

APRIL 2011

SACRAMENTO VALLEY  
WATER QUALITY COALITION

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# **Water Quality Management Plan Progress Report**

*prepared by*

LARRY WALKER ASSOCIATES

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## Table of Contents

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<b>Table of Contents</b> .....	<b>ii</b>
<b>Management Plan Progress Report</b> .....	<b>4</b>
<b>Results of Monitoring</b> .....	<b>10</b>
Registered Pesticides.....	10
Toxicity.....	11
Legacy Pesticides.....	12
Pathogen indicators.....	12
Trace Metals.....	12
Salinity.....	12
DO and pH.....	12
Nutrients.....	13
<b>Source Evaluations</b> .....	<b>13</b>
Pathogen Indicator Source Evaluation Report.....	13
<b>Outreach Documentation</b> .....	<b>17</b>
<b>Management Practices Inventories and Member Surveys</b> .....	<b>17</b>
<b>Recommendations for Management Plan Monitoring</b> .....	<b>18</b>
<b>Proposed Goals for Implementation of Management Practices</b> .....	<b>18</b>
<b>Update to Required Management Plans</b> .....	<b>19</b>
New Management Plan Elements.....	19
Implementation Tasks and Schedule for New Elements.....	19
Proposed Changes to the Management Plan.....	20
2011 Deliverables and Schedule for New and Ongoing Management Plan Elements....	20
<b>TMDL Compliance Reporting</b> .....	<b>28</b>
Chlorpyrifos and Diazinon TMDL.....	28
<b>Summary: Evaluation of Progress</b> .....	<b>30</b>
<b>Appendix A: Summary of 2010 Management Plan Outreach Efforts</b> .....	<b>32</b>
<b>Appendix B: 2011 Management Plan Monitoring</b> .....	<b>33</b>
<b>Appendix C: January 31, 2011 Memorandum to Water Board ILRP Staff</b> .....	<b>34</b>
<b>Appendix D: Chlorpyrifos and Diazinon Compliance Monitoring Results</b> .....	<b>35</b>

**List of Tables**

Table 1. Summary of Management Plan Task Activity.....	6
Table 2. 2010 Source Evaluation Deliverables: Schedule Revisions .....	13
Table 3. Summary of Surveys Conducted for Pathogen Indicator Source Evaluations ...	16
Table 4. 2010 Management Practices Implementation and Performance Goals documents: Schedule Revisions .....	19
Table 5. Additions to the Management Plan for Data through September 2010.....	19
Table 6. Task for New Management Plan Elements.....	21
Table 7. 2011 Schedule of Deliverables .....	26

## Management Plan Progress Report

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The purpose of this document is to provide an update on the status of the Sacramento Valley Water Quality Coalition's (Coalition) Water Quality Management Plan (the Management Plan<sup>1</sup>) and the Coalition's progress toward completion of this plan.

Reporting for the Management Plan is intended to provide information regarding progress toward and achievement of the Management Plan performance goals. These Progress Reports document the results of source identification evaluations, any evaluations conducted to determine the effectiveness of the management practice implementation, and whether additional or different management practices need to be implemented. These evaluations are conducted and reported according to the Management Plan deliverable schedule. Data reports for monitoring conducted for the Management Plan are submitted on the same quarterly schedule and in the same formats as required by the Monitoring and Reporting Program (MRP) for regular Coalition monitoring.

This second Progress Report provides summaries of progress toward completion of specific Management Plan elements, updates to the list of required Management Plan elements, and recommendations for continuation or modification of the Management Plan. This Progress Report also summarizes the results of initial source identification evaluations and results of selected Management Plan monitoring for the previous year, provides documentation of outreach efforts, and a summary of completed baseline management practice inventories in priority drainages. Future Progress Reports will also document goals established for additional management practice implementation and assess progress toward these implementation goals.

The activities conducted in 2010 to implement the Coalition's Management Plan were focused primarily on addressing the higher priority Management Plan elements triggered by exceedances of water quality objectives and trigger limits for registered pesticides and toxicity. Source evaluations for pathogen indicator bacteria also comprised a significant effort in 2010. Deliverables completed for registered pesticides included review and evaluation of pesticide application data, identification of potential sources, and determination of likely agricultural sources. Implementation completed to address toxicity exceedances included review and evaluation of pesticide application data, evaluation of monitoring results to identify potential causes of toxicity, and determination of likely agricultural sources of identified causes of toxicity. These evaluations have been documented in the Source Evaluation Reports submitted for each water body and management plan element<sup>2</sup> in March 2010. For registered pesticides and identified causes of toxicity, surveys of Coalition members operating on high priority parcels were also conducted to determine the degree of implementation of relevant management practices. Similar surveys (or in some cases the same surveys) were also conducted to support

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<sup>1</sup> SVWQC 2009. Water Quality Management Plan. Prepared by Larry Walker Associates for the Sacramento Water Quality Coalition (SVWQC). Sacramento, California. January 2009.

