Executive Summary

The Sacramento Valley Water Quality Coalition (Coalition) submits the 2005 Annual Monitoring Report (AMR) under the Central Valley Regional Water Quality Control Board's Irrigated Lands Program (*ILP*). The 2005 AMR provides a detailed description of our monitoring results in 2005 as part of our ongoing efforts to characterize agricultural and wetlands related water quality in the Sacramento River Basin.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this first year of the Coalition's *ILP* monitoring, the results are generally positive. From March through October 2005, 241 water column toxicity tests were conducted on 81 samples with three aquatic species. There were six statistically significant water column toxicity exceedances, with only four of those having reductions greater than 20% compared to control. In total, only 1.6% of all tests and 4.9% of all samples exhibited a statistically significant effects on survival (of *Ceriodaphnia* and *Pimephales*) or cell growth (*Selenastrum*) greater than 20% compared to the control. The two most extreme cases observed (100% *Ceriodaphnia* mortality) were associated with high levels of detected dichlorvos. The remaining cases were algae toxicity, and were not explained by any detected pesticides or other chemicals. None of the algae toxicity cases triggered TIE testing. No follow-up samples collected between March and October 2005 caused statistically significant toxicity to any test species. Aside from toxicity apparently caused by dichlorvos (which is not registered for use on irrigated crops), no pesticides detected during the monitoring period were associated with any significant toxicity.

There were 13 statistically significant sediment toxicity exceedances, with only four of those having reductions greater than 20% compared to the control (of 22 total samples and tests with *Hyalella*). In total, 18% of sediment samples exhibited a statistically significant reduction in survival of greater than 20% compared to the control. To date, investigation of causes of sediment toxicity has consisted of evaluations of pesticide use in the affected drainages. No specific causes of observed cases of sediment toxicity have been identified to date.

Exceedances of adopted numeric Basin Plan objectives were limited primarily to pH, dissolved oxygen, conductivity, dissolved solids, and *E. coli*. Although agricultural runoff and irrigation return flows may contribute to exceedances of these objected, all of these parameters are significantly affected by natural processes and sources that are not controllable by agricultural management practices. Causes of the observed exceedances of water quality objectives for pH, dissolved oxygen, coliform bacteria have not been investigated by the Coalition because effective methods have not yet been identified. However, follow-up strategies to evaluate causes of these types of exceedances are being pursued by the Coalition through participation in the *ILP* Technical Issues Committee (TIC) workgroups. The TIC is charged with developing recommendations for amendments to the current *ILP* Monitoring and Reporting Program requirements and procedures.

The Coalition initiated some Phase 2 monitoring elements during the 2005 irrigation season, concurrent with the Phase 1 irrigation season monitoring. The Phase 2 elements monitored included additional pesticide analyses, trace elements, and nutrients. Expansion of Phase 2 monitoring is planned for 2006.

Substantial progress has been made by the Coalition toward full compliance with the *ILP*. The Coalition developed a Watershed Evaluation Report (WER) that set 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 conditionally approved by the Water Board. 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 second monitoring report is documentation of the success of the Coalition in achieving these objectives.

To summarize, the results from monitoring conducted in 2005 are generally positive and suggest that there are not major water quality problems with agricultural and managed wetlands discharges in the Sacramento River Basin. Specifically, less than 3% of the toxicity tests performed in 2005 found any toxicity. For the sites with observed toxicity, the Coalition and its subwatersheds took the appropriate actions to address these issues, as is discussed below. By its nature, the AMR focuses in detail on the small number of sites 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.

The remainder of this Executive Summary summarizes the information and analysis detailed in the Annual Monitoring Report for monitoring conducted March – October 2005.

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 Resolution No. R5-2003-0105, *Conditional Waiver for Irrigated Lands* (hereinafter abbreviated as *ILP* for *Irrigated Lands Program*), the Monitoring and Reporting Program Plan Order No. R5-2003-0826 for Coalition Groups, and subsequent amendments to the *ILP* (WQO-2004-0003, SWRCB 2004). 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. This additional documentation was subsequently provided as Technical Reports on January 19 and December 23, 2005, as required by the Water Board.

