic to *Ceriodaphnia*. Malathion and diazinon are highly soluble and would not be effectively removed by centrifugation, suggesting that another metabolically-activated compound might be contributing to the *Ceriodaphnia* toxicity.

Willow Slough Bypass at SP (WLSBP)

In a toxicity test conducted with *Ceriodaphnia*, the Coalition observed a reduction in survival of 100% compared to the control (complete mortality). In a toxicity test conducted with *Selenastrum*, the Coalition observed a reduction in cell growth of 24% compared to the control. There was no significant *Ceriodaphnia* toxicity in the follow-up samples collected on 4/24/07 in the Willow Slough drainage. There was no significant *Selenastrum* toxicity in the follow-up sample collected on 4/24/07 from the WLSBP location, but there was a small but statistically significant reduction in *Selenastrum* cell density in the sample from the north part of the drainage (WLSNO) (11.7% reduction compared to control), and no reduction in the sample from the south part of the drainage (WLSSO). The TIE and chemical analyses indicated that chlorpyrifos and carbofuran were the primary causes of the *Ceriodaphnia* toxicity observed in the 4/17/07 sample. Chemical analyses indicated that diuron was the most likely cause of the *Selenastrum* toxicity in this sample.

Event 020

Freshwater Creek at Gibson Rd (FRSHC)

In toxicity tests conducted with *Selenastrum* on replicate samples, the Coalition observed reductions in cell density of 14% and 21% compared to the control. The average reduction for the two replicates was less than 20% compared to the control. However, these results were statistically significant and are therefore in exceedance of the Basin Plan narrative objective for toxicity. Because the average reduction in algae growth was less than 20%, no additional follow up samples or analyses were triggered. However, trace metal and pesticide results were evaluated for possible causes of the reduced *Selenastrum* growth in the FRSHC samples. Trace metals did not exceed aquatic life criteria or concentrations expected to result in toxicity to *Selenastrum*.

Pesticide analyses included organophosphate pesticides, carbamates, organochlorine pesticides, triazines, paraquat, and glyphosate. Thiobencarb was detected in the FRSHC replicate samples (7.6 ug/L and 4.0 ug/L), and trifluralin (0.001J ug/L) was detected at the detection limit in one replicate. The detected concentrations did not exceed the values reported in USEPA Aquatic Life Benchmark Table (http://www.epa.gov/oppefed1/ecorisk_ders/aquatic_life_benchmark.htm) for effects on nonvascular plants (algae). The aquatic life benchmarks provided by USEPA are based on toxicity values from data supporting registration of the listed pesticides. The benchmarks are estimates of the concentrations below which pesticides are not expected to have the potential for adverse effects on aquatic life. Although the thiobencarb concentrations did not exceed the benchmark for algae (17 ug/L), these concentrations may have contributed to the reduced *Selensastrum* growth, and also exceed the Basin Plan numeric objective (1.0 ug/L) based on the MUN beneficial use and the Basin Plan performance goal of 1.5 ug/L.

Event 021

Due to a Lab Control sample that did not meet test acceptability criteria for the *Ceriodaphnia* test, samples for five sites were retested (SSLIB, LAGAM, LRLNC, FRSHC, and CCCPY) on June 19 and new samples were also collected at all five sites on June 27. There was no significant toxicity observed in the retests of the original samples or in the new samples collected at these sites on June 27.

Cache Creek at Capay Diversion Dam (CCCPY)

In toxicity tests conducted with *Selenastrum*, the Coalition observed reductions in cell density of 89% compared to the control. Follow-up samples were collected at CCCPY and an upstream location near Guinda (CCGND) to evaluate persistence of ambient toxicity and the possible upstream extent and source(s) of toxicity. There was no significant toxicity in the follow-up samples, indicating that ambient toxicity to *Selenastrum* was not persistent. The follow-up samples provided no information regarding possible sources of toxicity. The TIE results were inconclusive and chemical analyses did not detect any pesticides or other chemicals at concentrations toxic to *Selenastrum* in the initial sample. The observed toxicity was not persistent in the original sample and was not observed in ambient follow-up samples. Based on the TIEs, pesticide analyses, and evaluation of pesticide application data, it is unlikely that agricultural practices were the source of the observed toxicity.

Coon Hollow Creek (COONH)

In a toxicity test conducted with *Ceriodaphnia*, the Coalition observed a reduction in survival of 90% compared to the control. Follow-up samples were collected on June 23 at the COONH location and an upstream location on Coon Hollow Creek with public access (CNHFU). The COONH sample exhibited a significant reduction in survival (16% of Control survival). The upstream CNHFU sample was not toxic to *Ceriodaphnia*. The TIE results indicated that the toxicity in the initial sample was due to particulate-associated metabolically-activated organic compound, such as an organophosphate pesticide. However, chemical analyses did not detect any pesticides or other chemicals at concentrations toxic to *Ceriodaphnia* in the initial samples. High inter-replicate variability in some of the toxicity tests and TIEs also supported a sediment-associated compound. Observation of toxicity to *Ceriodaphnia* in the follow-up sample for COONH suggests a potentially persistent source that is not typical of agricultural practices. No conclusive determination was made of the source or cause of toxicity.

Freshwater Creek at Gibson Rd (FRSHC)

In a toxicity test conducted with *Ceriodaphnia*, the Coalition observed a reduction in survival of 100% compared to the control (complete mortality) in the initial test. This test was determined to invalid due to unacceptable control performance, and no toxicity was detected in the restest of this sample. Follow-up samples were collected at FRSHC and an upstream location (FRSWF) to evaluate persistence of ambient toxicity and the possible upstream extent and source(s) of toxicity. The TIE results were inconclusive and chemical analyses did not detect any pesticides or other chemicals at concentrations toxic to *Ceriodaphnia* in the initial sample. The observed toxicity was not persistent in the original sample and was not observed in ambient follow-up samples. No conclusive determination was made of the source or cause of toxicity. Based on these results, the initial finding of toxicity was not considered to be valid and the result was rejected.

Event 022

No samples collected in July 2007 exhibited significant toxicity to *Ceriodaphnia* or *Selenastrum*.

Event 023

Cache Creek at Capay Diversion Dam (CCCPY)

In a toxicity test conducted with *Ceriodaphnia*, the Coalition observed a reduction in survival of 95% compared to the control. Follow-up sampling was conducted at CCCPY and additional samples were collected upstream from this site on August 30, 2007. The TIE results were inconclusive and chemical analyses did not detect any pesticides or other chemicals at concentrations toxic to *Ceriodaphnia* in the initial sample. The observed toxicity was not persistent in the original sample and was not observed in ambient follow-up samples. Based on the TIEs and pesticide analyses, it is unlikely that agricultural practices were the source of the observed toxicity.

Coon Hollow Creek (COONH)

In a toxicity test conducted with *Ceriodaphnia*, the Coalition observed a reduction in survival of 42% compared to the control. After consultation with Water Board ILP staff, it was agreed that no immediate follow-up sampling would be conducted at COONH, because a management plan is under development to address *Ceriodaphnia* toxicity observed in this watershed.

Lurline Creek at 99W (LRLNC)

In a sediment toxicity test conducted with *Hyalella*, the Coalition observed a reduction in survival of 17.5% compared to the control. This result was statistically significant, but did not exceed the 20% trigger for conducting follow-up testing or analyses.

Event 024

Walker Creek at Co Rd 48

In a toxicity test conducted with *Ceriodaphnia*, the Coalition observed a reduction in survival of 60% compared to the control. This result was statistically significant and is in exceedance of the Basin Plan narrative objective for toxicity. Follow-up sampling was conducted at WLKRC and at

one upstream site (Walker Creek below Artois, WLKRE) on September 25, 2007. Toxicity was not observed in these ambient follow-up samples. The TIE results for WLKRC were inconclusive because toxicity was not persistent in the original sample. However, chemical analyses detected chlorpyrifos in the initial sample at an elevated level sufficient to cause the observed toxicity to *Ceriodaphnia*. No other pesticides were detected, and trace metal concentrations did not exceed water quality objectives. Based on the pesticide analyses, it is likely that applications of chlorpyrifos reported for the month prior to sampling were the source of the observed toxicity in the WLKRC sample.