<sup>2</sup> A Management Plan element is the specific individual combination of the water body and analyte or monitoring category requiring management, e.g., diazinon in Gilsizer Slough, or invertebrate toxicity in Coon Hollow Creek.

source evaluation efforts for pathogen indicators. These survey results form the basis for establishing goals for additional management practice implementation needed to address exceedances of Basin Plan water quality objectives and *ILRP* trigger limits.

Management Plan elements with tasks to be completed in 2010 are listed in Table 1. This table provides the water body and analyte or monitoring category of concern, and a summary of the major Management Plan task activity. The remainder of this report documents the status, progress, and results for the following Management Plan Components:

- Results of Monitoring
- Source Evaluations
- Outreach Documentation
- Management Practices Inventories and Member Surveys
- Recommendations for Management Plan Monitoring
- Status of Management Plan tasks
- Proposed Goals for Implementation of Management Practices
- Update to Required Management Plans
- TMDL Compliance Reporting
- Evaluation of Progress

**Table 1. Summary of Management Plan Task Activity**

Management Plan Category	Subwatershed	Waterbody	Analyte	Summary of Major Mgt Plan Task Activity and Status;
DO and pH	ButteYubaSutter	Butte Slough	DO	Initial review of Regulatory Basis completed previously in 2009. Discussed and confirmed applicability of regulatory basis with ILRP Staff, based on support of aquatic life uses. No determination was made regarding impact of low flows on DO and pH exceedances; Evaluation of nutrient applications to be completed and reported in September 2011 SER;
		Gilsizer Slough	DO, pH	
	ColusaGlenn	Colusa Basin Drain	DO	
		Freshwater Creek	DO	
		Stone Corral Creek	DO	
		Stony Creek	DO	
		Sycamore Slough	DO	
		Walker Creek	DO	
	PitRiver	Fall River	DO	
		Pit River	DO, pH	
	PNSSNS	Coon Creek	DO	
	SacramentoAmador	Cosumnes River	DO, pH	
		Dry Creek	DO	
		Laguna Creek	DO, pH	
	ShastaTehama	Anderson Creek	DO	
Coyote Creek		DO		
SolanoYolo	Ulati Creek	DO, pH		
	Z-Drain	DO, pH		
UpperFeatherRiver	Indian Creek Middle Fork Feather River	DO	Special Study reports provided in 2010. Reports under review by Water Board	
		DO, pH		
Legacy Pesticides	ColusaGlenn	Freshwater Creek	DDT and degradation products	It was requested that the requirement for Freshwater Creek be deleted because it was incorrectly included in the 2009 Management Plan.
	ButteYubaSutter ColusaGlenn	Gilsizer Slough		Source Evaluation results presented in 2010 Management Plan Progress Report; No specific agricultural sources identified and surveys were not needed to set goals; MPIPG (April 2011) for this Management Plan element will provide for general soil conservation and sediment management goals not targeted to specific crops or growers; El Dorado is currently in the Pilot BMP Program;
		Lurline Creek Sycamore Slough		
	SacramentoAmador	Grand Island Drain		
	SolanoYolo	Willow Slough		
EIDorado	Coon Hollow Creek North Canyon Creek			

Management Plan Category	Subwatershed	Waterbody	Analyte	Summary of Major Mgt Plan Task Activity and Status;
Pathogen Indicators	ButteYubaSutter	Gilsizer Slough Lower Snake River Pine Creek Wadsworth Canal	E. coli	Regional Board deemed the requirement for Pit River complete in July 2010.  Review Regulatory Basis task completed previously (2009); Surveys of Coalition members completed in 2010 and reported in SER (March 2011); Field surveys not feasible due to access constraints; Source Evaluation Report rescheduled and completed in March 2011; MPIPG deliverable rescheduled to June 2011;
	ColusaGlenn	Colusa Basin Drain Logan Creek Lurline Creek Stone Corral Creek Sycamore Slough Walker Creek		
	EIDorado	North Canyon Creek		
	LakeNapa	Capell Creek McGaugh Slough		
	PitRiver	Pit River		
	PNSSNS	Coon Creek		
	SacramentoAmador	Dry Creek Laguna Creek		
	ShastaTehama	Anderson Creek Burch Creek		
	SolanoYolo	Tule Canal Ulati Creek Willow Slough Z-Drain		
	UpperFeatherRiver	Indian Creek Spanish Creek		



