

Proposed Water Quality Monitoring Program for 2006:

Sacramento Valley Water Quality Coalition

In January 2005, the Sacramento Valley Water Quality Coalition commenced monitoring under its Monitoring and Reporting Program Plan (MRPP) and Quality Assurance Project Plan (QAPP) submitted to the Regional Water Quality Control Board, Central Valley Region (Regional Board) on April 1, 2004 and December 22, 2004 respectively. The Regional Board issued a Conditional Approval of the Coalition's MRPP on December 2, 2004.

The following document is the Coalition monitoring plan for 2006 and is provided as an attachment to the Coalition's amended MRRP.

MONITORING IN 2005

Monitoring conducted in 2005 under the Coalition's MRPP provides the basis for the monitoring proposed for 2006. This monitoring is briefly summarized in the following sections, along with the basis for changes implemented for the 2006 storm and irrigation season monitoring.

Core Monitoring Sites

The Coalition has collected samples and performed analyses at sixteen core sites throughout the watershed (Table 1). Consistent with conditionally approved MRPP and QAPP, monitoring was generally conducted twice during the storm season (December – March), and monthly during the irrigation season (May – October).

Table 1. SVWQC core monitoring sites, 2005

Site Index	Subwatersheds	Site Location
4	Shasta/Tehama	Burch Creek at Woodson Ave Bridge
5	ColusaBasin	Stony Creek on Hwy 45 near Rd 24
8	ColusaBasin	Rough and Ready Pumping Plant (RD 108)
11	Placer/Nevada/S.Sutter/N.Sac.	Coon Creek at Striplin Road
12	Butte/Yuba/Sutter	Butte Slough at Pass Road
13	Butte/Yuba/Sutter	Wadsworth Canal at South Butte Rd
14	Butte/Yuba/Sutter	Pine Creek at Nord Gianella Road
16	Solano/Yolo	Z Drain – Dixon RCD
17	Solano/Yolo	Toe Drain at Little Holland Tract
18	Solano/Yolo	Tule Canal at I-80
19	UpperFeatherRiver	Spanish Creek above Greenhorn Cr.
20	UpperFeatherRiver	Middle Fork Feather River at County Road A-23
21	UpperFeatherRiver	Indian Creek d/s from Indian Valley
22	Lake/Napa	McGaugh Slough at Finley Road East
25	EIDorado	North Canyon Creek
26	Sacramento/Amador	Cosumnes River at Twin Cities Rd

Exceptions to the planned monitoring frequencies documented in the MRPP and QAPP were as follows:

Toe Drain @ Little Holland Tract: Poor access conditions in storm and irrigation seasons resulted in only two samples being collected at this site throughout the year. In August, the Coalition identified a new site in the same drainage area and submitted a memo to the Regional Board specifying the reason for the change. Monitoring commenced at the new location (Shag Slough at Liberty Island Bridge) in September 2005, and are proposed to continue in 2006.

Middle Fork Feather River at County Road A-23: This site was inaccessible in January 2005 due to icy conditions. This site was successfully sampled during all other planned events.

Burch Creek at Woodson Avenue Bridge: This site was sampled for two storm events and one irrigation event (January, March and May). Following the May irrigation season sample event, flow was inadequate to sample this site. The site was checked monthly for flow after May, and was found to be dry for the remainder of the irrigation season.

Pine Creek at Nord-Gianella Road: This site was sampled for two storm events and three irrigation events (January, March, May, June and July). Following the July event, flow was inadequate to sample this site. The site was checked monthly for flow after July, and was found to be dry for the remainder of the irrigation season.

Cosumnes River at Twin Cities Road: This site was sampled for two storm events and four irrigation events: January, March, May, June, July and August. Following the August event, flow was inadequate to sample this site. The site was checked monthly for flow in September and October, and was found to be dry for the remainder of the irrigation season.