To achieve the objectives of the MRP, the Coalition has implemented this effort in cooperation with the ten subwatersheds. The Coalition also coordinated 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 *ILP* and in subsequent amendments to the *ILP* requirements (WQO-2004-0003, SWRCB 2004, R5, 2005-0833). The following environmental monitoring elements are included in the Phases 1-3 of the Coalition MRPP:

- Water column and sediment toxicity
- Physical and conventional parameters in water and sediment
- Organic carbon and ultraviolet 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 to be measured and the relevant Phases of the Coalition monitoring effort are listed in Table E-1.

A total of 26 sites were monitored by the Coalition and coordinating subwatershed monitoring programs during the period covered by this report. A map of these sites and overall land use patterns is presented in Figure E-1. As required by the *ILP*, Coalition monitoring events included storm season monitoring and irrigation season monitoring. The sites and annual frequency of samples planned for the Coalition's 2004-2006 Phase 1 monitoring conducted in 2005 are summarized in Table E-1.

Sample collection and analysis for Coalition monitoring was performed by the following agencies and subcontractors:

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

Table E-1. Sacramento Valley Water Quality Coalition 2004-2006 Phase 1 Monitoring: Planned Annual Sampling Frequency[1]

			Physical and Chemical Parameters													Water Column and Sediment Toxicity								
Location	Water Column Sample Events	Sediment Sample Events	Flow	pH, conductivity, DO, temperature	Color	Turbidity	Total Dissolved Solids	Total Suspended Solids	Total Organic Carbon	Dissolved Organic Carbon	Ultraviolet Absorbance at 254 nm	Diazinon, chlorpyrifos, azinphos-methyl, malathion, methyl parathion	Carbofuran (begins in irrigation season 2005)	Pathogen Indicators: *E. Coli* bacteria	Ceriodaphnia, 96-h acute	Ceriodaphnia, dilution series (5 dilutions+control)	Pimephales, 96-h acute	Pimephales, dilution series (5 dilutions+control)	Selenastrum, 96-h short-term chronic	Selenastrum, dilution series (5 dilutions+control)	Phase 1 TIE (aquatic toxicity only)	Additional follow-up aquatic toxicity source sampling, per site	Follow-up toxicity source testing (with most sensitive spp. only)	Hyalella, 10-day short-term chronic
Butte Slough at Pass Road	8	2	8	8	8	8	8	8	8	8	8	8	6	8	8	Dependent on toxicity results	8	Dependent on toxicity results	8	Dependent on toxicity results	Dependent on toxicity results	Dependent on toxicity results	Dependent on toxicity results	2
Wadsworth Canal at South Butte Rd	8	2	8	8	8	8	8	8	8	8	8	8	6	8	8		8		8					2
Pine Creek at Nord-Gianella Rd	8	2	8	8	8	8	8	8	8	8	8	8	6	8	8		8		8					2
Z-Drain (Dixon RCD)	8	2	8	8	8	8	8	8	8	8	8	8	6	8	8		8		8					2
Toe Drain at NE corner of Little Holland	8	2	8	8	8	8	8	8	8	8	8	8	6	8	8		8		8					2
Tule Canal at NE corner of I-80	8	2	8	8	8	8	8	8	8	8	8	8	6	8	8		8		8					2
Rough and Ready Pumping Plant (RD 108)	8	2	8	8	8	8	8	8	8	8	8	8	6	8	8		8		8					2
Stony Creek on Hwy 45 near Rd 24	8	2	8	8	8	8	8	8	8	8	8	8	6	8	8		8		8					2
North Canyon Creek	8	2	8	8	8	8	8	8	8	8	8	ns	ns	8	8		8		8					2
McGaugh Slough at Finley Road East	3	2	3	3	3	3	3	3	3	3	3	ns	ns	3	3		3		3					2
Coon Creek at Striplin Road	8	2	8	8	8	8	8	8	8	8	8	8	6	8	8		8		8					2
Cosumnes River at Twin Cities Rd	8	2	8	8	8	8	8	8	8	8	8	ns	ns	8	8		8		8					2
Burch Creek at Woodson Ave Bridge	8	2	8	8	8	8	8	8	8	8	8	8	6	8	8		8		8					2
Spanish Creek above confluence with Greenhorn Creek	7	ns	7	7	7	7	7	7	7	7	7	ns	ns	7	ns		ns		ns					ns
Indian Creek at gage d/s from Indian Valley	7	ns	7	7	7	7	7	7	7	7	7	ns	ns	7	ns		ns		ns					ns
Middle Fork Feather River at County Road A-23	7	ns	7	7	7	7	7	7	7	7	7	ns	ns	7	ns		ns		ns					ns