Management Plan Category	Subwatershed	Waterbody	Analyte	Summary of Major Mgt Plan Task Activity and Status;
Registered Pesticides	PNSSNS	Coon Creek	Chlorpyrifos	Management Plan requirement approved as Completed
	ButteYubaSutter	Gilsizer Slough	Diazinon	
		Pine Creek	Chlorpyrifos	
	ColusaGlenn	Walker Creek	Chlorpyrifos	
	SolanoYolo	Ulatis Creek	Diuron, malathion	
Willow Slough		Chlorpyrifos		
Salinity	ButteYubaSutter	Gilsizer Slough	EC	Source evaluation and task to compile information about potentially salt-sensitive crops in drainages with elevated salinity are currently being accomplished through participation in the CV-SALTS process. Determination of the scope and schedule of SER report to be determined in coordination with CV-SALTS process for these tasks.
	ColusaGlenn	Colusa Basin Drain	EC	
		Freshwater Creek	EC	
		Lurline Creek	EC, TDS	
		Stone Corral Creek	EC	
		Sycamore Slough	EC, TDS	
	Sacramento Amador	Dry Creek	TDS	
		Grand Island Drain	EC, TDS	
	SolanoYolo	Cache Creek	Boron, EC	
		Tule Canal	Boron, EC, TDS	
		Ulatis Creek	EC, TDS	
		Willow Slough	Boron, EC, TDS	
		Z-Drain	EC, TDS	

Management Plan Category	Subwatershed	Waterbody	Analyte	Summary of Major Mgt Plan Task Activity and Status;
Toxicity	Sacramento Amador	Laguna Creek	Ceriodaphnia	Management Plan requirement approved as Completed
	EIDorado	Coon Hollow Creek	Ceriodaphnia (completed)	Management Plan requirement approved as Completed
	SacramentoAmador	Cosumnes River	Hyaella	Source evaluations to be reported in SER (rescheduled to April 2011);
	ButteYubaSutter	Butte Slough	Selenastrum (unidentified cause)	Cause of toxicity not identified, so MPIPG not triggered; Monitoring of additional potential causes continued in 2011;
	SolanoYolo	Cache Creek	Ceriodaphnia (unidentified cause)	Cause of toxicity not identified, so MPIPG not triggered; Monitoring of additional potential causes continued in 2011;
	ColusaGlenn	Stony Creek	Ceriodaphnia (unidentified cause)	Source evaluations to be reported in SER (rescheduled to April 2011);
			Ceriodaphnia (chlorpyrifos)	Surveys for management practice base line completed; Prioritization of recommended practices completed; MPIPG development and deliverable rescheduled to April 2011, in progress;
	SolanoYolo	Walker Creek	Selenastrum (diuron)	
		Ulatis Creek	Ceriodaphnia (chlorpyrifos), Selenastrum (diuron)	
		Willow Slough	Hyaella, Pyrethroids	
	Z-Drain			
Trace Metals - Se	SolanoYolo	Willow Slough	Selenium	Discussed and confirmed applicability of regulatory basis with ILRP Staff, based on support of aquatic life uses; Discussed whether selenium should be included in the "Salinity" Management Plan category (no record of a determination by ILRP staff); Review of data and identification of areas and drainages with elevated selenium to be reported in SER in September 2011;

## RESULTS OF MONITORING

The results of monitoring for all management plan analytes through September 2010 have been reported previously in the Coalition's 2010 AMR and submitted to the Water Board. Additionally, exceedances for all management plan sampling conducted from October 2009 through September 2010 have been reported in Exceedance Reports as required by the ILRP MRP.

The 2010 monitoring year (October 2009 through September 2010) was a "Core" monitoring year for most sites, and most management plan monitoring for core parameters (DO, pH, E. coli, conductivity) was coordinated with scheduled Core monitoring. Assessment monitoring was conducted at two sites in 2009 (Lower Honcut Creek and Walker Creek). Management Plan sampling for non-Core parameters (pesticides and toxicity) was also coordinated with scheduled monitoring or conducted independently as needed for the specific locations and parameters. The results of Management Plan sampling performed in addition to scheduled Core or Assessment monitoring are summarized below.

### Registered Pesticides

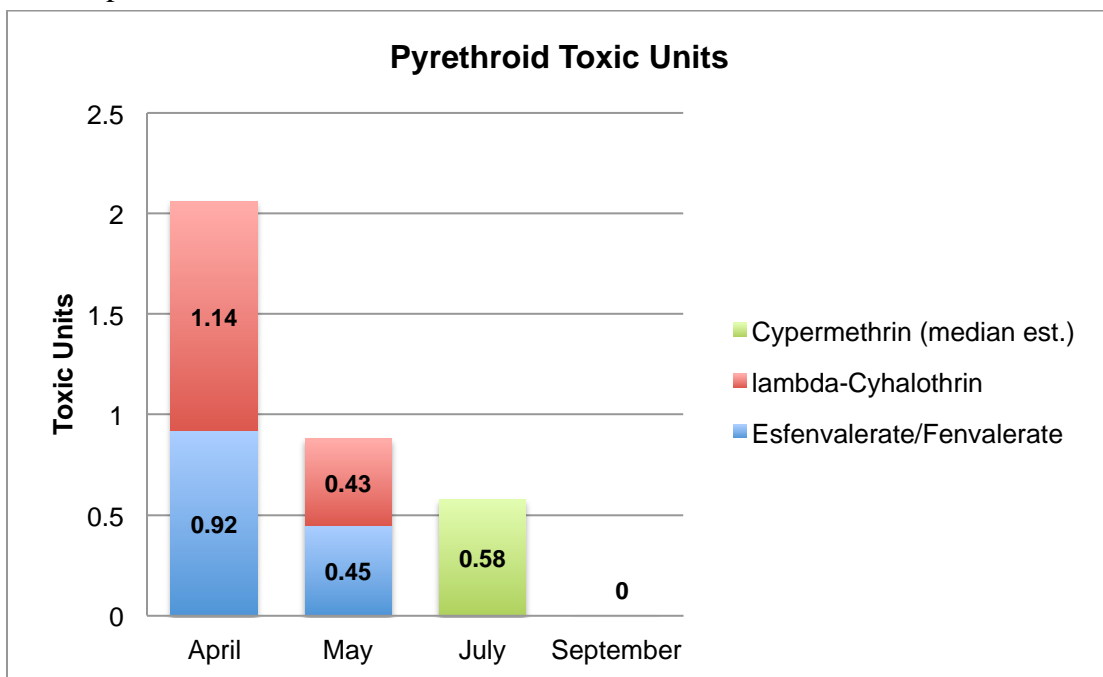
Organophosphate pesticides were sampled at nine compliance sites for chlorpyrifos and diazinon TMDLs. Four of 42 samples collected during this period were observed to exceed the Basin Plan water quality objective for chlorpyrifos for the TMDL, and one additional sample was found to exceed the water quality objective for diazinon. A summary of the conclusions based on the TMDL compliance monitoring is provided beginning on Page 28 of this report, and the full TMDL Compliance Monitoring Report is also provided in **Appendix D**.