Coordinated Monitoring

The Coalition also coordinated efforts with five other programs collecting samples in priority drainage areas throughout the Sacramento Valley. Samples were collected at the sites listed in Table 2 at the frequencies specified in the Coalition's Table 7A of the MRPP. The parameters analyzed were also as specified in Table 7A.

Table 2. Coordinating program monitoring sites in 2005

Subwatersheds	Site Location	Frequency	Agency
Pit River	Pit River at Pittville	Monthly, April through September	Northeastern California Water Association
	Fall River at Fall River Ranch Bridge		
	Pit River at Canby Bridge		
Lake/Napa	Pope Creek upstream from Lake Berryessa	Three events (January, March, May)	Putah Creek Watershed Group
	Capell Creek upstream from Lake Berryessa		
Colusa Basin	Colusa Drain near Maxwell Road	Monthly, May through September	Glenn County Agriculture Department
	Stone Corral Creek		
	Butte Creek at Gridley Rd Bridge		
Sacramento / Amador	Big Indian Creek at Bridge	Three events (December 2004, March and June 2005)	Plymouth Area Vineyard Erosion Control
Colusa Basin	Colusa Basin Drain above KL	No samples were collected in 2005	Sacramento River Watershed Program
Butte/Yuba/Sutter	Sacramento Slough		

RECOMMENDED MONITORING FOR 2006

Consistent with R5-2005-0833 which states that “*Based on results of the monitoring program after a minimum of one year, the Coalition Group may submit a revised MRP Plan requesting a reduction in the constituents monitored and/or sample frequency...*” the Coalition is submitting the following MRPP proposal for 2006. The proposed monitoring plan is also summarized in the attached Table 7A, which includes additional detail for parameters, sampling frequency, and implementation. The categories and criteria used for making these monitoring recommendations are discussed below.

Sites with No Observed Toxicity

For most sites that did not exhibit toxicity during 2005, the Coalition will end Phase 1 testing and initiate Phase 2 testing (i.e., pesticides, metals, nutrients, general physical parameters). These sites are listed below, with a brief discussion of exceptions:

- *Tule Canal at I-80*
- *Coon Creek at Striplin Road*
- *Wadsworth Canal at South Butte Rd*
- *McGaugh Slough at Finley Road East.* Although no toxicity was observed at this site in 2005, Phase 1 testing is planned to continue in 2006 to increase the number of monitored events.
- *Toe Drain at Little Holland Tract.* Due to the access problems experienced in 2005, this site was replaced during the irrigation season with Shag Slough at Liberty Island Bridge, where Phase 1 monitoring will continue in 2006.
- *Middle Fork Feather River at County Road A-23, Spanish Creek above Greenhorn Cr., and Indian Creek d/s from Indian Valley.* Phase 1 monitoring at

these sites excluded toxicity on the basis of minimal irrigated acreage and pesticide use in these drainages. Phase 2 monitoring will be implemented in 2006, but will exclude pesticide analyses on this same basis.

Sites with Observed Toxicity

Sites with occasional toxicity observed in 2005 will be sampled as described below in 2006. Toxicity observed at these sites is summarized in Table 3. The scope of Phase 2 monitoring was determined on a case-by-case basis as described below for each site.