Table 18. Summary of Water Column Samples Exceeding the Basin Plan Narrative Toxicity Objective, April 2007 – October 2007

Site	Date	Species	Units	% of Control
Cache Creek at Capay Diversion Dam	6/20/07	*Selenastrum* cell density	% of Control	11.1%
Cache Creek at Capay Diversion Dam	8/22/07	*Ceriodaphnia* survival	% of Control	5%
Coon Creek at Brewer Road	4/18/07	*Selenastrum* cell density	% of Control	46.6%
Coon Hollow Creek	4/17/07	*Ceriodaphnia* survival	% of Control	15.0%
Coon Hollow Creek	4/25/07	*Ceriodaphnia* survival	% of Control	20.0%
Coon Hollow Creek FU SITE 1	4/25/07	*Ceriodaphnia* survival	% of Control	0.0%
Coon Hollow Creek	6/19/07	*Ceriodaphnia* survival	% of Control	10%
Coon Hollow Creek	6/23/07	*Ceriodaphnia* survival	% of Control	15.8%
Coon Hollow Creek	8/22/07	*Ceriodaphnia* survival	% of Control	58%
Freshwater Creek at Gibson Rd	5/16/07	*Selenastrum* cell density	% of Control	86.3%
Freshwater Creek at Gibson Rd – *field replicate sample*	5/16/07	*Selenastrum* cell density	% of Control	78.9%
Laguna Creek at Alta Mesa Rd	4/17/07	*Ceriodaphnia* survival	% of Control	25.0%
Laguna Creek at Alta Mesa Rd	4/25/07	*Ceriodaphnia* survival	% of Control	5.0%
Laguna Creek below Reclamation Canal	4/25/07	*Ceriodaphnia* survival	% of Control	15.0%
Lurline Creek at 99W (*sediment*)	8/22/07	*Hyalella* survival	% of Control	82.5%
Walker Creek at Co Rd 48 (*retest*)	4/17/07	*Ceriodaphnia* survival	% of Control	16.7%
Walker Creek at Co Rd 48	9/18/07	*Ceriodaphnia* survival	% of Control	40%
Willow Slough Bypass at SP	4/17/07	*Ceriodaphnia* survival	% of Control	0.0%
Willow Slough Bypass at SP	4/17/07	*Selenastrum* cell density	% of Control	76.4%
Willow Slough North Fk at CR-99	4/24/07	*Selenastrum* cell density	% of Control	88.3%

Pesticides Detected in Coalition Monitoring

Pesticides were analyzed in 106 individual water column samples collected from April 2007 to October 2007. Analyses were conducted for organophosphates, carbamates, organochlorines, triazines, pyrethroids, glyphosate, and paraquat. Within these categories, 22 different pesticides were detected in 66 separate samples (out of 106 individual samples) collected for Coalition monitoring conducted April 2007 to October 2007. Legacy organochlorines were detected in 10 samples from six sites. It should be noted that detected pesticides are not equivalent to exceedances. Five pesticides (carbofuran, chlorpyrifos, malathion, thiobencarb, and DDE) exceeded applicable water quality objectives in a total of 18 Irrigation Season 2007 samples. Seven pesticides (azinphos-methyl, carbofuran, chlorpyrifos, malathion, methomyl, methyl parathion, and thiobencarb) were detected at concentrations with the potential to cause toxicity to sensitive invertebrate test species, but only carbofuran and chlorpyrifos were conclusively associated with any detected significant toxicity to *Ceriodphnia*. One thiobencarb exceedance was associated with a case of significant *Selenastrum* toxicity, and diuron was was determined to be a probable contributor to *Selenastrum* toxicity in another sample.

All detected pesticide concentrations for Coalition monitoring conducted between April 2007 and October 2007 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*[4].

- Atraton was detected in one sample. There is no adopted objective for atraton.
- Atrazine was detected in eight samples from six different sites. Atrazine did not exceed the California 1˚ MCL of 1 ug/L, in any samples, and did not exceed any of USEPA's *Aquatic Life Benchmarks.*
- Azinphos-methyl was detected in one sample. Azinphos-methyl was detected at a concentration with the potential to cause toxicity to sensitive invertebrate test species in this sample, but this concentration was not associated with any toxicity in the sample. Azinphos-methyl exceeded the revised National criterion (0.01 ug/L, USEPA 2006) in this sample.
- Carbofuran was detected in one sample and also exceeded the Basin Plan objective (0.4 ug/L) in this sample. Carbofuran was detected at a concentration with the potential to cause toxicity to *Ceriodaphnia* and was associated with observed significant toxicity to *Ceriodphnia* in this sample (Willow Slough, 4/17/2007).
- Chlorpyrifos was detected in ten samples from six different sites. Chlorpyrifos exceeded the Basin Plan Amendment objective (.015 ug/L) in eight samples. Chlorpyrifos was detected at concentrations with the potential to cause toxicity to sensitive invertebrate test species, but these concentrations were associated with

[4] *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

observed significant toxicity to *Ceriodphnia* in only two samples (Willow Slough, 4/17/2007, and Walker Creek 9/18/2007).

- DDE (p,p'), a legacy organochlorine pesticide, was detected in 12 samples from five 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 six samples from six different sites. Detected concentrations did not exceed the Basin Plan Amendment objective of 0.10 ug/L or the revised National criterion (0.17 ug/L, USEPA 2006) in any sample. Detected concentrations were also well below USEPA's *Aquatic Life Benchmarks* for invertebrates. Toxicity to *Ceriodaphnia* was observed in one sample with detected diazinon (Walker Creek, 4/17/2007) although the diazinon concentration (0.014 ug/L) was well below concentrations with the potential to cause acute or chronic toxicity (0.17 ug/L and 0.1 ug/L, respectively) to *Ceriodaphnia*.
- 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 ten samples from four different sites. Detected concentrations were below levels with the potential to cause adverse effects to *Selanastrum* (2.4 ug/L) and were not associated with toxicity. There is no adopted objective for diuron.
- Endrin was detected in one sample. Endrin did not exceed the CTR objective (.036 ug/L) in this sample.
- Endrin ketone was detected in one sample. Endrin ketone is a legacy pesticide, and there is no adopted objective for endrin ketone.
- Malathion was detected in four samples from three different sites. Malathion exceeded the Basin Plan objective (0.1 ug/L) in one sample (Willow Slough, 7/17/2007) but was not associated with any observed sample toxicity. Toxicity to *Ceriodaphnia* was observed in one sample with detected malathion (Walker Creek, 4/17/2007) although the concentration (0.013 ug/L) was well below concentrations expected to cause no acute or chronic toxicity (0.25 ug/L and 0.06 ug/L, respectively) to *Ceriodaphnia*.
- Methamidophos was detected in one sample. There is no adopted objective for methamidophos.
- Methomyl was detected in one sample (Freshwater Creek, 9/18/2007). Methomyl was detected at a concentration (0.53 ug/L) with the potential to cause chronic toxicity to sensitive invertebrate test species in this sample, but was not associated with any observed sample toxicity. There is no adopted objective for methomyl.
- Molinate was detected in seven samples from three different sites. Detected concentrations of this carbamate herbicide were below concentraions with the potential to cause adverse effects to sensitive test species (105 ug/L) and detections

were not associated with any observed sample toxicity. Molinate did not exceed the Basin Plan objective of 10 ug/L in any sample.

- Methyl parathion was detected in one sample. Methyl parathion did not exceed the Basin Plan objective (0.13 ug/L) in this sample and was not associated with any observed sample toxicity.
- Oryzalin was detected in one sample. The detected concentration was below levels with the potential to cause adverse effects on sensitive test species (42 ug/L). There is no adopted objective for oryzalin.
- Pendimethalin (Prowl) was detected in two samples from two different sites. The detected concentrations of this herbicide were below levels with the potential to cause adverse effects to sensitive test species (5.4 ug/L) and the detection was not associated with toxicity. There is no adopted objective for pendimethalin.
- Prometon was detected in four samples from two different sites. Detected concentrations were below levels with the potential to cause adverse effects on sensitive test species. There is no adopted objective for prometon.
- Propargite was detected in one sample. The detected concentration of was below levels with the potential to cause adverse effects on sensitive test species (9 ug/L). There is no adopted objective for propargite.
- Simazine was again the most common of the pesticides detected (in 28 samples from 11 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 did not exceed the California 1˚ MCL of 4 ug/L in any samples.
- Sulprofos (Bolstar) was detected in one sample and was below levels with the potential to cause adverse effects on sensitive test species (>0.5 ug/L). There is no adopted objective for sulprofos.
- Thiobencarb was detected in ten samples from four different sites. Thiobencarb exceeded the Basin Plan objective of 1.0 ug/L in three of these samples (including two replicate samples). Concentrations detected in two replicates (Freshwater Creek, 5/16/2007) were associated with observed toxicity to *Selenastrum*. Other samples were well below objectives and levels with the potential to cause adverse effects to test species and were not associated with toxicity.
- Trifluralin was detected in eleven samples from five different sites. The detected concentrations of this herbicide were below levels with the potential to cause adverse effects to sensitive test species (1.14 ug/L) in all samples. There is no adopted objective for trifluralin.
- Paraquat and glyphosate were not detected in any samples.