(1) Tabled values indicate planned annual sampling frequency. “ns” indicates “not sampled”. Spanish Creek, Indian Creek, and Middle Fork Feather River sites have one fewer event due to a shortened irrigation season at higher elevations.

RESULTS

This report characterizes potential water quality impacts of agricultural runoff and irrigation return flows from a broad geographic area in the Sacramento Valley. This report presents the monitoring results from seven sampling events completed from March through October 2005. During this period, samples were taken at 26 locations. This monitoring included one major storm season event in March 2005 and six irrigation season events (May through October 2005). Storm event monitoring included water chemistry and aquatic toxicity. Irrigation season monitoring in 2005 included water chemistry and aquatic toxicity monitoring conducted monthly (May through October). Sediment toxicity testing was also conducted twice during irrigation season, as specified in the MRPP and QAPP. The sites and parameters for these events were monitored in accordance with the Coalition's MRPP and QAPP.

Data Quality and Completeness

Based on evaluation of the Quality Assurance data for the monitoring discussed above, the precision and accuracy of the monitoring results generally meet the DQOs and there were no systematic sampling or analytical problems. All data presented in this report are adequate for the purposes of the Coalition's monitoring program and very few results required qualification. Of the 7605 total analytical results generated from March – October 2005, only 67 results required qualification, resulting in 99.12% valid and unqualified data with no restrictions on data use.

The objectives for completeness are assessed for the monitoring program as a whole. As summarized in Table 5, 126 of 140 initial water column samples planned by the Coalition and subwatersheds were collected and all collected samples were analyzed, resulting in an overall sampling success rate of 90%. A majority of uncollected planned samples were due to lack of adequate flows at the sampling sites (10 samples), and 3 uncollected samples were due to access problems. Considering only events with flows adequate for sampling, 98% of samples were successfully collected and analyzed, demonstrating a high level of compliance with the *ILP* requirements.

Data Interpretation

Coalition and subwatershed monitoring data collected from March through October 2005 were compared to applicable narrative and numeric water quality objectives in the Central Valley Basin Plan (CVRWQCB 1995) and the California Toxics Rule (USEPA 2000). Statistically significant toxicity was observed in six water quality samples collected from four different sites from March through October 2005. Significant toxicity to the algae *Selenastrum* was observed at Burch Creek at Woodson Avenue, Stony Creek on Hwy 45 near Rd 24, and Butte Slough at Pass Road. Significant toxicity to *Ceriodaphnia* was observed at Butte Slough at Pass Road, and Rough and Ready Pumping Plant. Statistically significant toxicity to *Hyalella azteca* was observed in 13 sediment quality samples collected from eight different sites in June, September, and October, 2005. Samples exhibiting statistically significant water column toxicity are summarized in Table E-1 and Table E-2. The observations of toxicity to *Ceriodaphnia*, *Selenastrum*, and *Hyalella* were considered exceedances of the Basin Plan narrative objective for toxicity ("*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*."), and the results were reported to the Water Board by the Coalition in "Exeedance Reports" and

"Communication Reports" as required by the *ILP* and the Coalition's MRPP. The Exceedance and Communication Reports detailing these results, and the required follow-up testing and results are provided in Appendix D. The results of these reports are also summarized in the body of this report. In brief, the pesticide dichlorvos was identified as the probable cause of the toxicity to *Ceriodaphnia* observed in samples from Rough and Ready Pumping Plant in September and Butte Slough in October. Toxicity observed in other samples was insufficient to trigger TIEs and no definitive causes of the observed toxicity to *Selenastrum* were identified.