Three samples were analyzed for diuron in Willow Slough, which has a Management Plan requirement for diuron and algae toxicity exceedances. One of these three samples was found to be an exceedance (January 19, 2010). Follow-up for this exceedance determined that there were applications of diuron to approximately 1300 acres of alfalfa reported in the Willow Slough drainage in the month prior to sampling.

Four samples were analyzed for diuron in Ulatis Creek, which has a Management Plan requirement for diuron and algae toxicity exceedances. One of these four samples was found to be an exceedance (January 19, 2010). Follow-up for this exceedance determined that there were 38 applications of diuron to alfalfa reported in the Ulatis Creek drainage in the month prior to sampling.

Four samples were analyzed for pyrethroids and chlorpyrifos for Z-drain, which has a Management Plan requirement for *Hyalella* toxicity in sediment. The results for these samples indicated that three pyrethroid pesticides (L-cyhalothrin, esfenvalerate/fenvalerate, and cypermethrin) were present at concentrations that would likely cause toxicity to sensitive invertebrate species in three of the four samples. Concentrations were highest in the sample collected immediately after wet season, and seemed to decrease in subsequent samples, with no detectable concentrations of pyrethroids in the last sample in the series (9/21/2010) collected at the end of the irrigation season. Details of the assessments of these sample results were as follows:

- Event 50 (4/20/2010) – In the Z-Drain sediment sample, concentrations of pyrethroids were present that were likely to cause toxicity. Based on published LC50 data for *Hyallella* (Amweg et al., 2005), concentrations of esfenvalerate/fenvalerate (0.84 µg/g organic carbon) and fenvalerate (0.59 µg/g organic carbon) (median *Hyallella* LC50 = 1.54 µg/g organic carbon) accounted for approximately 0.92 Toxic Units, and lambda-cyhalothrin accounted for approximately 1.14 additional Toxic Units, for a total of **2.06 Toxic Units**<sup>3</sup>.
- Event 051 (5/18/2010) – Concentrations of esfenvalerate/fenvalerate (0.37 µg/g organic carbon) and fenvalerate (0.33 µg/g organic carbon) (median *Hyallella* LC50 = 1.54 µg/g organic carbon) accounted for approximately 0.45 Toxic Units, and lambda-cyhalothrin accounted for approximately 0.43 additional Toxic Units, for a total of **0.88 Toxic Units**. These concentrations were considered likely to cause or contribute to toxicity to sensitive invertebrates in sediment.
- Event 053 (7/20/2010) – The concentration of cypermethrin (0.16 µg/g) (median *Hyallella* LC50 ranges from 0.18 to 0.6 µg/g organic carbon) accounted for between **0.27 - 0.89 Toxic Units**. This concentration was considered to have potential to cause or contribute to toxicity to sensitive invertebrates in sediment.
- Event 055 (9/21/2010) – No pyrethroids or chlorpyrifos were detected in this sample.



**Figure 1. Pyrethroid pesticide Toxic Units in Z-Drain sediment samples, 2010 monitoring results.**

<sup>3</sup> A Toxic Unit is equal to the concentration estimated to cause 50% mortality to the test organism.

## Toxicity

One sample was analyzed for *Selenastrum* toxicity in Butte Slough (November 2009). This sample was not significantly toxic. Butte Slough has a Management Plan requirement for algae toxicity exceedances.

One sample was analyzed for *Ceriodaphnia* toxicity in Walker Creek (December 2009). This sample was not significantly toxic. Walker Creek has a Management Plan requirement for *Ceriodaphnia* toxicity exceedances.