Table 19. Pesticides Detected in Coalition Monitoring, April 2007 – October 2007

Site	Date Sampled	Analyte	Result[1] (µg/L)	Water Quality Limits[2]	
Gilsizer Sl. at G. Washington Rd.	04/18/2007	Atrazine	J .008	1	CA 1˚ MCL
Gilsizer Sl. at G. Washington Rd.	04/18/2007	Prometon	J .009	NA	NA
Gilsizer Sl. at G. Washington Rd.	04/18/2007	Simazine	.669	4	CA 1˚ MCL
Gilsizer Sl. at G. Washington Rd.	05/16/2007	Prometon	J .008	NA	NA
Gilsizer Sl. at G. Washington Rd.	05/16/2007	Simazine	.077	4	CA 1˚ MCL
Gilsizer Sl. at G. Washington Rd.	07/18/2007	Simazine	J .005	4	CA 1˚ MCL
Gilsizer Sl. at G. Washington Rd.	08/22/2007	DDE(p,p')	J .0043	.00059	CTR
Gilsizer Sl. at G. Washington Rd.	08/22/2007	Diazinon	.005	0.1	BPA
Gilsizer Sl. at G. Washington Rd.	09/18/2007	DDE(p,p')	0.0053	0.00059	CTR
Lower Snake R. at Nuestro Rd	04/18/2007	Simazine	J .005	4	CA 1˚ MCL
Lower Snake R. at Nuestro Rd	05/16/2007	Molinate	.718	10	BP
Lower Snake R. at Nuestro Rd	06/19/2007	Molinate	.3122	10	BP
Lower Snake R. at Nuestro Rd	06/19/2007	Thiobencarb	J .0736	1	CA 2˚ MCL
Lower Snake R. at Nuestro Rd	07/18/2007	Molinate	.1813	10	BP
Lower Snake R. at Nuestro Rd	07/18/2007	Thiobencarb	J .0851	1	CA 2˚ MCL
Lower Snake R. at Nuestro Rd	08/22/2007	Parathion, Methyl	.082	.13	BP
Pine Creek at Nord Gianella Rd	08/21/2007	Chlorpyrifos	.038	.014	BPA
Freshwater Creek at Gibson Rd	05/16/2007	Thiobencarb	7.585	1	CA 2˚ MCL
Freshwater Creek at Gibson Rd	05/16/2007	Thiobencarb	4.014	1	CA 2˚ MCL
Freshwater Creek at Gibson Rd	05/16/2007	Trifluralin	J .001	NA	NA
Freshwater Creek at Gibson Rd	06/20/2007	Thiobencarb	.1449	1	CA 2˚ MCL
Freshwater Creek at Gibson Rd	07/18/2007	Azinphos methyl	.294	.01	USEPA NRC
Freshwater Creek at Gibson Rd	07/18/2007	Thiobencarb	.1026	1	CA 2˚ MCL
Freshwater Creek at Gibson Rd	09/18/2007	Methomyl	.53	NA	NA
Logan Ck at 4 Mile-Excelsior Rd	04/17/2007	Simazine	.014	4	CA 1˚ MCL
Logan Ck at 4 Mile-Excelsior Rd	05/15/2007	Molinate	J .073	10	BP
Logan Ck at 4 Mile-Excelsior Rd	09/18/2007	Propargite	0.1401	NA	NA
Lurline Creek at 99W	05/15/2007	Thiobencarb	.51	1	CA 2˚ MCL
Lurline Creek at 99W	06/20/2007	Thiobencarb	J .0907	1	CA 2˚ MCL
Lurline Creek at 99W	07/17/2007	Thiobencarb	J .0514	1	CA 2˚ MCL
Lurline Creek at 99W	08/22/2007	DDE(p,p')	J .0033	.00059	CTR
Lurline Creek at 99W	09/19/2007	Diazinon	0.035	0.1	BPA
Lurline Creek at 99W	09/19/2007	Pendimethalin	1.35	NA	NA
Walker Creek at Co Rd 48	04/17/2007	Diazinon	.014	0.1	BPA
Walker Creek at Co Rd 48	04/17/2007	Diuron	.66	NA	NA
Walker Creek at Co Rd 48	04/17/2007	Malathion	.013	.1	BP
Walker Creek at Co Rd 48	04/17/2007	Simazine	.243	4	CA 1˚ MCL
Walker Creek at Co Rd 48	04/17/2007	Trifluralin	.0074	NA	NA
Walker Creek at Co Rd 48	05/15/2007	Atraton	.023	NA	NA
Walker Creek at Co Rd 48	05/15/2007	Simazine	.248	4	CA 1˚ MCL
Walker Creek at Co Rd 48	06/19/2007	Molinate	.1927	10	BP

Site	Date Sampled	Analyte	Result[1] (µg/L)	Water Quality Limits[2]	
Walker Creek at Co Rd 48	06/19/2007	Simazine	.391	4	CA 1˚ MCL
Walker Creek at Co Rd 48	08/21/2007	Chlorpyrifos	.05	.015	BPA
Walker Creek at Co Rd 48	08/21/2007	Chlorpyrifos	.046	.015	BPA
Walker Creek at Co Rd 48	08/21/2007	Molinate	J .0503	10	BP
Walker Creek at Co Rd 48	08/21/2007	Molinate	J .052	10	BP
Walker Creek at Co Rd 48	08/21/2007	Simazine	J .007	4	CA 1˚ MCL
Walker Creek at Co Rd 48	08/21/2007	Simazine	J .007	4	CA 1˚ MCL
Walker Creek at Co Rd 48	09/18/2007	Chlorpyrifos	0.017	.015	BPA
Coon Hollow Creek	04/17/2007	DDE(p,p')	.0067	.00059	CTR
Coon Hollow Creek	04/25/2007	Atrazine	.066	1	CA 1˚ MCL
Coon Hollow Creek	07/18/2007	Chlorpyrifos	.003	.015	BPA
Coon Hollow Creek	07/18/2007	DDE(p,p')	.0164	.00059	CTR
Coon Hollow Creek	07/18/2007	Endrin Ketone	J .003	NA	NA
Coon Hollow Creek	08/21/2007	DDE(p,p')	J .0031	.00059	CTR
Coon Hollow Creek	09/18/2007	DDE(p,p')	0.0073	0.00059	CTR
Coon Hollow Ck FU SITE 1	04/25/2007	Atrazine	J .006	1	CA 1˚ MCL
North Canyon Creek	04/17/2007	Diazinon	.017	0.1	BPA
Coon Creek at Brewer Road	04/18/2007	Diuron	J .21	NA	NA
Coon Creek at Brewer Road	04/18/2007	Simazine	.012	4	CA 1˚ MCL
Coon Creek at Brewer Road	05/16/2007	Thiobencarb	8.572	1	CA 2˚ MCL
Coon Creek at Brewer Road	08/22/2007	Chlorpyrifos	.007	.015	BPA
Dry Creek at Alta Mesa Road	04/17/2007	Simazine	.066	4	CA 1˚ MCL
Dry Creek at Alta Mesa Road	05/15/2007	Atrazine	J .006	1	CA 1˚ MCL
Dry Creek at Alta Mesa Road	05/15/2007	Simazine	.048	4	CA 1˚ MCL
Laguna Creek at Alta Mesa Rd	04/17/2007	Simazine	J .006	4	CA 1˚ MCL
Laguna Creek at Alta Mesa Rd	04/25/2007	Simazine	J .005	4	CA 1˚ MCL
Laguna Creek at Alta Mesa Rd	05/15/2007	Atrazine	J .006	1	CA 1˚ MCL
Laguna Creek at Alta Mesa Rd	06/20/2007	Atrazine	.405	1	CA 1˚ MCL
Laguna Creek at Alta Mesa Rd	07/17/2007	Atrazine	.031	1	CA 1˚ MCL
Cache Cr at Capay Diversion Dam	04/18/2007	Simazine	J .005	4	CA 1˚ MCL
Cache Cr at Capay Diversion Dam	05/16/2007	Trifluralin	J .003	NA	NA
Cache Cr at Capay Diversion Dam	07/18/2007	Endrin	.0075	.036	CTR
Cache Cr at Capay Diversion Dam	08/22/2007	Simazine	J .007	4	CA 1˚ MCL
Cache Cr at Capay Diversion Dam	09/18/2007	Simazine	0.008	4	CA 1˚ MCL
Shag Sl at Liberty Island Bridge	04/17/2007	Diazinon	.014	0.1	BPA
Shag Sl at Liberty Island Bridge	04/17/2007	Simazine	.031	4	CA 1˚ MCL
Shag Sl at Liberty Island Bridge	05/15/2007	Simazine	.017	4	CA 1˚ MCL
Ulatis Creek at Brown Road	04/17/2007	Diazinon	.006	0.1	BPA
Ulatis Creek at Brown Road	04/17/2007	Diuron	1.6	NA	NA

Site	Date Sampled	Analyte	Result[1] (µg/L)	Water Quality Limits[2]	
Ulatis Creek at Brown Road	04/17/2007	Malathion	.012	.1	BP
Ulatis Creek at Brown Road	04/17/2007	Oryzalin	J .23	NA	NA
Ulatis Creek at Brown Road	04/17/2007	Prometon	.017	NA	NA
Ulatis Creek at Brown Road	04/17/2007	Simazine	.153	4	CA 1˚ MCL
Ulatis Creek at Brown Road	04/17/2007	Trifluralin	J .0038	NA	NA
Ulatis Creek at Brown Road	05/15/2007	Atrazine	J .006	1	CA 1˚ MCL
Ulatis Creek at Brown Road	05/15/2007	Diuron	J .25	NA	NA
Ulatis Creek at Brown Road	05/15/2007	Prometon	J .005	NA	NA
Ulatis Creek at Brown Road	05/15/2007	Simazine	.026	4	CA 1˚ MCL
Ulatis Creek at Brown Road	05/15/2007	Trifluralin	J .002	NA	NA
Ulatis Creek at Brown Road	06/20/2007	Diuron	J .31	NA	NA
Ulatis Creek at Brown Road	06/20/2007	Simazine	.023	4	CA 1˚ MCL
Ulatis Creek at Brown Road	07/17/2007	Simazine	.016	4	CA 1˚ MCL
Ulatis Creek at Brown Road	07/17/2007	Sulprofos	.073	NA	NA
Ulatis Creek at Brown Road	08/21/2007	Malathion	.018	.1	BP
Ulatis Creek at Brown Road	08/21/2007	Simazine	.018	4	CA 1˚ MCL
Ulatis Creek at Brown Road	09/19/2007	Methamidophos	J .065	NA	NA
Ulatis Creek at Brown Road	09/19/2007	Simazine	0.018	4	CA 1˚ MCL
Willow Slough Bypass at SP	04/17/2007	Carbofuran	.72	0.4	BP
Willow Slough Bypass at SP	04/17/2007	Chlorpyrifos	.083	.015	BPA
Willow Slough Bypass at SP	04/17/2007	Diuron	3.7	NA	NA
Willow Slough Bypass at SP	04/17/2007	DDE(p,p')	J .0043	.00059	CTR
Willow Slough Bypass at SP	04/17/2007	Simazine	.012	4	CA 1˚ MCL
Willow Slough Bypass at SP	04/17/2007	Trifluralin	.1274	NA	NA
Willow Slough Bypass at SP	05/15/2007	Chlorpyrifos	.013	.014	BPA
Willow Slough Bypass at SP	05/15/2007	Diuron	.69	NA	NA
Willow Slough Bypass at SP	05/15/2007	Diuron	.69	NA	NA
Willow Slough Bypass at SP	05/15/2007	Trifluralin	.084	NA	NA
Willow Slough Bypass at SP	06/19/2007	Diuron	.4	NA	NA
Willow Slough Bypass at SP	06/19/2007	Pendimethalin	.2006	NA	NA
Willow Slough Bypass at SP	06/19/2007	Trifluralin	.0201	NA	NA
Willow Slough Bypass at SP	07/17/2007	DDE(p,p')	J .004	.00059	CTR
Willow Slough Bypass at SP	07/17/2007	Dimethoate	.177	NA	NA
Willow Slough Bypass at SP	07/17/2007	Diuron	J .28	NA	NA
Willow Slough Bypass at SP	07/17/2007	Malathion	.455	.1	BP
Willow Slough Bypass at SP	07/17/2007	Trifluralin	.0092	NA	NA
Willow Slough Bypass at SP	08/21/2007	Chlorpyrifos	.023	.015	BPA
Willow Slough Bypass at SP	08/21/2007	DDE(p,p')	.0056	.00059	CTR
Willow Slough Bypass at SP	08/21/2007	Simazine	J .007	4	CA 1˚ MCL
Willow Slough Bypass at SP	08/21/2007	Trifluralin	.0092	NA	NA
Willow Slough Bypass at SP	09/19/2007	Chlorpyrifos	0.016	0.014	BPA
Willow Slough Bypass at SP	09/19/2007	DDE(p,p')	J .0037	0.00059	CTR
Willow Slough Bypass at SP	09/19/2007	Simazine	J .008	4	CA 1˚ MCL