- *Burch Creek at Woodson Ave Bridge* exhibited statistically significant toxicity in three samples, including two samples in January 2005 and one sample in May 2005. Phase 1 testing will continue at this site to attempt to assess causes of the observed toxicity. Phase 2 testing will also commence at this site in January 2006. The Shasta-Tehama subwatershed group has also provided a monitoring strategy for 2006 to more completely characterize agricultural drainage in this area. The proposed strategy includes contingency samples collected at two sites upstream from the original site to identify sources of toxicity observed in 2006.
- *Pine Creek at Nord-Gianella Road* exhibited statistically significant toxicity to *Selenastrum* in one sample in January 2005. The cause was not determined and the toxicity was not repeated. Based on these results, Phase 1 toxicity testing will continue at this site for the 2006 Storm season, but will not be continued in the irrigation season. The Coalition will commence Phase 2 testing at Pine Creek beginning with the 2006 storm season. This sampling will continue analyses for organophosphorus pesticides which were identified in the January 2005 event (0.0141 ug/l diazinon and 0.227 ug/l chlorpyrifos), but determined not to be the cause of the observed *Selenastrum* toxicity.
- At the *Z Drain – Dixon RCD* site, water column toxicity has been evaluated on twelve occasions since July 2004. Three water samples exhibited statistically significant toxicity to three different test species respectively, and one sediment sample caused statistically significant toxicity. None of the samples resulted in mortality greater than or equal to 50% of the control and therefore no Toxicity Identification Evaluations (TIEs) were initiated. The Coalition will continue Phase 1 toxicity testing in 2006, and will also expand analysis of the Phase 2 analyses implemented in 2005 at this site.
- At *Stony Creek on Hwy 45 near Rd 24*, limited algae toxicity observed in one 2005 event, and therefore Phase 1 aquatic toxicity is discontinued at this site. Phase 1 sediment toxicity testing will be continued due to observed moderate toxicity in two 2005 events. Phase 2 parameters will be implemented in 2006. Due to low use of pyrethroids in this drainage, these pesticides will be excluded from the list of Phase 2 analyses in 2006.
- At *Rough and Ready Pumping Plant*, complete mortality to *Ceriodaphnia* was observed in one sample. The probable cause of the observed toxicity was determined to be the organophosphorus pesticide, dichlorvos (.087 ug/l), which is not registered for cultivated crop use in California. Because the cause of the single case of observed toxicity was determined, Phase 1 parameters (including toxicity)

- are discontinued for 2006. However, there will be continued investigation of the potential source(s) of dichlorvos. Phase 2 monitoring will be implemented in 2006, including continued analysis for dichlorvos.
- At *Butte Slough at Pass Road*, complete mortality to *Ceriodaphnia* was observed in one sample (October 2005). Two additional samples caused low but statistically significant mortality to *Selenastrum* and *Hyaella*. The probable cause of the observed *Ceriodaphnia* toxicity was determined to be an organophosphorus pesticide, dichlorvos (0.542 ug/L), which is not registered for cultivated crop use in California. Because the cause of the single case of substantial observed toxicity was determined, monitoring of Phase 1 parameters (including toxicity) by the Coalition will be discontinued for 2006. However, the California Rice Commission *ILP* monitoring is continuing toxicity testing at this site, and there will be continued investigation of the potential source(s) of dichlorvos by the Coalition and subwatershed. Phase 2 monitoring will be implemented in 2006, including continued analysis for dichlorvos.
 - At *North Canyon Creek*, negligible sediment toxicity (<20% effect) and no aquatic toxicity were observed in 2005. Therefore Phase 1 parameters are discontinued and Phase 2 parameters will be implemented in 2006 (including OP pesticides that were detected in 2005, but not associated with any observed toxicity).
 - At *Cosumnes River at Twin Cities Rd*, negligible sediment toxicity (<20% effect) was observed in one sample and no aquatic toxicity was observed in 2005. The minimal sediment toxicity observed was associated with late season zero flow conditions not related to agricultural runoff. Therefore Phase 1 parameters are discontinued at this site and Phase 2 parameters will be implemented in 2006.
 - At *Pit River at Canby Bridge*, low but statistically significant toxicity to *Selenastrum* was observed in one sample. Phase 1 parameters will be continued for the 2006 storm season (Dec-March) because toxicity was not monitored for storms in 2005 at this site. Phase 1 will be discontinued if no further toxicity is observed in the Storm season. Phase 2 nutrients will be added for 2006 to address 303(d) listings downstream for low DO and elevated nutrients. Organophosphate pesticides will be monitored in three events (following dormant spray application, and in July and October) to monitor potential discharges of malathion and chlorpyrifos. Bioassessment monitoring has also been added by the subwatershed monitoring agency (Northeastern California Water Association).