Pesticides were analyzed in 190 individual water column samples collected between March and October 2005 for the Coalition. Analyses were conducted for organophosphates, carbamates, organochlorines, triazines, glyphosate, paraquat, and pyrethroid pesticides. Within these categories, only six different pesticides (chlorpyrifos, diazinon, dichlorvos, dimethoate, diuron, and simazine) were detected in 17 separate samples collected for Coalition monitoring conducted March through October 2005.

- Toxicity was associated with detected pesticides in only 2 samples, and no pesticides were detected in 91% of samples analyzed for pesticides.
- Of the pesticides detected, chlorpyrifos was the most common and exceeded the recommended California Department of Fish and Game recommended criterion of 0.014 ug/L (Siepmann and Finlayson 2000) in five samples. However, none of these samples exhibited toxicity to any of the three test species.
- Diazinon was detected in three samples and exceeded the site-specific Basin Plan objective of 0.05 ug/L in one sample collected from North Canyon Creek (3/19/2005, 0.124 ug/L). The site-specific Basin Plan objective does not apply specifically to North Canyon Creek, and no toxicity to any of the three test species was observed in this sample.
- Dichlorvos was detected in three irrigation season samples collected in September and October. In two of these samples, dichlorvos appeared to be at least partially responsible for significant toxicity to *Ceriodaphnia.* Dichlorvos was the only pesticide detected that was associated with any observed toxicity. Dichlorvos is not registered for use on irrigated crops in California.
- Dimethoate was detected in one sample and was not associated with any observed sample toxicity.
- Diuron was detected in three samples and was not associated with any observed sample toxicity.
- Simazine was detected in two samples from Big Indian Creek at Bridge (3/20/2005, 6/28/2005) and was not associated with any observed sample toxicity.
- No organochlorine or pyrethroid pesticides were detected in any samples.
- The herbicides paraquat and glyphosate were not detected in any samples.

All detected pesticide concentrations for Coalition monitoring conducted between March and October 2005 are summarized in Table E-4.

Exceedances of adopted Basin Plan objectives and advisory limits were observed for pH and dissolved oxygen, conductivity and total dissolved solids, and *E. coli* bacteria, (Table E-5).

pH was measured in 137 samples from Coalition 26 sites. pH exceeded the Basin Plan maximum of 8.5 Standard Units (-log[H^+]) in 14 Coalition samples collected from 8 different sites between March and October, and was below the 6.5 minimum limit in one sample. 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. The factors combine to cause increasing pH during daylight hours and decreasing pH at night. Diurnal variations in summer are greater because there is more light and higher temperatures. Irrigation return flows may influence this variation primarily by increasing or decreasing instream temperatures, or by increasing available nutrients or organic matter.

Dissolved oxygen was measured in 119 samples from 23 sites. Dissolved oxygen concentrations were measured below the Basin Plan minimum objective (5.0 mg/L) in only 6 samples at six different sites. Dissolved oxygen also typically exhibits significant diurnal variations, and is controlled by the same processes as pH (discussed above). Five of the six exceedances observed were measured early in the day (before 11:00 AM), when daily DO concentrations are lowest. The sixth (and lowest) dissolved oxygen exceedance was measured late in the irrigation season at the Cosumnes River at Twin Cities Road (0.91 mg/L) during stagnant conditions with no measurable surface flows. This is an extreme example of the low-flow conditions in valley streams that often dry up completely in the late irrigation season. The primary cause of low dissolved oxygen under these conditions is lack of flow and high water temperatures.

E. coli bacteria were monitored in 122 samples from 26 sites. Coliform bacteria numbers exceeded the single sample maximum objectives for *E. coli* (235 MPN/100mL), in 36 samples from 22 different Coalition locations. The majority of these exceedances and the highest concentrations of bacteria were observed in the May and June sample events at the beginning of irrigation season. The avian and wildlife resources supported by most agricultural lands are believed to be the primary sources of *E. coli* and other bacteria in agricultural runoff and irrigation return flows.