Site	Date Sampled	Analyte	Result[1] (µg/L)	Water Quality Limits[2]	
Willow Slough Bypass at SP	09/19/2007	Trifluralin	0.0051	NA	NA
Willow Slough North Fk at CR99	07/17/2007	DDE(p,p')	.0104	.00059	CTR
Willow Slough North Fk at CR99	09/19/2007	Chlorpyrifos	0.021	.015	BPA

1. "J" indicates pesticide was detected below the quantitation limit (QL)
2. Water Quality Objective Basis: BP = Central Valley Basin Plan; BPA = Basin Plan Amendment; 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.
3. Concentration is qualified as *estimated* based on quality assurance results.

Other Coalition-Monitored Water Quality Parameters

Exceedances of adopted Basin Plan objectives and advisory limits were observed for pH, dissolved oxygen (DO), conductivity, copper, total dissolved solids, boron, selenium, and *E. coli* bacteria (**Table 20**). There were no exceedances of water quality objectives for monitored nutrient compounds.

pH

During the 2007 Irrigation Season, pH was measured in 168 samples from 51 Coalition sites. In these samples, pH exceeded the Basin Plan maximum of 8.5 Standard Units (-log[H+]) in eight Coalition samples collected from four different sites (Gilsizer Slough at Bogue Road; Gilsizer Slough at Hutchins Road; Laguna Creek at Alta Mesa Road; and Middle Fork Feather River above Grizzly Creek) and was below the minimum limit of 6.5 Standard Units in one sample (at Anderson Creek at Ash Creek Road). The Basin Plan limit for pH is intended to be assessed based on "…*an appropriate averaging period that will support beneficial uses*". 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, these exceedances were associated with the presence of low flows, ponded conditions, extensive algae and rooted vegetation, and/or supersaturated oxygen concentrations.

Dissolved Oxygen

Dissolved oxygen was measured in in 168 samples from 51 Coalition sites. Dissolved oxygen concentrations were below the Basin Plan lower limit of 7.0 mg/L for waterbodies with a COLD designated beneficial use in 14 samples from eight different sites, and concentrations were below the lower limit of 5.0 mg/L for waterbodies with a WARM designated beneficial use in 19 samples from nine different sites. These exceedances were generally associated with extensive vegetation and lack of visible or measurable flow. Many of these sites lack natural flow during irrigation season.

E. coli *bacteria*

E. coli bacteria were monitored in 123 samples from 30 sites. Coliform bacteria numbers exceeded the single sample maximum objectives for *E. coli* (235 MPN/100mL) in 21 samples from 13 different Coalition locations. The Basin Plan objectives are intended to protect contact recreational uses where ingestion of water is probable (e.g., swimming). In general, 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 potential sources include cattle, horses, and septic systems. *E. coli* exceedances are being investigated by a watershed-wide study of the biological sources of *E. coli* contamination.

Conductivity and Total Dissolved Solids

Conductivity was monitored in 156 samples from 45 Coalition sites. Conductivity exceeded the California recommended 2˚ MCL (900 uS/cm) for drinking water in one sample and the unadopted UN Agricultural Goal (700 uS/cm) in a total of eleven samples collected from seven different sites (Freshwater Creek, Ulatis Creek at Brown Road, Z-Drain, and four different Gilsizer Slough sites). Total dissolved solids (TDS) were monitored in 86 samples from 19 sites. TDS exceeded the California recommended 2˚ MCL (500 mg/L) for drinking water in two samples collected from one site that also exceeded the conductivity objective (Ulatis Creek at Brown Road). 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 *ILP* monitoring included arsenic, boron, cadmium, copper, lead, nickel, selenium, and zinc. Trace metals were monitored in samples collected from 19 Coalition sites. Selenium exceeded the Basin Plan objective of 5 ug/L in one sample from Shag Slough at Liberty Island Bridge (Solano/Yolo subwatershed), and was below detection in 72% of samples. Total boron exceeded the unadopted UN Agricultural Supply Goal (700 ug/L) in 9 samples from Cache Creek at Capay Diversion Dam and Willow Slough Bypass (both in the Solano/Yolo subwatershed), and dissolved boron also exceeded this limit in four samples from these sites. 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. Copper exceeded the hardness-adjusted CTR criterion in one sample (Coon Creek at Brewer Road, 5/16/2007), there was no toxicity to *Ceriodaphnia* or *Selenastrum* associated with the sample. There were no exceedances of objectives for arsenic, cadmium, lead, nickel, or zinc.

Nutrients

Nutrients monitored during the 2007 Irrigation Season included nitrate+nitrite nitrogen, total Kjeldahl nitrogen (TKN), ammonia, total phosphorus, and dissolved orthophosphate. Nutrients were monitored in at 24 different Coalition sites and did not exceed water quality objectives at any sites in the 2007 Irrigation Season monitoring. 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, 2007 Irrigation Season

Site ID	Sample Date	Analyte	Units	Result	WQO[1]	WQO Basis[2]	Mgt Plan[3]
CCCPY	06/20/2007	Boron, Total	ug/L	770	700	A&W	Yes
CCCPY	07/18/2007	Boron, Total	ug/L	810	700	A&W	Yes
CCCPY	08/22/2007	Boron, Dissolved	ug/L	790	(700 as total)	A&W	Yes
CCCPY	08/22/2007	Boron, Total	ug/L	830	700	A&W	Yes
CCCPY	09/19/2007	Boron, Dissolved	ug/L	950	(700 as total)	A&W	Yes
CCCPY	09/19/2007	Boron, Total	ug/L	990	700	A&W	Yes
WLSBP	05/15/2007	Boron, Total	ug/L	1500	700	A&W	Yes
WLSBP	06/19/2007	Boron, Total	ug/L	1700	700	A&W	Yes
WLSBP	07/17/2007	Boron, Total	ug/L	1400	700	A&W	Yes
WLSBP	08/21/2007	Boron, Dissolved	ug/L	1200	(700 as total)	A&W	Yes
WLSBP	08/21/2007	Boron, Total	ug/L	1200	700	A&W	Yes
WLSBP	09/19/2007	Boron, Dissolved	ug/L	1500	(700 as total)	A&W	Yes
WLSBP	09/19/2007	Boron, Total	ug/L	1500	700	A&W	Yes
UCBRD	06/20/2007	Conductivity	uS/cm	858	700	A&W	Yes
UCBRD	07/17/2007	Conductivity	uS/cm	819	700	A&W	Yes
FRSFW	07/18/2007	Conductivity	uS/cm	1234	700	A&W	No
UCBRD	08/21/2007	Conductivity	uS/cm	832	700	A&W	Yes
GILLR	08/22/2007	Conductivity	uS/cm	779	700	A&W	No
GILBR	09/18/2007	Conductivity	uS/cm	774	700	A&W	No
GILLR	09/18/2007	Conductivity	uS/cm	848	700	A&W	No
GILOR	09/18/2007	Conductivity	uS/cm	766	700	A&W	No
UCBRD	09/19/2007	Conductivity	uS/cm	758	700	A&W	Yes
CCBRW	05/16/2007	Copper, Dissolved	ug/L	39	8.3	CTR	No
ACACR	06/19/2007	DO	mg/L	4.95	7 (COLD[7]), 5 (WARM)	BP	No
ACACR	06/19/2007	DO	mg/L	5.21	7 (COLD[7]), 5 (WARM)	BP	No
ACACR	06/19/2007	DO	mg/L	5.2	7 (COLD[7]), 5 (WARM)	BP	No
ACACR	06/19/2007	DO	mg/L	5.2	7 (COLD[7]), 5 (WARM)	BP	No
COYTR	06/19/2007	DO	mg/L	6.19	7 (COLD[7]), 5 (WARM)	BP	No
GILSL	06/19/2007	DO	mg/L	4.5	7 (COLD[7]), 5 (WARM)	BP	No