Table 3. Sites exhibiting toxicity in 2004-2005 initial toxicity screening tests

Site	Sample Event	Initial Toxicity Screening Test	(units = percent of control)		
			Initial Test Result	Re-Test Result	Re-Sample Result
Burch Creek at Woodson Ave Bridge	Jan 2005	<i>Ceriodaphnia</i> survival	20%	85%	0%
	May 2005	<i>Selenastrum</i> growth	69%	n/a	n/a
Pine Creek at Nord-Gianella Road	Jan 2005	<i>Selenastrum</i> growth	46%	62%	100%
Z Drain – Dixon RCD	Aug 2004	<i>Selenastrum</i> growth	68%	n/a	n/a
	Sep 2004	Fathead survival	78%	n/a	n/a
	Jan 2005	<i>Ceriodaphnia</i> survival	55%	80%	100%
	Jun 2005	<i>Hyalella</i> survival (replicate sample)	63%, 78%	n/a	n/a
Stony Creek on Hwy 45 near Rd 24	Jun 2005	<i>Hyalella</i> survival	61%	n/a	n/a
	Sep 2005	<i>Hyalella</i> survival	74%	n/a	n/a
Rough and Ready Pumping Plant	Sep 2005	<i>Ceriodaphnia</i> survival	0%	0% (100% conc.)	100%
Butte Slough at Pass Road	Aug 2005	<i>Selenastrum</i> growth	80%	n/a	(1)
	Jun 2005	<i>Hyalella</i> survival	80%	n/a	n/a
	Oct 2005	<i>Ceriodaphnia</i> survival	0%	(1)	n/a
		(replicate sample) ²	0%		
	(replicate sample) ³	0%	n/a	100%	
North Canyon Creek	Sep 2005	<i>Hyalella</i> survival	88%	n/a	n/a
Cosumnes River at Twin Cities Rd	Sep 2005	<i>Hyalella</i> survival	84%	n/a	n/a
Pit River at Canby Bridge	Apr 2005	<i>Selenastrum</i> growth	74%	n/a	n/a

(1) Retest and re-sampling were not initiated by CRC for these samples.

(2) Collected by CRC and tested by Pacific EcoRisk.

(3) Collected by Regional Board and UC Davis staff and tested by California Department of Fish and Game ATL. Preliminary TIE results indicated non-polar organic was cause of toxicity.

Completion of Phase 1 Monitoring

Phase 1 parameters will be continued for the 2006 storm season (Dec-March) at the following sites, either because toxicity was not monitored for storms in 2005, or to provide additional sample events. Phase 1 will be discontinued if no further toxicity is observed in the 2006 storm season. No toxicity was observed in irrigation season monitoring events at these sites.

- *Colusa Basin Drain near Maxwell Road, Stone Corral Creek, and Butte Creek at Gridley Rd Bridge.* Phase 2 testing will also begin at these three sites in January 2006 and continue throughout the irrigation season during each event. The Glenn County Agriculture Department implemented monitoring at these sites in 2005. The Coalition will assume full responsibility for monitoring these sites in 2006.
- *Fall River at River Ranch Bridge, and Pit River at Pittville.* Phase 2 nutrients will be added for 2006 to address 303(d) listings downstream for low DO and elevated nutrients. Phase 2 Organophosphate pesticides will be monitored in three events (following dormant spray application, and in July and October) to monitor potential discharges of malathion and chlorpyrifos. Bioassessment monitoring has also been added by the subwatershed agency conducting monitoring (Northeastern California Water Association).

- *Pope Creek* and *Capell Creek* in the Napa/Lake subwatershed. These two sites will continue to be monitored for a drainage-specific sub-set of Phase 1 parameters, based on minimal irrigated acreage and pesticide use. Toxicity is not monitored at these sites.