Conductivity was monitored in 133 samples from 26 sites. Conductivity exceeded the California recommended 2˚ MCL (900 uS/cm) for drinking water in 11 samples collected from 4 sites. *Total dissolved solids* (TDS) was monitored in 110 samples from 23 sites. TDS exceeded the California recommended 2˚ MCL (450 mg/L) for drinking water in 8 samples collected from the same four 4 sites that exceeded the conductivity objective. Both the conductivity and TDS objectives are intended to apply to treated drinking water. Most of these observed exceedances (15 of 19) can be attributed to irrigation supply water in the Yolo/Solano subwatershed region, which is primarily groundwater with naturally high conductivity and dissolved solids.

Nutrients did not exceed water quality objectives at any Coalition sites in 2005. Nitrate concentrations were monitored in the Pit River and Fall River, and in Big Indian Creek, and were not observed to exceed the 10 mg/L (as nitrogen) drinking water MCL in any sample. Ammonia concentrations measured at Big Indian Creek and for all toxicity testing samples at did not exceed the temperature- and pH-dependent National water quality criterion for this parameter in any sample. *Trace metals* analyzed for Phase 2 *ILP* monitoring in 17 samples collected from 7 Coalition sites in 2005 did not exceed Basin Plan objectives or CTR criteria in any sample. No

other parameters monitored were observed to exceed Basin Plan objectives or California Toxics Rule criteria.

Table E-2. Summary of Water Column Samples Exceeding the Basin Plan Narrative Toxicity Objective, March – October 2005

Site and Sample Descriptions	Sample Date	Test Organiism	Result(1)
Burch Creek at Woodson Ave Bridge (Retest of initial water sample)	05/02/05	*Selenastrum*	70% of control*
Stony Creek on Hwy 45 near Rd 24	08/02/05	*Selenastrum*	57% of control*
Butte Slough at Pass Road	07/05/05	*Selenastrum*	87% of control growth*
	08/24/05	*Selenastrum*	80% of control growth*
	10/18/05	*Ceriodaphnia*	0% survival*
Replicate water sample	10/18/05	*Ceriodaphnia*	0% survival*
Replicate sample collected by Reg'l Board	10/18/05	*Ceriodaphnia*	0% survival*
Rough and Ready Pumping Plant	09/07/05	*Ceriodaphnia*	0% survival*
Serial dilution test with initial sample, 5 days	09/07/05	*Ceriodaphnia*	EC50 = 64.8%, 1.5 TUA

(1) An asterisk indicates that the result is statistically significant at the 95% confidence level. "NS" indicates toxicity result is not significantly different from the control.

Table E-3. Summary of Sediment Samples Exceeding the Basin Plan Narrative Toxicity Objective, March – October 2005

Site	Sample Date	*Hyalella* Survival (% of Control)
Big Indian Creek at Bridge	06/07/2005	62.0%
Cosumnes River at Twin Cities Rd	06/07/2005	92.4%
	09/06/2005	84.8%
North Canyon Creek	06/08/2005	92.4%
	09/06/2005	88.6%
Pine Creek at Nord-Gianella Road	06/07/2005	89.9%
Shag Slough at Liberty Island Bridge	09/06/2005	84.8%
Stony Creek on Hwy 45 near Rd 24	06/07/2005	60.8%
	09/08/2005	86.8%
Wadsworth Canal at South Butte Rd	10/05/2005	88.2%
Z Drain – Dixon RCD	06/07/2005	63.3%
(replicate sample)	06/07/2005	78.5%
	10/04/2005	88.2%