Site ID	Sample Date	Analyte	Units	Result	WQO[1]	WQO Basis[2]	Mgt Plan[3]
WALKRC	06/19/2007	DO	mg/L	.16	7 (COLD[7]), 5 (WARM)	BP	No
UCBRD	06/20/2007	DO	mg/L	4.6	7 (COLD[7]), 5 (WARM)	BP	No
UCBRD	06/21/2007	DO	mg/L	4.7	7 (COLD[7]), 5 (WARM)	BP	No
UCBRD	06/21/2007	DO	mg/L	4.6	7 (COLD[7]), 5 (WARM)	BP	No
UCBRD	06/21/2007	DO	mg/L	4.6	7 (COLD[7]), 5 (WARM)	BP	No
INDAB	07/10/2007	DO	mg/L	6.6	7 (COLD[7]), 5 (WARM)	BP	No
ACACR	07/17/2007	DO	mg/L	4.74	7 (COLD[7]), 5 (WARM)	BP	No
ACBLF	07/17/2007	DO	mg/L	3.53	7 (COLD[7]), 5 (WARM)	BP	No
ACDSR	07/17/2007	DO	mg/L	6.86	7 (COLD[7]), 5 (WARM)	BP	No
ACLTR	07/17/2007	DO	mg/L	4.58	7 (COLD[7]), 5 (WARM)	BP	No
COYTR	07/17/2007	DO	mg/L	.56	7 (COLD[7]), 5 (WARM)	BP	No
UCBRD	07/17/2007	DO	mg/L	3.94	7 (COLD[7]), 5 (WARM)	BP	No
WALKRC	07/17/2007	DO	mg/L	1.3	7 (COLD[7]), 5 (WARM)	BP	No
FRSFW	07/18/2007	DO	mg/L	5.88	7 (COLD[7]), 5 (WARM)	BP	No
FRSHC	07/18/2007	DO	mg/L	6.36	7 (COLD[7]), 5 (WARM)	BP	No
FRSHC	07/18/2007	DO	mg/L	6.71	7 (COLD[7]), 5 (WARM)	BP	No
GILSL	07/18/2007	DO	mg/L	.25	7 (COLD[7]), 5 (WARM)	BP	No
INDAB	08/07/2007	DO	mg/L	5.7	7 (COLD[7]), 5 (WARM)	BP	No
ACACR	08/21/2007	DO	mg/L	5.5	7 (COLD[7]), 5 (WARM)	BP	No
WALKRC	08/21/2007	DO	mg/L	1.31	7 (COLD[7]), 5 (WARM)	BP	No
SPGRN	09/04/2007	DO	mg/L	6.6	7 (COLD[7]), 5 (WARM)	BP	No
ACACR	09/18/2007	DO	mg/L	6.36	7 (COLD[7]), 5 (WARM)	BP	No
WALKRC	09/18/2007	DO	mg/L	3.64	7 (COLD[7]), 5 (WARM)	BP	No
LAGAM	09/19/2007	DO	mg/L	4.43	7 (COLD[7]), 5 (WARM)	BP	No
LAGAM	09/19/2007	DO	mg/L	3.5	7 (COLD[7]), 5 (WARM)	BP	No

Site ID	Sample Date	Analyte	Units	Result	WQO[1]	WQO Basis[2]	Mgt Plan[3]
LAGAM	09/19/2007	DO	mg/L	3.56	7 (COLD[7]), 5 (WARM)	BP	No
LAGAM	09/19/2007	DO	mg/L	3.5	7 (COLD[7]), 5 (WARM)	BP	No
WALKRC	09/25/2007	DO	mg/L	5.74	7 (COLD[7]), 5 (WARM)	BP	No
LGNCR	04/17/2007	*E. coli*	MPN/100mL	650	235	BPA	Yes
GILSL	04/18/2007	*E. coli*	MPN/100mL	370	235	BPA	Yes
LSNKR	04/18/2007	*E. coli*	MPN/100mL	410	235	BPA	Yes
ACACR	05/15/2007	*E. coli*	MPN/100mL	2400	235	BPA	Yes
UCBRD	05/15/2007	*E. coli*	MPN/100mL	>2400[(8)]	235	BPA	Yes
CCSTR	05/16/2007	*E. coli*	MPN/100mL	340	235	BPA	Yes
LSNKR	05/16/2007	*E. coli*	MPN/100mL	770	235	BPA	Yes
WADCN	05/16/2007	*E. coli*	MPN/100mL	520	235	BPA	Yes
INDAB	06/05/2007	*E. coli*	MPN/100 ml	370	235	BPA	Yes
INDAB	06/05/2007	*E. coli*	cfu/100mL	370	235	BPA	Yes
ACACR	06/19/2007	*E. coli*	MPN/100mL	410	235	BPA	Yes
CCBRW	06/19/2007	*E. coli*	MPN/100mL	260	235	BPA	Yes
LGNCR	06/19/2007	*E. coli*	MPN/100mL	260	235	BPA	Yes
LGNCR	06/19/2007	*E. coli*	MPN/100mL	310	235	BPA	Yes
UCBRD	06/20/2007	*E. coli*	MPN/100mL	>2400[(8)]	235	BPA	Yes
UCBRD	07/17/2007	*E. coli*	MPN/100mL	650	235	BPA	Yes
PNCGR	08/21/2007	*E. coli*	MPN/100mL	1400	235	BPA	Yes
WLSBP	08/21/2007	*E. coli*	MPN/100mL	300	235	BPA	Yes
COONH	08/22/2007	*E. coli*	MPN/100mL	260	235	BPA	Yes
LSNKR	08/22/2007	*E. coli*	MPN/100mL	440	235	BPA	Yes
ACACR	09/18/2007	*E. coli*	MPN/100mL	690	235	BPA	Yes
INDAB	10/02/2007	*E. coli*	cfu/100mL	410	235	BPA	Yes
SPGRN	10/02/2007	*E. coli*	cfu/100mL	244	235	BPA	Yes
LAGAM	06/20/2007	pH	-log[H+]	8.82	6.5-8.5	BP	No
MFFGR	07/10/2007	pH	-log[H+]	9.2	6.5-8.5	BP	No
MFFGR	08/07/2007	pH	-log[H+]	9.8	6.5-8.5	BP	No
ACACR	08/21/2007	pH	-log[H+]	6.02	6.5-8.5	BP	No
GILBR	08/22/2007	pH	-log[H+]	8.7	6.5-8.5	BP	No
MFFGR	09/04/2007	pH	-log[H+]	8.9	6.5-8.5	BP	No
GILBR	09/18/2007	pH	-log[H+]	8.55	6.5-8.5	BP	No

Site ID	Sample Date	Analyte	Units	Result	WQO[1]	WQO Basis[2]	Mgt Plan[3]
GILHR	09/18/2007	pH	-log[H+]	9.09	6.5-8.5	BP	No
MFFGR	10/02/2007	pH	-log[H+]	9	6.5-8.5	BP	No
SSLIB	04/17/2007	Selenium	ug/L	6	5	CTR	No
UCBRD	06/20/2007	Total Dissolved Solids	mg/L	530	500	BPN	Yes
UCBRD	08/21/2007	Total Dissolved Solids	mg/L	600	500	BPN	Yes

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 = Basin Plan Amendment (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 site and parameter are currently being addressed by an ongoing management plan, study, or TMDL.
4. Dissolved copper results pending resolution of QA issues with the analytical laboratory.
5. 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 ILP MRP are 0.02 ug/l for DDD, and 0.01 ug/L for DDE and DDT. Concentrations at LRLNC and MDLCR did not exceed these MRP limits. The concentration of DDE did exceed the 0.01 ug/L limit at NRTCN.
6. The COLD freshwater habitat beneficial use is listed as a potential use in the Basin Plan.
7. The COLD use has not been specifically designated for this site.
8. The measured E. coli concentration exceeded the dilution range of the analysis.

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*. 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.

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*. A draft copy of the Coalition's Management Plan will be available for Regional Board review in March.

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 two Annual Monitoring Reports summarizing the 2005-2006 and 2006-2007 monitoring objectives, locations and results, outreach efforts, grower surveys, and effectiveness of management practices. Monitoring conducted under the Plan to date has shown no exceedances of diazinon or chlorpyrifos. The final year of monitoring will be completed in winter 2008, as scheduled in the Plan.

Notably, there were no observed exceedances of the Basin Plan diazinon objective in the 2007 irrigation season.

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 ILP 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 ILP 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.

Bacterial Source Identification Study

In September 2006, the Coalition initiated a Bacterial Source Identification Study (Study). The primary objective of the Study is to identify the categorical sources (i.e., which animal species) are contributing to fecal contamination resulting in observed exceedances of the Basin Plan *E. coli* water quality objective.[5] Exceedances of the *E. coli* objective were observed at nineteen locations throughout the Coalition area in 2006. Of the nineteen sites, nine sites throughout the Sacramento Valley were selected for the Study based on two main criteria: (1) a history of multiple exceedances of the Basin Plan *E. coli* objective (235 MPN/100 mL); and (2) broad representation of regional differences in hydrology, predominant crop types, and cultural practices.

Because the techniques used are research-level analyses, the study is also intended to serve as a model for investigation of bacterial contamination sources elsewhere in the Coalition's watersheds. The results will also support the second objective of the study, which is to evaluate whether contributing sources of bacterial contamination are agricultural. As part of the study, the Coalition collected samples in September 2006 and February and May 2007. Results are currently being evaluated and a final report on the study will be available in January 2008.

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,

[5] Although the *E. coli* objective has been adopted as an amendment to the Central Valley Basin Plan by the Water Board, the amendment has not been approved by the State Water Board, the Office of Administrative Law, and the United States Environmental Protection Agency; therefore, it is not yet in effect.

chlorpyrifos, DDT and other legacy pesticides, and electrical conductivity. A draft copy of the Coalition's Management Plan will be available for Regional Board review in March.