All other toxicity testing was limited to Assessment monitoring conducted from October 2009 – December 2009.

## Legacy Pesticides

Monitoring for legacy organochlorine pesticides during this period was limited to one assessment monitoring event conducted in December 2009 at two sites (Lower Honcut Creek and Walker Creek). No legacy organochlorine pesticides were detected and neither site has a Management Plan requirement for legacy pesticides.

## Pathogen indicators

Monitoring for *E. coli* consisted of Core and Assessment monitoring conducted from October 2009 – September 2010. There were 162 samples collected from 16 sites with active Management Plan requirements for pathogen indicators. There were 46 exceedances of the ILRP trigger limit for *E. coli* observed at these sites (28%) during the October 2009 – September 2010 monitoring period.

## Trace Metals

Monitoring for selenium during this period was limited to one assessment monitoring event conducted in December 2009 at two sites (Lower Honcut Creek and Walker Creek). These two sites do not have management plan requirements for trace metals and no exceedances were observed in these samples.

## Salinity

Monitoring for parameters related to salinity (conductivity and boron) consisted of Core and Assessment monitoring conducted from October 2009 – September 2010. There were 74 samples collected from 8 sites with active Management Plan requirements for salinity. There were 41 exceedances of the ILRP trigger limit for conductivity observed at these sites (55%) during the October 2009 – September 2010 monitoring period.

## DO and pH

Monitoring for these parameters consisted of Core and Assessment monitoring conducted from October 2009 – September 2010.

- There were 153 samples collected from 18 sites with active Management Plan requirements for dissolved oxygen. There were 10 exceedances (6.6%) of the ILRP trigger limit for dissolved oxygen observed at 6 sites during the October 2009 – September 2010 monitoring period.

- There were 41 samples collected from 6 sites with active Management Plan requirements for pH. There were 4 exceedances (9.8%) of the ILRP trigger limit for pH observed at 2 sites during the October 2009 – September 2010 monitoring period.

## Nutrients

Monitoring for nutrients consisted of Core and Assessment monitoring conducted from October 2009 – September 2010. This included the only site that currently has a management plan requirement for nutrients (Nitrate in Ulatis Creek). There were 12 samples collected from this site, and one exceedance (8.3%) of the ILRP trigger limit for nitrate observed during the October 2009 – September 2010 monitoring period.

## SOURCE EVALUATIONS

Source evaluations conducted for the Management Plan during 2010 and submitted in early 2011 included evaluations for pathogen indicators (24 water bodies). Additional source evaluations planned for 2010 were rescheduled for completion in 2011 and are currently in progress. These included evaluations for nutrients (1 water body), registered pesticides (3 water bodies), and toxicity (4 water bodies). These evaluations are in progress and have not yet been submitted to the Water Board. The proposed schedule revisions for Source Evaluation Reports are provided in Table 2. The final proposed revision of schedule for Management Plan deliverables was submitted to Water Board ILRP staff in March 2011 and is currently under review.

**Table 2. 2010 Source Evaluation Deliverables: Schedule Revisions**

Deliverable	Management Plan Category	# of Water Bodies	Original Date	Revised Date
Source Evaluation Reports	Pathogen Indicators	22	9/30/10	2/24/11
	Toxicity	3	8/31/10	4/15/11
	Sediment Toxicity	1	9/30/10	4/15/11
	Nutrients	1	10/31/10	4/15/11
	Registered Pesticides	3	8/31/10	4/15/11

## Pathogen Indicator Source Evaluation Report

Source Evaluations were conducted and reported for 23 water bodies with management plan requirements for pathogen indicators. The source evaluations were based on the results of surveys of Coalition members and on known agricultural sources. A summary of the surveys completed is presented in Table 3. The findings and conclusions of the source evaluations were reported in “*Pathogen Indicator Source Evaluation Report* (SVWQC 2011) and are summarized below.

The specific causes and sources (human, waterfowl and wildlife, or livestock) of individual *E. coli* exceedances cannot be definitively determined using available cost-effective monitoring methods. Instead, this evaluation relies primarily on an assessment of monitoring data and surveys of growers in the affected drainages. It appears unlikely that agriculture is a significant contributing source of *E. coli* exceedances in Sacramento

Valley surface waters, with the possible exception of a few drainages. Based on the low percentage of growers reporting grazing or manure application, and given the high rate of management practice adoption and implementation, additional targeted outreach to increase implementation of management practices is not warranted and is unlikely to significantly improve water quality.