Table E-4. Pesticides Detected in Coalition Monitoring, March – October 2005

Site	Date Sampled	Analyte	Result[1] (ug/L)	Water Quality Limit[2] and Basis	
Big Indian Creek at Bridge	03/20/2005	Simazine	.83	4.0	CA 1˚ MCL
	06/28/2005	Simazine	.046	4.0	CA 1˚ MCL
Butte Slough at Pass Road	10/18/2005	Dichlorvos	.503	—	NA
(replicate analysis)	10/18/2005	Dichlorvos	.542	—	NA
Coon Creek at Striplin Road	03/19/2005	Diazinon	.0265	.05	Basin Plan
	07/06/2005	Chlorpyrifos	.0222	.014	CDFG advisory
	09/07/2005	Chlorpyrifos	.0431	.014	CDFG 2000
North Canyon Creek	03/19/2005	Diazinon	.124	.05	Basin Plan
	05/04/2005	Diazinon	.0194	.05	Basin Plan
(replicate sample)	05/04/2005	Diazinon	.0201	.05	Basin Plan
Pine Creek at Nord-Gianella Road	07/06/2005	Chlorpyrifos	.0216	.014	CDFG 2000
Rough and Ready Pumping Plant	08/02/2005	Dimethoate	.119	—	NA
	09/07/2005	Dichlorvos	.0847	—	NA
Shag Slough at Liberty Island Bridge	10/04/2005	Diuron	J .27	—	NA
Stone Corral Creek at Maxwell Road	09/07/2005	Chlorpyrifos	.0487	.014	CDFG 2000
Stony Creek on Hwy 45 near Rd 24	07/06/2005	Chlorpyrifos	.0216	.014	CDFG 2000
Tule Canal at I-80	09/06/2005	Dichlorvos	J .0146	—	NA
Z Drain – Dixon RCD	07/07/2005	Diuron	.65	—	NA
	08/03/2005	Diuron	J .30	—	NA

(1) "J" indicates pesticide was detected below the quantitation limit (QL)

(2) "Basin Plan" indicates limit is an adopted objective in the Central Valley Basin Plan; "CA 1˚MCL" indicates a California Primary Maximum Contaminant Limit for drinking water (adopted by reference in the Basin Plan); "CDFG" is the recommended criterion for protection of aquatic life developed by the California Department of Fish and Game for chlorpyrifos, It is provided as an unadopted "Advisory Objective" for evaluation of the potential aquatic life impacts of chlorpyrifos; "NA" indicates no applicable objective available

Table E-5. Exceedances of Basin Plan Limits for Conventional and Microbiological Parameters, March – October 2005

Station Description	Date Sampled	Analyte	Result	Objective	Units
Burch Creek at Woodson Ave Bridge	05/02/05	E. Coli	1200	235	MPN/100mL
Butte Creek at Gridley Rd Bridge	05/03/05	E. Coli	2000	235	MPN/100mL
	05/03/05	E. Coli	2400	235	MPN/100mL
Butte Slough at Pass Road	05/03/05	E. Coli	> 2400	235	MPN/100mL
Capell Creek upstream from Lake Berryessa	05/03/05	E. Coli	> 2420	235	MPN/100mL
Colusa Drain near Maxwell Road	05/03/05	E. Coli	2400	235	MPN/100mL
	06/08/05	E. Coli	280	235	MPN/100mL
	07/07/05	E. Coli	370	235	MPN/100mL
Coon Creek at Striplin Road	05/04/05	E. Coli	> 2400	235	MPN/100mL
	06/08/05	E. Coli	340	235	MPN/100mL
	07/06/05	pH	8.52	8.5	-log[H+]
	08/02/05	E. Coli	1400	235	MPN/100mL
	09/07/05	DO	4.95	5	mg/L
	09/07/05	E. Coli	390	235	MPN/100mL
Cosumnes River at Twin Cities Rd	05/04/05	E. Coli	> 2400	235	MPN/100mL
	06/07/05	pH	4.84	6.5	-log[H+]
	09/06/05	DO	.91	5	mg/L
Fall River at Fall River Ranch Bridge	06/23/05	pH	8.97	8.5	-log[H+]
	07/18/05	pH	8.73	8.5	-log[H+]
	08/30/05	pH	8.59	8.5	-log[H+]
	09/20/05	pH	8.7	8.5	-log[H+]
Indian Creek d/s from Indian Valley	05/02/05	E. Coli	580	235	MPN/100mL
	09/08/05	pH	8.61	8.5	-log[H+]
McGaugh Slough at Finley Road East	05/03/05	E. Coli	> 2400	235	MPN/100mL
	05/03/05	EC	961	900	uS/cm
	05/03/05	TDS	630	500	mg/L
Middle Fork Feather River at County Road A-23	05/02/05	E. Coli	1200	235	MPN/100mL
	09/08/05	pH	8.56	8.5	-log[H+]
	09/08/05	pH	8.61	8.5	-log[H+]
North Canyon Creek	05/04/05	E. Coli	920	235	MPN/100mL
	10/04/05	E. Coli	490	235	MPN/100mL
Pine Creek at Nord-Gianella Road	05/02/05	E. Coli	> 2400	235	MPN/100mL
Pit River at Canby Bridge	05/16/05	E. Coli	980	235	MPN/100mL
	06/20/05	E. Coli	387	235	MPN/100mL
Pit River at Pittville	09/20/05	pH	9.43	8.5	-log[H+]
Pope Creek upstream from Lake Berryessa	05/03/05	E. Coli	2400	235	MPN/100mL
Rough and Ready Pumping Plant (RD 108)	03/20/05	EC	1131	900	uS/cm
	03/20/05	TDS	880	500	mg/L
	05/04/05	E. Coli	> 2400	235	MPN/100mL
	07/07/05	DO	4.5	5	mg/L
Shag Slough at Liberty Island Bridge	08/03/05	DO	4.8	5	mg/L
Spanish Creek above Greenhorn Cr.	05/02/05	E. Coli	870	235	MPN/100mL
	06/07/05	E. Coli	> 2400	235	MPN/100mL
Stone Corral Creek at Maxwell Raod	05/03/05	E. Coli	2400	235	MPN/100mL
Stony Creek on Hwy 45 near Rd 24	05/02/05	E. Coli	820	235	MPN/100mL
	07/06/05	pH	8.51	8.5	-log[H+]
	08/02/05	pH	9.28	8.5	-log[H+]
	08/09/05	pH	9.13	8.5	-log[H+]