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 Appendix G). 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 will be 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.

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, four subwatersheds with known pesticide exceedances and/or toxicity to *Hyallela* were targeted for outreach to growers. The information distributed to growers in the four targeted subwatersheds in 2007 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 June 1, 2007 and December 31, 2007 are listed in **Table 22**.

Table 21. Summary of Targeted Outreach Efforts

Coalition Subwatershed	Sample Site	Exceedances in 2006-07	Action	BMP Literature Distributed
Sacramento-Amador	Dry Creek	Sediment toxicity, water column toxicity, pH, E. coli	Advisory notice/BMP survey mailed in July 2007 to growers in high priority lands. Notifications included exceedances, Coalition Update, Best Management Practices (manure, pyrethroids), and a watershed map.	Pyrethroids; sediment mgmt
Shasta-Tehama	Anderson Creek	Sediment toxicity, DO, E. coli	Advisory notice/BMP survey mailed in August 2007 to growers in high priority lands. Notifications included exceedances, Coalition Update, Best Management Practices (manure, pyrethroids), and a watershed map.	Pyrethroids; sediment mgmt
Yolo-Solano	Z-drain	Sediment toxicity, EC, TDS, E. coli, pH, DO, Selenium, Boron	Advisory notice/BMP survey to be mailed in January 2008 to growers in high priority lands	Pyrethroids; sediment mgmt
Yolo-Solano	Ulatis Creek	Chlorpyrifos, TDS, EC, DO, water column toxicity, E. coli, pH	Advisory notice/BMP survey to be mailed in January 2008 to almond/alfalfa growers (i.e., crops labeled for Lorsban use) in high priority lands	Chlorpyrifos (Lorsban); Pyrethroids; sediment mgmt

Table 22. Summary of Landowner Outreach Efforts, June 2007 – December 2007

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
All	6/1/2007	Sacramento Valley Water Quality Coalition & Subwatersheds	4 Page publication including 2006 water quality results and management plan information	Throughout Coalition Membership	8,600	4 Page Publication
All	10/3/2007	Sacramento Valley Water Quality Coalition & Subwatersheds	Sacramento Valley Water Quality Coalition Meeting	Yuba City	28	Agenda
All	10/3/2007	Sacramento Valley Water Quality Coalition & Subwatersheds	Subwatershed Training	Yuba City	13	Agenda
All	8/2/2007	Sacramento Valley Water Quality Coalition & Subwatersheds	Sacramento Valley Water Quality Coalition Newsletter	Throughout Coalition Membership	288	Newsletter
All	11/1/2007	Sacramento Valley Water Quality Coalition & Subwatersheds	Sacramento Valley Water Quality Coalition Newsletter	Throughout Coalition Membership	277	Newsletter
All	10/2007	Sacramento Valley Water Quality Coalition & Subwatersheds	Developed by CURES, distributed by Sacramento Valley Water Quality Coalition	Throughout Coalition Membership	5,000	CURES Watershed Coalition News Summer 2007 and BMP Special Issue 2007 Newsletters
All	Monthly	Sacramento Valley Water Quality Coalition & Subwatersheds	General program information, BMPs	Website, http://www.svwqc.org/	NA	NA
Butte-Yuba-Sutter	7/26/2007	UC Cooperative Extension	Field Day - SVWQC monitoring results and demonstration of various Best Management Practices to manage runoff and protect water quality.	Chico State University Farm	76 (covers three subwatersheds)	Agenda
Butte-Yuba-Sutter	11/1/2007	Sutter County Agricultural Department	UC Year-round IPM programs, IPM for prunes, early dormant spray program, update on dormant spray regulations, rice pests.	Sutter County Agricultural Department, Yuba City	58	Agenda

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
Butte-Yuba-Sutter	11/6/2007	Sutter County Agricultural Department	NOIs and use reports - avoid penalties, field worker safety, new respirator guidelines.	Sutter County Agricultural Department, Yuba City	98	Agenda
Butte-Yuba-Sutter	11/14/2007	Sutter County Agricultural Department	UC Year-round IPM programs, updates on walnut husk fly & peach twig borer IPM, new CUPA regulations, closed mixing systems, meaning of ERP.	Sutter County Agricultural Department, Yuba City	72	Agenda
Butte-Yuba-Sutter	11/29/2007	Sutter County Agricultural Department	UC Year-round IPM programs, updates on husk fly & peach twig borer IPM, update on dormant spray regulations, rice pests.	Sutter County Agricultural Department, Yuba City	73	Agenda
Butte-Yuba-Sutter	12/6/2007	Sutter County Agricultural Department	Wise use of herbicides, NOIs and use reports - avoid fines, field worker safety, closed mixing systems, new CUPA regulations, ERP - avoid penalties.	Sutter County Agricultural Department, Yuba City	77	Agenda
Butte-Yuba-Sutter	12/6/2007	Butte County Agricultural Commissioner, Butte Co. Farm Bureau	New respirator regulations, irrigated lands program update, enforcement policy issues, upcoming restricted material permit season.	Durham Memorial Hall	100-150	NA
Colusa-Glenn	9/2007-10/2007	Colusa County Farm Bureau	Diazinon, Simozine, Chlorpyrifos, DO, EC, DDD, E. Coli and pH exceedances; program update	Colusa County	800	Newsletter
Colusa-Glenn	7/1/2007	Colusa Glenn Subwatershed Program	Aquatic Toxicity	Freshwater Creek, Colusa County	22	NA
Colusa-Glenn	11/26/2007	Colusa Glenn Subwatershed Program	Program Update, Grower Meetings, Annual Meeting, Monitoring Results for 2007, Definition of Exceedance, Director Elections - Colusa County, Contact Info	Throughout Membership	2,000	CURES Watershed Coalition News Summer 2007 and BMP Special Issue 2007 Newsletters

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
Colusa-Glenn	10/19/2007	Sacramento Valley Region of RCDs	Sacramento Valley Water Quality Coalition information and newsletters distributed	Orland Memorial Hall, City of Orland	39	Sacramento Valley Water Quality Coalition Newsletter
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	NA
Colusa-Glenn	10/19/2007	Glenn County Resource Conservation District	Sacramento Valley Water Quality Coalition information and newsletters distributed	Orland Memorial Hall, City of Orland	75	Sacramento Valley Water Quality Coalition Newsletter
Colusa-Glenn	7/26/2007	UC Cooperative Extension	Field Day - SVWQC monitoring results and demonstration of various Best Management Practices to manage runoff and protect water quality.	Chico State University Farm	76 (covers three subwatersheds)	Agenda
Colusa-Glenn	12/4/2007	Colusa County Ag. Department	Program Update, 2007 Monitoring Summary, Exceedences, Q&A	Colusa Industrial Park Conference Center, Colusa	68	Agenda
Colusa-Glenn	12/13/2007	Glenn County Ag. Department	Program Update, 2007 Monitoring Summary, Exceedances, Walker Creek Management Plan, Workshop to be held January 16, 2007, Q&A	Ord Bend Community Hall, Ord Bend	107	Agenda
Colusa-Glenn	12/19/2007	Colusa Glenn Subwatershed Program	Meeting of Members, Organization Establishment, 2007 Monitoring Summary, Walker Creek Workshop Discussion, Monitoring and Reporting Program for 2008, Q&A	Willows City Hall, Willows	16	Agenda
El Dorado	6/14/2007	UCCE/El Dorado County RCD	Foothill Grape Day meeting	Camino	105	Available in Grant Report #4
El Dorado	6/18/2007	El Dorado County RCD	Ag Watershed Group meeting	Placerville	12	Agenda
El Dorado	7/1/2007	CURES	Watershed Coalition News	Throughout Membership	NA	CURES Watershed Coalition News
El Dorado	7/3/2007	El Dorado County RCD	Conservation Planning workshop mailing	El Dorado County	365	NA

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
El Dorado	7/3/2007-7/9/2007	El Dorado County RCD	Ag Group membership letters	El Dorado County	121	Available in Grant Report #5
El Dorado	7/16/2007	EDC Ag Watershed Group & El Dorado County RCD	Ag Watershed Group Meeting	Placerville	13	Available in Grant Report #5
El Dorado	Monthly	El Dorado County Farm Bureau newsletter	Ag Watershed Group general information	El Dorado County	1800	Available in All Grant Reports
El Dorado	7/24/2007	UC Cooperative Extension	Apple Scab Control Field Day	Camino	10	Flyer
El Dorado	7/26/2007	USDA/NRCS & El Dorado County RCD	Conservation Planning Workshop	Placerville	41	Agenda
El Dorado	8/15/2007	El Dorado County RCD	Ag Watershed Group mailing - exceedances	El Dorado County	356	Available in Grant Report #5
El Dorado	8/20/2007	El Dorado County RCD	Ag Watershed Group Meeting	Placerville	20	Exceedance Notice
El Dorado	8/20/2007	EDCAWG & Fish Friendly Farming	Farm Plan & BMP Certification program presented to ag group	Placerville	20	Available in Grant Report #5
El Dorado	9/7/2007	UC Cooperative Extension	BMP for Managing Irrigation Runoff for Water Quality Protection Field Day	UC Davis Ag Research Farm	25	Agenda and Materials
El Dorado	9/17/2007	El Dorado County RCD	Ag Watershed Group Meeting	Placerville	18	Available in Grant Report #5
El Dorado	9/20/2007	El Dorado County Agriculture Council	Ag Watershed Group information for dissemination to group	Placerville	15	Agenda and Summary Report
El Dorado	9/20/2007	Apple Hill Growers Association	Ag Watershed Group meeting information for dissemination	Camino	25	Summary Report
El Dorado	3rd Quarter 2007	El Dorado County RCD	Ag Watershed Group meeting minutes published	website/email	50+	Available in Grant Report #4
El Dorado	3rd Quarter 2007	El Dorado County Agricultural Watershed Group	Watershed Group meeting minutes published	listserv	39	Available in Grant Report #4
El Dorado	Monthly	El Dorado County Farm Bureau	Conditional Waiver Update Report	Placerville	15	All Grant Reports