Based on evaluations of land uses and reported implementation of management practices, agricultural activities (livestock operations and manure application) are almost certainly not the primary cause of these exceedances. Several non-agricultural sources—including septic systems, treated wastewater, and urban runoff—were identified as having the potential to cause or contribute to the observed exceedances in a few specific drainages. Although a 2006-2007 preliminary bacterial source identification study was not definitive, the results suggested that contamination from human sources (e.g., septic systems, treated wastewater) was much more prevalent than that from cattle. The presence of wildlife and waterfowl was identified as having the highest potential to cause or contribute to the observed exceedances in all drainages. Although this potential is greater for drainages near or downstream from dedicated wildlife habitat such as refuges and wetlands, the potential is significant for all drainages. Analyses of *E. coli* concentrations for samples collected over more than six years' time by the Coalition for the ILRP indicate that seasonal differences are not substantial; however, monthly median *E. coli* concentrations and exceedances are slightly increased for December through February. Typical seasonal patterns of manure applications or livestock grazing in irrigated pastures do not coincide with this increase in median *E. coli* concentrations and exceedances. However, storm season and peak waterfowl migration season, during which over 40 percent of the waterfowl in the Pacific Flyway comes to the Sacramento Valley to winter, do correspond to this time period.

There was no indication that exceedances were related to livestock grazing on irrigated pastures. There is an association between water bodies reporting manure applications and increased exceedances, although approximately 67% of exceedances in these drainages appear unrelated to manure applications. However, there is also already a very high degree of adoption and implementation of effective management practices by the Coalition members reporting manure applications in these drainages. In most cases, the degree of management practices implementation is based on the responses of only one or two growers.

The primary conclusions and next steps indicated by the evaluation are as follows:

- Survey results, evaluations of water quality data, and evaluations of other non-agricultural sources indicate that irrigated agriculture is not a likely cause of observed exceedances the *E. coli* trigger limit in 19 of the 23 water bodies evaluated. The Coalition has submitted formal requestss to the Water Board to certify that the pathogen indicator management plan requirement should be considered completed for these water bodies on the basis of this source evaluation determination.
- The source evaluations presented in this report indicate that livestock operations in four of the 23 water bodies evaluated may be contributing to observed exceedances of the *E. coli* trigger limit. However, the results of the grower

surveys indicate that the adoption and implementation of appropriate and effective management practices by Coalition members is already high in these drainages. Because of these two somewhat conflicting results and the small number of survey respondents reporting livestock grazing activity, it is recommended that the next step be to confirm the degree of implementation by conducting a broader survey of Coalition members that graze livestock on irrigated pasture in these drainages. If this high degree of implementation is confirmed, and assuming that Coalition members will continue to implement their current management practices at consistent levels, this would indicate that other factors are causing the additional exceedances and that implementation of additional management practices is not warranted. If it is determined that implementation is significantly lower in the drainage than predicted by the initial surveys conducted for this evaluation, a need for implementation of additional specific practices would be indicated and appropriate practices and implementation goals would be identified in a separate document.



**Table 3. Summary of Surveys Conducted for Pathogen Indicator Source Evaluations**

Subwatershed	Water Body	Total Number of:					Percent Surveys Completed
		Property Owners	Properties	Coalition Members	Coalition APNs	Surveys Completed	
Butte Yuba Sutter	Gilsizer Slough	23	30	12	12	12	100%
Butte Yuba Sutter	Lower Snake River	12	20	3	9	3	100%
Butte Yuba Sutter	Pine Creek	9	19	2	2	2	100%
Butte Yuba Sutter	Wadsworth Canal	10	16	3 <sup>(a)</sup>	5	2	100%
Colusa Glenn	Colusa Basin Drain	7	21	0	0	0	N/A
Colusa Glenn	Logan Creek	25	36	7	12	7	100%
Colusa Glenn	Lurline Creek	12	33	1	1	1	100%
Colusa Glenn	Stone Corral Creek	16	22	0	0	N/A	N/A
Colusa Glenn	Sycamore Slough	3	8	3 <sup>(a)</sup>	7	2	100%
Colusa Glenn	Walker Creek	36	36	25	25	25	100%
El Dorado	North Canyon Creek	437	491	25	31	25	100%
Lake Napa	Capell Creek	9	10	0	0	0	N/A
Lake Napa	McGaugh Slough	30	32	7	13	7	100%
PNSSNS	Coon Creek	11	14	5	8	5	100%
Sacramento/Amador	Dry Creek	10	12	6	7	6	100%
Sacramento/Amador	Laguna Creek	10	17	3	13	3	100%
Shasta Tehama	Anderson Creek	Not determined <sup>(b)</sup>	32	3	3	3	100%
Shasta Tehama	Burch Creek	Not determined <sup>(b)</sup>	19	11	14	11	100%
Solano Yolo	Tule Canal	11	20	3	18	3	100%
Solano Yolo	Ulati Creek	17	34	8	21	8	100%
Solano Yolo	Willow Slough	26	36	20	28	20	100%
Solano Yolo	Z-Drain	20	29	19	27	19	100%
Upper Feather River	Indian Creek	48	80	4	13	4	100%
Upper Feather River	Spanish Creek	26	36	5	10	5	100%

a. There are three Coalition members in this watershed, two of whom are in the irrigated lands program. Only two surveys needed to be completed.

b. The total number of property owners was not determined for this drainage.

c. Z-drain was not included in the Source Evaluation Report submitted in February 2011