Table E-5 continued. Exceedances of Basin Plan Limits for Conventional and Microbiological Parameters, March – October 2005

Station Description	Date Sampled	Analyte	Result	Objective	Units
Toe Drain at NE corner of Little Holland	05/04/05	E. Coli	> 2400	235	MPN/100mL
Tule Canal at I-80	03/20/05	EC	728	900	uS/cm
	03/20/05	TDS	560	500	mg/L
	05/04/05	E. Coli	> 2400	235	MPN/100mL
	06/08/05	DO	3.89	5	mg/L
	06/08/05	EC	715	900	uS/cm
	07/07/05	EC	960	900	uS/cm
	07/07/05	TDS	560	500	mg/L
	07/07/05	TDS	570	500	mg/L
	08/02/05	EC	811	900	uS/cm
	09/06/05	E. Coli	550	235	MPN/100mL
	09/06/05	EC	934	900	uS/cm
	09/06/05	TDS	500	500	mg/L
Wadsworth Canal at South Butte Rd	05/03/05	E. Coli	> 2400	235	MPN/100mL
	07/07/05	E. Coli	730	235	MPN/100mL
Z Drain – Dixon RCD	03/19/05	EC	977	900	uS/cm
	03/19/05	pH	9.01	8.5	-log[H+]
	03/19/05	TDS	670	500	mg/L
	05/04/05	EC	989	900	uS/cm
	05/04/05	TDS	510	500	mg/L
	06/07/05	E. Coli	2400	235	MPN/100mL
	06/07/05	EC	735	900	uS/cm
	06/07/05	pH	9.38	8.5	-log[H+]
	06/28/05	EC	876	900	uS/cm
	07/07/05	E. Coli	650	235	MPN/100mL
	08/03/05	DO	4.8	5	mg/L
	08/03/05	E. Coli	370	235	MPN/100mL
	09/06/05	E. Coli	730	235	MPN/100mL

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. This AMR therefore focuses upon sampling results and use reports for six priority pesticides that meet these criteria. The six pesticides specifically analyzed for the Phase 1 Coalition monitoring are azinphos-methyl, carbofuran, chlorpyrifos, diazinon, malathion, and, methyl parathion. Fourteen Coalition sites were monitored for these constituents during March – October 2005 sampling events and diazinon and chlorpyrifos were detected in 9 samples, overall. Azinphos-methyl, carbofuran, malathion, and, methyl parathion were not detected in any samples. Phase 2 monitoring for organochlorine and pyrethroid pesticides was conducted at 9 and 7 sites, respectively. No organochlorine or pyrethroid pesticides were detected in any samples.