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
El Dorado	9/24/2007	El Dorado County Department of Agriculture	Ag Land Use in EDC brochure	Placerville	100	Brochures
El Dorado	9/24/2007	El Dorado County Development Services	Ag Land Use in EDC brochure	Placerville	100	Brochures
El Dorado	9/24/2007	Association of Realtors	Ag Land Use in EDC brochure	Placerville	100	Brochures
El Dorado	9/24/2007	Chamber of Commerce	Ag Land Use in EDC brochure	Placerville	100	Brochures
El Dorado	9/24/2007	ERA Realty Center	Ag Land Use in EDC brochure	Cameron Park	100	Brochures
El Dorado	9/24/2007	ReMax Realtors	Ag Land Use in EDC brochure	Cameron Park	100	Brochures
El Dorado	9/24/2007	Lyons Realty	Ag Land Use in EDC brochure	Cameron Park	100	Brochures
El Dorado	10/2/2007	El Dorado County Libraries	Ag Land Use in EDC brochure	Cameron Park & Placerville	100	Brochures
El Dorado	10/2/2007	Placerville City Hall	Ag Land Use in EDC brochure	Placerville	100	Brochures
El Dorado	10/15/2007	El Dorado County RCD	Growers Advisory Group mailing	Placerville	18	Minutes
El Dorado	10/15/2007	El Dorado County RCD	Coon Hollow Workshop mailing	Placerville	58	Flyer
El Dorado	10/17/2007	El Dorado County RCD	Technical Advisory Committee Meeting	Placerville	6	Minutes
El Dorado	10/22/2007	El Dorado County RCD	Ag Watershed Group Meeting	Placerville	21	Minutes
El Dorado	10/22/2007	El Dorado County RCD, SVWQC, Regional Board	Coon Hollow Creek Water Quality Workshop – BMP information distributed	Placerville	18	Agenda
El Dorado	10/26/2007	El Dorado County RCD	Growers Advisory Group Meeting	Placerville	15	Minutes
El Dorado	10/29/2007	Developed by CURES, distributed by El Dorado County Farm Bureau	Watershed Coalition News	Placerville	75	CURES Watershed Coalition News BMP Special Issue
El Dorado	10/30/2007	El Dorado County RCD	Growers Advisory Group mailing	Placerville	11	Letter
El Dorado	11/13/2007	El Dorado County RCD	Growers Advisory Group Meeting	Placerville	16	Minutes
El Dorado	11/19/2007	El Dorado County RCD	Ag Watershed Group Meeting	Placerville	6	Minutes

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
Lake-Napa	6/25/2007	Napa Putah Creek Watershed Group	Membership update; water quality monitoring results; distribution of best management practices; Treasurer's Report	Napa County Planning Department	6	Agenda and BMPs
Lake-Napa	10/25/2007	Napa Putah Creek Watershed Group	Membership update; Approve RCD contract for water quality monitoring results; update on SVWQC; Treasurer's Report & budget for 2007.08; Approve assessment at $3.00/acre	Napa County Farm Bureau	8	Agenda
Lake-Napa	7/13/2007	Lake County Farm Bureau	Board of Directors meeting - Program Update	Lakeport	20 people	NA
Lake-Napa	9/12/2007	Lake County Farm Bureau	Board of Directors meeting - Program Update	Lakeport	21 people	NA
Lake-Napa	10/10/2007	Regional Board/ Stakeholders Nutrient TMDL for Clearlake Stakeholders Meeting	Nutrient TMDL - Clear Lake/Stakeholders meeting	Lakeport		NA
Lake-Napa	10/10/2007	Lake County Farm Bureau	Board of Directors meeting - Program Update	Lakeport	18 people	NA
Lake-Napa	12/10/2007	Lake County Agricultural Commissioner	Ag Commissioner Growers meetings - Program Overview	Lakeport	~50	NA
Lake-Napa	12/20/2007	Lake County Agricultural Commissioner	Ag Commissioner Growers meetings - Program Overview	Lakeport	~50	NA
NECWA (Pit River)	6/25/2007	Northeastern California Water Association	Board Meeting of the Directors of Northeastern California Water Association	McArthur	15	Agenda
NECWA (Pit River)	7/26/2007	UC Cooperative Extension	BMP to manage irrigation runoff and protect water quality	Chico State University	unknown	Announcement and Itinerary
NECWA (Pit River)	9/18/2007	Northeastern California Water Association	Board Meeting of the Directors of Northeastern California Water Association	Bieber	5	Agenda

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
NECWA (Pit River)	9/15/2007	Developed by CURES, distributed by Northeastern California Water Association	Distributed Watershed Coalition News- Summer 2007	Throughout Membership	Distributed to 170 members	CURES Watershed Coalition News Summer 2007
NECWA (Pit River)	10/23/2007	Northeastern California Water Association	Board Meeting of the Directors of Northeastern California Water Association	McArthur	13	Agenda
NECWA (Pit River)	7/2/2007	Northeastern California Water Association	Distributed Crop Information Sheet	Throughout Membership	167	NA
Placer-Nevada-So. Sutter- No. Sacramento	6/1/2007	Placer-Nevada-So. Sutter- No. Sacramento Subwatershed	Flyer sent - information on E. coli findings	Throughout Membership	800 flyers mailed to farmers and interested parties	Flyer
Placer-Nevada-So. Sutter- No. Sacramento	6/7/2006	Placer-Nevada-So. Sutter- No. Sacramento Subwatershed	Board Meeting. Secured funding for outreach newsletter.	Lincoln	NA	NA
Placer-Nevada-So. Sutter- No. Sacramento	8/2007	Placer-Nevada-So. Sutter- No. Sacramento Subwatershed	First newsletter sent (basic water testing and organization info)	Throughout Membership	800 flyers mailed to farmers and interested parties	Newsletter
Placer-Nevada-So. Sutter- No. Sacramento	10/2007	Placer-Nevada-So. Sutter- No. Sacramento Subwatershed	2nd newsletter sent w member renewal packet (test site info, Q&A for members, basic water testing techniques)	Throughout Membership	800 flyers mailed to farmers and interested parties	Newsletter
Sacramento Amador	6/10/2007	Sacramento County Farm Bureau	Provided general article for Farm Bureau Bulletin	Farm Bureau Office, Sacramento	Distribution of 400+	Article
Sacramento-Amador	6/21/2007	Amador RCD	Provide general updates	Amador County		Agenda and Status Report
Sacramento-Amador	6/26/2007	Amador RCD	Provide general updates	Amador County	8	Agenda and Status Report
Sacramento-Amador	7/26/2007	Amador RCD	2007 Monitoring & Testing Results	Amador County	9	Agenda
Sacramento-Amador	7/13/2007	Sacramento County Farm Bureau	General Program information. Open Forum for questions	Lockford	125	NA

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
Sacramento-Amador	8/14/2007	Lower Cosumnes RCD	Provide general updates	Elk Grove	6	Agenda
Sacramento-Amador	8/16/2007	Amador RCD	Provide general updates	Amador County	7	Agenda
Sacramento-Amador	9/27/2007	Amador RCD	Outreach activities, Event 24 and 2008 Monitoring locations and plan	Amador County	9	Agenda and Status Report
Sacramento-Amador	10/18/2007	Amador RCD	Amador RCD Board Meeting, provide general updates	Amador County		Agenda
Sacramento-Amador	10/18/2007	Amador RCD	Newsletters, Outreach and the '08 Draft Monitoring Plan	Amador County	5	NA
Sacramento-Amador	10/25/2007	Amador RCD	Provide general updates	Amador County		Agenda and Status Report
Sacramento-Amador	10/25/2007	Developed by Cures, distributed by Sacramento Amador Water Quality Alliance	Newsletters, Outreach and the '08 Draft Monitoring Plan	Amador County	5	CURES Watershed Coalition Summer 2007 and BMP Special Issue 2007 Newsletters
Sacramento-Amador	11/2/2007	Amador RCD	Budget meeting	Amador County		Agenda
Sacramento-Amador	11/15/2007	Reclamation District #3 Board Meeting	Met to discuss possible locations on Grand Island for a monitoring site	Ride	7	NA
Sacramento-Amador	11/19/2007	Sloughhouse RCD and Cosumnes River Task Force 2007 Water Tour	Water Quality and Preservation	Amador County and El Dorado County	22	NA
Sacramento-Amador	11/20/2007	Amador RCD	Regional Board Draft Mgmt Plan, Monitoring results and '08 Monitoring in the Delta, Dry Creek and Laguna. Rates, Budget, etc.	Amador County	7	Agenda
Sacramento-Amador	12/6/2007	Amador County Wine Grape Growers	Monitoring Results, new rates, budget and membership requirements	Amador County	15	Presentation Outline used by Speaker