New and Modified Monitoring Sites

The Coalition is proposing to add three new monitoring sites at which Phase 1 testing (water column and sediment toxicity, drinking water constituents, and general physical parameters) will commence in January 2006 and continue throughout the 2006 irrigation season:

- One new site will be monitored on *Gilsizer Slough at George Washington Road* in the Butte/Yuba/Sutter subwatershed. This site is needed to assess diazinon use and TMDL compliance in this Gilsizer Slough drainage, and complements an ongoing BMP study being conducted in this drainage.
- *Ulati Creek at Brown Road* is a new site that will be monitored in the Solano/Yolo subwatershed. This site was added to more completely characterize agricultural drainages in this subwatershed. The site characterizes a large proportion of the irrigated acreage in Solano County.
- One site will be added on Andersen Creek in Southern Shasta County. This site is needed to more completely characterize agricultural drainages in this subwatershed. Phase 1 and Phase 2 parameters will be monitored simultaneously. Phase 2 pesticides will be limited to organophosphate pesticides, based on usage in this subwatershed. The exact location of the monitoring site will be confirmed by the Shasta Tehama Water Education Coalition (STWEC) prior to implementing monitoring in January.
- Sampling will cease at the *Big Indian Creek at Bridge* site in the Sacramento/Amador subwatershed after one additional storm event. This site will be replaced with *Dry Creek at Alta Mesa Road* (also in the Sacramento/Amador subwatershed), with analysis of Phase 1 parameters (water column and sediment toxicity, drinking water constituents and general physical parameters) beginning in January 2006. Monitoring at this site will be implemented by the Coalition.

New monitoring location are listed in Table 4. A summary of all monitoring by the Coalition and coordinating partners is provided in Table 5, with a more detailed summary in MRPP Table 7A (attached).

Table 4. New monitoring sites for 2006

Subwatersheds	Site Location	Latitude	Longitude
Butte/Yuba/Sutter	Gilsizer Slough at George Washington Road	39.0090	-121.6716
Solano/Yolo	Ulati Creek at Brown Road	38.3070	-121.7940
Shasta/Tehama	Andersen Creek (location TBD)	NA	NA
Sacramento/Amador	Dry Creek at Alta Mesa Road	38.2480	-121.2260