Pesticide use information for the Sacramento Valley watershed was acquired from the California Department of Pesticides' Pesticide Use Reporting (PUR) Database (2004). This information is currently limited to historical data reported through 2003 and is not yet available for 2004 or the monitoring period represented in this report. Data for the pesticides of primary concern in the Sacramento Valley watershed were compiled for the subwatersheds and are summarized in Table E-6. Pesticide use data were also characterized for specific monitored drainages within each subwatershed. These additional detailed tables are provided in Appendix E. Over the past four years with available data (2000-2003), these pesticides have been widely used throughout the Coalition's subwatersheds and exhibited relatively small annual variations in use overall. Within this overall pattern there are some spatial and temporal trends that are discussed in additional detail in the Annual Report.

Table E-6. Application Trends for Selected Pesticides in the Sacramento Valley Watershed, 2000-2003

Pesticide	2000(1)	2001	2002	2003	Trend(2)
Azinphos-methyl	29,768	27,597	28,061	29,040	⇔
Carbofuran	5,932	6,284	5,804	4,758	⇔
Chlorpyrifos	113,823	111,426	137,167	139,685	↗
Diazinon	78,245	57,593	86,794	69,888	⇔
Malathion	23,972	42,993	51,550	30,942	⇔
Methyl Parathion	10,328	11,514	7,530	7,986	↘

(1) Tabled values are total annual pounds of active ingredient applied per Coalition Subwatershed, as reported in the California Department of Pesticide Regulation PUR Database (2004).

(2) Trends are qualitatively assessed and indicated by arrow direction. "⇔" indicates no apparent trend.

ACTIONS TAKEN

Coalition sampling results indicated exceedances of the narrative toxicity objective in six water samples collected from four sites: 1) Burch Creek at Woodson Avenue, 2) Stony Creek on Hwy 45 near Rd 24, 3) Butte Slough at Pass Road, and 4) Rough and Ready Pumping Plant. The nature of the toxicity, and the results of follow-up sampling and analysis to identify causes of toxicity observed are detailed in the section titled *Exceedances of Relevant Water Quality Objectives*. In each case, subwatershed groups representing growers in the respective drainage areas were contacted and reviewed drafts of the Coalition's initial Communications Reports. Additional actions implemented as a result of observed exceedances include the following:

- Identification of dichlorvos as the probable cause of the *Ceriodaphnia* toxicity observed in Butte Slough at Pass Road and Rough and Ready Pumping Plant samples, and investigation of potential sources of dichlorvos in affected subwatershed. Additional evaluation of potential dichlorvos sources is planned for 2006.
- The Coalition is in the process of developing a letter to notify landowners and growers of exceedances observed in their drainages, and to announce meeting locations to discuss the potential BMPs. The letter will emphasize the importance of implementing BMPs on lands determined to be sources of farm runoff problems, and will include discussion of the consequences of failure to solve water quality problems through watershed-wide efforts. An example of the letter will be provided to the Water Board on request.
- Extensive landowner outreach has been conducted in 2005 by the Butte/Yuba/Sutter Counties Watershed Coalition, Colusa County Department of Agriculture and Colusa Basin Subwatershed Coalition, Yolo County Subwatershed Group, the Shasta Tehama Water Education Coalition, Dixon/Solano Water Quality Coalition, and Yolo County Farm Bureau Education Corporation. This outreach has focused on informing growers and landowners of the results of water quality monitoring and on available Best Management Practice options to protect surface waters from potential impacts of runoff and irrigation return flows from irrigated lands. This type of outreach is planned to continue in 2006.
- Development of a monitoring plan by the Shasta Tehama Water Education Coalition to investigate toxicity and sources of diazinon observed in Burch Creek samples.
- The Coalition has completed a Management Practice Action Plan 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. This plan is provided in Appendix G.
- In response to the Sacramento and Feather Rivers TMDL for diazinon, the Coalition submitted to the Water Board on 31 August 2005 the *Diazinon Runoff Management Plan for Orchard Growers in the Sacramento Valley*. This plan was developed as part of the Coalition's commitment to address water quality issues identified in the watershed. Key components of the plan include monitoring required by the TMDL to gauge compliance with water quality objectives, and surveying orchard growers who have used diazinon in the last four years. This plan is currently being revised in response to comments from the Water Board, and will be implemented in January 2006.