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
Sacramento-Amador	12/5/2007	Amador RCD	Approved Budget, fee schedule and Mgr Contract discussions	Amador County	7	Agenda and Status Report
Sacramento-Amador	12/6/2007	Lower Cosumnes RCD	Discussed and approved new rates and budget. As well as Manager Reports and Financial Reports	Elk Grove	6	Agenda
Sacramento-Amador	12/11/2007	Sloughhouse RCD, LC RCD and Florin RCD	Discussed new rates and membership requirements.	Sacramento	24	NA
Sacramento-Amador	12/13/2007	Sacramento County Farm Bureau	Discussed new rates and membership requirements.	Sheldon	30	NA
Sacramento-Amador	12/14/2007	Sacramento County Farm Bureau	Discussed new rates and membership requirements.	Farm Bureau Office, Sacramento	3	Article
Sacramento-Amador	12/11/2007	MBK Engineers for Reclamation District #3	Monitoring locations and issues on Grand Island	MBK Engineers Office	4	NA
Sacramento-Amador	12/19/2007	Reclamation District #3	Monitoring locations and issues on Grand Island	Delta	7	NA
Shasta-Tehama	5/21/2007	Shasta Tehama Water Education Coalition	Status of Organization @ Annual meeting	Palo Cedro	15	NA
Shasta-Tehama	11/2/2007	Tehama County RCD	Water Quality Workshop	Red Bluff	30	Agenda
Shasta-Tehama	7/26/2007	UC Cooperative Extension	Field Day - SVWQC monitoring results and demonstration of various Best Management Practices to manage runoff and protect water quality.	Chico State University Farm	76 (covers three subwatersheds)	Agenda
Solano-Yolo	8/17/2007	Dixon-Solano Water Quality Coalition	A targeted mailing of informational flyers about the Yolo-Solano Ag Water Quality Program that provides funding for water quality BMPs. The mailing was sent to members of the Yolo Solano Water Quality Coalition who expressed interest in BMPs on the Coalition's May 2007 Contact Preferences Survey.	Distributed by mail	80	Flyer

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
Solano-Yolo	9/1/2007	Dixon-Solano Water Quality Coalition	Information about the Yolo-Solano Ag Water Quality Program that provides funding for water quality BMPs submitted to the Solano Irrigation District's Irrigator newsletter	Distributed by mail	450	Article
Solano-Yolo	9/17/2007	Dixon-Solano Water Quality Coalition	A program update to inform Coalition members about the process for contacted landowners in subwatershed where water quality exceedances are found, about E. coli study results, and about Dixon-Solano Water Quality Coalition management	Distributed by mail	750	Copy of program update enclosed
Solano-Yolo	10/25/2007	Dixon-Solano Water Quality Coalition	Use of winter cover crops to improve the water quality of storm runoff	Meeting with grower on Casey Rd, Dixon	1	NA
Solano-Yolo	10/29/2007	Dixon-Solano Water Quality Coalition	Use of winter cover crops to improve the water quality of storm runoff	Meeting with grower on Putah Creek Rd, Winters, CA	1	NA
Solano-Yolo	6/15/2007 & 7/3/2007	Yolo County Farm Bureau Education Corporation - Subwatershed Program	Exceedance Notice	Distributed by mail	637	Letters
Yolo- Solano	9/6/2007	UC Cooperative Extension	Field Day - SVWQC monitoring results and demonstration of various Best Management Practices to manage runoff and protect water quality.	UC Davis Farm	Approximately 35	NA
Solano-Yolo	10/16/2007	Yolo County Farm Bureau Education Corporation - Subwatershed Program	Exceedance Notice	Distributed by mail	676	Letters

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
Solano-Yolo	Fall 2007	Yolo County Farm Bureau Education Corporation - Subwatershed Program	Newsletter	Distributed by mail	1750	Fall Newsletter
Solano-Yolo	11/1/2007	Yolo County Farm Bureau Education Corporation - Subwatershed Program	Seminar for Realtors, Lenders, and Title Companies	Farm Bureau office, Woodland	250 invitations mailed 36 attended	Agenda
Solano-Yolo	Winter 2007	Yolo County Farm Bureau Education Corporation - Subwatershed Program	Newsletter	Distributed by mail	1750	Winter Newsletter
Solano-Yolo	11/15/07, 11/21/07, 11/28/07, 12/12/07	Yolo County Farm Bureau Education Corporation - Subwatershed Program	Irrigated Lands Program Recap for 2007	Winters, Woodland, Clarksburg	1,750 mailed, 11/15/07 Winters 28 Attended, 11/21/07 Woodland 59 Attended, 11/28/07 Clarksburg 37 Attended, 12/12/07 Woodland 35 Attended	Agenda
Upper Feather River	9/6/2007	UC Cooperative Extension	Forage/Irrigation Study Field Tour	Plumas & Sierra Co	12	Agenda
Upper Feather River	9/28/2007	RCD Ag Workshop	Water monitoring DO & E. coli exceedances/ noxious weed BMPs	Plumas Co	45	Handouts
Upper Feather River	10/18/2007	Upper Feather River Watershed Group Meeting	General program information. Open forum for questions	Graeagle	22	Agenda
Upper Feather River	10/20/2007	Upper Feather River Watershed Group & Prop 50 Team	Newsletter	Throughout Membership	110	Newsletter

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or # on Distribution List	Document Enclosed
Upper Feather River	11/2007	Upper Feather River Watershed Group & Prop 50 Team	Prop 50 Stakeholder meeting notices	Throughout Membership	110	Meeting Notice
Upper Feather River	11/2007	Upper Feather River Watershed Group & Prop 50 Team	Stakeholder meeting PSA for local papers	Sierra & Plumas Counties	6 local papers	NA
Upper Feather River	11/15/2007	Upper Feather River Watershed Group & Prop 50 Team	Stakeholder meeting - E. coli, DO, ph, Phase II landowner monitoring, Ranch Management Plans, BMP's. Monitoring Data Handouts; E. coli, ph, DO info & management sheets; ILP Organization Chart; Riparian Areas A Users Guide to Health Booklet; WCN Newsletter BMP Issue 2007; Landowners Guide; Stream Restoration in Upper Feather River Watershed Flyer;	Quincy Fairgrounds	45 in attendance 75-80 to be mailed to remaining members	NA
Upper Feather River	12/3/2007	Upper Feather River Watershed Group & Prop 50 Team	Phase II Cooperator meeting	Mohawk Resource Center	12	NA
Upper Feather River	Monthly	UC Cooperative Extension	Organization water monitoring	Publish website, http://ufrwg.org	NA	NA

Conclusions and Recommendations

The Coalition submits this 2007 Irrigation Season Semi-Annual Monitoring Report under the Water Board's Irrigated Lands Program (*ILP*). The 2007 Irrigation 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 irrigation season monitoring in 2007 continue to indicate that there are not major water quality problems with agricultural and managed wetlands discharges in the Sacramento River Basin. Significant toxicity was observed in 19 of the 243 water column and sediment toxicity tests performed in 2007 irrigation season (7.8%). 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 that were taken and are 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 April 2007 through October 2007. To date, a total of six 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 (April 2007 – October 2007), samples were collected during 7 irrigation events, and at a total of 51 different locations.

From April 2007 through Ocober 2007, 207 water column toxicity tests were conducted with three aquatic species on 97 samples from 26 different sites. Sediment toxicity tests were conducted on 36 samples with *Hyalella*. There were 17 statistically significant water column toxicity exceedances with reductions greater than 20% compared to control in Coalition Irrigation Season samples (13 *Ceriodaphnia* tests and 4 *Selenastrum* tests). In total, 7.8% of all tests and 10% of water and sediment samples exhibited a statistically significant reduction in invertebrate or fish survival or algae cell density greater than 20% compared to the control.

Chemical results were evaluated for all of the cases of observed toxicity. In one of these cases, the toxicity to *Ceriodaphnia* was explained by concentrations of chlorpyrifos and carbofuran. In two other cases, concentrations of the herbicides thiobencarb or diuron may have contributed to the toxicity to *Selenastrum*. For the 14 samples that triggered TIE procedures to investigate the cause of toxicity, toxicity was not persistent in 11 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 three TIEs indicated metabolically activated pesticides (e.g., some organophosphate and carbamate pesticides) as probable contributors to *Ceriodaphnia* toxicity, and pesticide analyses supported this result in two of TIEs.

When detected, pesticides rarely exceeded applicable objectives, and were typically not associated with toxicity. Five pesticides (carbofuran, chlorpyrifos, malathion, thiobencarb, and DDE) exceeded applicable water quality objectives in a total of 18 Irrigation Season 2007 samples. Notably, there were no observed exceedances of the Basin Plan diazinon objective in the 2007 irrigation season. Several of the pesticides specifically required to be monitored by the

ILP have not been detected in any Coalition water sample, including paraquat and all of the pyrethroid pesticides. Glyphosate, one of the most widely used agricultural pesticides has been detected in only one Coalition sample to date. This indicates that monitoring 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 has proposed to discontinue these pesticides from water column monitoring. Similarly, the Coalition has proposed to discontinue monitoring of most trace elements (arsenic, cadmium, lead, nickel, selenium, and zinc) in 2008 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 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 are also being investigated through a region-wide pilot study conducted by the Coalition. The Coalition also participates in the *ILP* Technical Issues Committee (TIC) workgroups to develop procedures and guidelines for evaluation of exceedances. The TIC has worked with Water Board *ILP* staff to develop recommendations for amendments to the current *ILP* Monitoring and Reporting Program requirements and procedures. Many of these recommendations have been incorporated into the proposed revised MRP released 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 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 ILP 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 *ILP*, 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 2007 Coalition monitoring. The Coalition continues to adapt and improve elements of the monitoring program based on the knowledge gained through *ILP* 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) 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. 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 *ILP* 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

Appendix G: SVWQC Management Practices