Table 5. Coalition Monitoring Summary: Planned samples in 2006

Location	Physical and Chemical Parameters												Toxicity and Follow-up Testing				Implementation
	Water Column Sample Events	Sediment Sample Events	Flow	pH, conductivity, DO, temperature	Color, Turbidity, TDS, TSS, TOC	Nutrients	Trace metals	Organophosphate pesticides	Organochlorines, triazines, pyrethroids	Glyphosate, Paraquat	Carbofuran	Pathogen Indicators: <i>E. Coli</i> bacteria	Ceriodaphnia, 96-h acute	Pimephales, 96-h acute	Selenastrum, 96-h short-term chronic	Hyalella, 10-day short-term chronic	
Butte Slough at Pass Road	8	2	8	8	8	8	8	8	8	8	6	8	ns	ns	ns	ns	SVWQC
Colusa Drain near Maxwell Road	8	2	8	8	8	8	8	8	8	8	6	8	8	8	8	2	SVWQC
Stone Corral Creek near Maxwell Road	8	2	8	8	8	8	8	8	8	8	6	8	8	8	8	2	SVWQC
Butte Creek at Gridley Rd Bridge	8	2	8	8	8	8	8	8	8	8	6	8	8	8	8	2	SVWQC
Wadsworth Canal at South Butte Rd	8	2	8	8	8	8	8	8	8	8	6	8	ns	ns	ns	ns	SVWQC
Pine Creek at Nord-Gianella Rd	8	2	8	8	8	8	8	8	8	8	6	8	ns	ns	ns	ns	SVWQC
Gilsizer Slough at George Washington Rd	8	2	8	8	8	ns	ns	8	ns	ns	ns	8	8	8	8	2	SVWQC
Z-Drain (Dixon RCD)	8	2	8	8	8	8	8	8	8	8	6	8	8	8	8	2	SVWQC
Shag Slough at Liberty Island	8	2	8	8	8	8	8	8	8	8	6	8	8	8	8	2	SVWQC
Tule Canal at NE corner of I-80	8	2	8	8	8	8	8	8	8	8	6	8	ns	ns	ns	ns	SVWQC
Ulatis Creek	8	2	8	8	8	8	8	8	8	8	6	8	8	8	8	2	SVWQC
Rough and Ready Pumping Plant	8	2	8	8	8	8	8	8	8	8	6	8	ns	ns	ns	ns	SVWQC
Stony Creek on Hwy 45 near Rd 24	8	2	8	8	8	8	8	8	8	8	6	8	ns	ns	ns	2	SVWQC
North Canyon Creek	8	2	8	8	8	8	8	8	8	ns	ns	8	ns	ns	ns	ns	SVWQC
McGaugh Slough at Finley Road East	3	2	3	3	3	3	3	3	3	ns	ns	3	3	3	3	2	SVWQC
Coon Creek at Striplin Road	8	2	8	8	8	8	8	8	8	8	6	8	ns	ns	ns	ns	SVWQC
Cosumnes River at Twin Cities Rd	8	2	8	8	8	8	8	8	8	8	ns	8	ns	ns	ns	ns	SVWQC
Big Indian Creek at Bridge	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	SVWQC
Dry Creek at Alta Mesa Road	8	2	8	8	8	ns	ns	ns	ns	ns	ns	8	8	8	8	2	SVWQC
Burch Creek at Woodson Ave Bridge	8	2	8	8	8	8	8	8	8	ns	6	8	8	8	8	2	SVWQC
Anderson Creek in Shasta County	8	2	8	8	8	8	8	8	ns	ns	6	8	8	8	8	2	SVWQC
Spanish Creek above Greenhorn Creek	7	ns	7	7	7	7	7	ns	ns	ns	ns	7	ns	ns	ns	ns	SVWQC
Indian Creek d/s from Indian Valley	7	ns	7	7	7	7	7	ns	ns	ns	ns	7	ns	ns	ns	ns	SVWQC
Middle Fork Feather River at County Rd A-23	7	ns	7	7	7	7	7	ns	ns	ns	ns	7	ns	ns	ns	ns	SVWQC
Pit River at Pittville	8	ns	8	8	8	8	ns	3	ns	ns	ns	8	2	2	2	ns	NECWA
Fall River at Fall River Ranch Bridge	8	ns	8	8	8	8	ns	3	ns	ns	ns	8	2	2	2	ns	NECWA
Pit River at Canby Bridge	8	ns	8	8	8	8	ns	3	ns	ns	ns	8	2	2	2	ns	NECWA
Pope Creek upstream from Lake Berryessa	8	ns	8	8	8	ns	ns	ns	ns	ns	ns	8	ns	ns	ns	ns	PCWG
Capell Creek upstream from Lake Berryessa	8	ns	8	8	8	ns	ns	ns	ns	ns	ns	8	ns	ns	ns	ns	PCWG
Colusa Drain above Knight's Landing	9	ns	9	9	9	9	ns	6	6	ns	6	9	9	9	9	ns	SRWP
Sacramento Slough	9	ns	9	9	9	9	ns	6	6	ns	6	9	9	9	9	ns	SRWP

Notes: Tabled values indicate number of regular samples planned for 2006. "ns" indicates parameter is not sampled. Implementation indicates whether monitoring is implemented by the Coalition (SVWQC), Northeastern California Water Association (NECWA), Putah Creek Watershed Group (PCWG), or Sacramento River Watershed Program (SRWP)