## OUTREACH DOCUMENTATION

The Coalition and its subwatersheds, working with the Coalition for Urban/Rural Environmental Stewardship (CURES) continue to work with the Regional Water Board and its staff to implement the Coalition's *Landowner Outreach and Management Practices Communications Process* and the Coalition's approved Management Plan to address water quality problems identified in the Sacramento Valley. The primary strategic approach taken by the Coalition has been to notify and educate the subwatershed landowners, farm operators, and/or wetland managers about the cause(s) of toxicity and/or exceedance(s) of water quality objectives or ILRP trigger limits. Notifications have been focused on (but not limited to) growers who operate directly adjacent to or within close proximity to the waterway. The broader outreach program, which includes both grower meetings and the notifications distributed through direct mailings, encourages the adoption of BMPs and modification of the uses of specific farm and wetland inputs to prevent movement of constituents of concern into Sacramento Valley surface waters.

When exceedances are initially observed, the Coalition's targeted outreach approach is to focus on the growers with fields directly adjacent to or near the waterways of concern. To identify those landowners operating in high priority lands, the Coalition identifies the assessor parcels and subsequently the owners of agricultural operations nearest the water bodies of interest. From the list of assessor parcel numbers, the Coalition identifies its members and mails to them an advisory notice along with information on how to address the specific exceedances using BMPs. This same approach has been used to conduct management practice surveys in areas targeted by the Management Plan.

Descriptions of the outreach and education activities specifically related to the Management Plan are provided in **Appendix A** (*Summary of 2010 Management Plan Outreach Efforts*).

## MANAGEMENT PRACTICES INVENTORIES AND MEMBER SURVEYS

Inventories of management practices have been conducted by the Coalition in several contexts for the ILRP. For the 2010 monitoring year, surveys were conducted as part of source evaluations for pathogen indicators in 24 water bodies and the results were reported in the associated Source Evaluation Report, as summarized on page 13 of this document.

Surveys were also conducted to establish an implementation baseline for 7 water bodies with management plan requirements for registered pesticides or toxicity with an identified cause. The results of these surveys will be reported in April 2011 as part of the specific Management Practice Implementation Performance Goals documents for each Management Plan element. The water body- and constituent-specific baselines from these surveys form the basis for setting goals for management practices implementation for the Management Plan.

A report summarizing the results of the grower surveys conducted for the ILRP is being developed by the Coalition and is planned for completion in June 2011.

## RECOMMENDATIONS FOR MANAGEMENT PLAN MONITORING

Special project monitoring for the management plan includes specific targeted monitoring or studies to address implementation of a TMDL or implementation of a Management Plan that results from exceedances. Management plan monitoring is generally conducted to support source identification or effectiveness assessment, and may include surveys of agricultural practices as well as water column or sediment sampling. The monitoring sites, special study parameters, management plan strategy, implementation steps, and schedule for management plans have been presented previously in the Sacramento Valley Coalition Group's approved 2009 Management Plan, the April 2010 Water Quality Management Plan Progress Report, and the Addendum to Sacramento Valley Water Quality Coalition Management Plan: Chlorpyrifos and Diazinon TMDLs.

Monitoring required in 303(d)-listed water bodies and TMDLs for chlorpyrifos and diazinon, legacy OC pesticides, and Group A OC pesticides is documented for Coalition Core and Assessment monitoring sites in Attachment D (Site Specific Monitoring Tables) of the 2011 ILRP Monitoring Plan. It was determined by the Coalition and Water Board ILRP Staff that no supplemental monitoring by the Coalition was required to comply with the Clear Lake Nutrient TMDL.

Monitoring proposed for the Management Plan in 2011 was initially submitted to the Water Board in 2010 (*2011 Assessment Year Monitoring Schedule for the Sacramento Valley Water Quality Coalition*). A revised version addressing Water Board comments was provided in February 2011, and approved March 9, 2011 by the Water Board Executive Officer. The approved 2011 monitoring plan includes the recommended monitoring schedule for the Management Plan (**Appendix B**).

The need for management plan monitoring is determined primarily based on the potential to provide useful information for source identification, in establishing causes of toxicity, and to evaluate management practice effectiveness. This monitoring may consist of water column or sediment sampling, field surveys, or surveys of agricultural practices. There are five currently active management plan categories with water bodies that do not have monitoring scheduled for 2011. The rationale for not including specific additional monitoring for these with the assessment and core monitoring and other specific management plan monitoring in 2011 was documented in a January 31, 2011 memorandum to Water Board ILRP Staff (**Appendix C**).

## PROPOSED GOALS FOR IMPLEMENTATION OF MANAGEMENT PRACTICES

The Coalition is required to develop performance goals and a schedule for implementation of management practices when it is determined that agriculture is a contributor to exceedances of water quality objectives or ILRP trigger limits. These goals are developed as independent documents for specific management plan elements. Development of Management Practice Implementation Performance Goals (MPIPG) documents planned for 2010 were rescheduled for completion in 2011 and are currently in progress. These included implementation for legacy pesticides (7 water bodies), registered pesticides (5 water bodies), and toxicity (4 water bodies). These MPIPG documents are in progress and have not yet been submitted to the Water Board. The

proposed schedule revisions for MPIP documents are provided in Table 4. The final proposed schedule revision for Management Plan deliverables was submitted in March 2011 and is currently under review by Water Board ILRP staff.

**Table 4. 2010 Management Practices Implementation and Performance Goals documents: Schedule Revisions**

<b>Deliverable</b>	<b>Management Plan Category</b>	<b># of Water Bodies</b>	<b>Original Date</b>	<b>Revised Date</b>
	Legacy Pesticides	7	12/31/10	4/8/11
Mgt Practices	Registered Pesticides	5	6/30/10	4/8/11
Implementation and	Toxicity	4	6/30/10	4/8/11
Performance Goals	Pathogen Indicators	2	3/31/10	6/30/11
Documents	(UFRW)			
	Sediment Toxicity	1	9/30/10	6/30/11

## UPDATE TO REQUIRED MANAGEMENT PLANS

This section provides an update to the Coalition's currently approved Management Plan. The existing Management Plan approved in 2009 included elements based on monitoring conducted from 2005 through September 2007, and was updated in 2010 with data collected by the Coalition through September 2009. Data collected by the Coalition through September 2010 were evaluated to update the management plan requirements for this Progress Report. Requirements for new management plan elements were based on observations of more than one exceedance in a three-year period, as required by the ILRP. Proposed tasks and schedules to implement the new elements were developed. In some cases, modifications to the existing scope or schedule for implementation outlined in the approved Management Plan were proposed.

### New Management Plan Elements

There are five new Management Plan requirements in four subwatersheds triggered by exceedances observed in Coalition monitoring conducted since September 2009. All of the new required elements were in low priority categories (salinity, DO, pH, and pathogen indicators). The new Management Plan elements based on monitoring data through September 2010 are listed in Table 5.

**Table 5. Additions to the Management Plan for Data through September 2010**

<b>Subwatershed</b>	<b>Water Body</b>	<b>Category</b>	<b>Analyte</b>	<b>Priority</b>
Colusa Glenn	Colusa Basin Drain	Pathogen Indicators	E. coli	LOW
Lake Napa	Middle Creek	Pathogen Indicators	E. coli	LOW
Lake Napa	Pope Creek	DO and pH	pH	LOW
Solano Yolo	Shag Slough	Salinity	EC	LOW
Upper Feather River	Middle Fork Feather River	Salinity	EC	LOW

### Implementation Tasks and Schedule for New Elements

Tasks and schedules to implement the new management plan requirements were developed to be consistent with the Coalition's existing Management Plan, unless

otherwise specified. In cases where it was possible, the existing schedules for a category were adopted without modification. In others, the schedules were adjusted to conform to agricultural cycles, Coalition reporting schedules, or other ILRP programmatic constraints. Any modifications to the approaches or scope for specific Management Plan categories are documented in “Proposed Changes to the Management Plan”.

The tasks and schedules proposed for the new Management Plan elements are provided in Table 6.

### **Proposed Changes to the Management Plan**

No significant changes to the scope of the Management Plan are proposed in this Progress Report. However, there have been a number of significant and minor changes requested by the Water Board and/or proposed by the Coalition since the 2009 Management Plan was originally approved. These include:

- Addition of an approach to address the nutrient category of analytes
- Modification of the approach for the pathogen indicator category
- Schedule modifications for ongoing Management Plan element tasks and deliverables
- Additions of new management plan requirements
- Removal of some management plan requirements incorrectly included in the initial approved Management Plan.

It is proposed that significant changes are consolidated in an updated Management Plan document for review and approval by the Water Board.

### **2011 Deliverables and Schedule for New and Ongoing Management Plan Elements**

Deliverables to be completed in 2011 for existing Management Plan elements are included in **Error! Reference source not found.**Table 7. Tasks for the existing Management Plan elements have been provided previously. An updated list of all deliverables will be provided after the schedules for the additions in this report have been approved.

**Table 6. Task for New Management Plan Elements**

<b>Waterbody (Subwatershed)</b>	<b>Management Plan Category</b>	<b>Management Plan Task</b>	<b>Element Detail</b>	<b>Responsible Entities</b>	<b>Task End</b>
Pope Creek (Lake Napa)	DO and pH	Review Regulatory Basis	Review monitoring data and the regulatory basis establishing the need for the management plan. Confirm appropriate beneficial uses (COLD/WARM aquatic life)	SVWQC; ILRP	4/30/11
		Evaluate nutrient applications	Evaluate Nutrient applications and agricultural uses	SVWQC	6/1/11
		Evaluate monitoring data	Evaluate relevant monitoring data for nutrients and organic carbon and relationship to DO and pH exceedances	SVWQC	6/30/11
		Source Evaluation Report	Source Evaluation Report: Identify and prioritize agricultural and non-agricultural causes	SVWQC; SWC	9/30/11
		Survey Coalition members	If agriculture is identified as a source, conduct surveys of Coalition members for current level of implementation of relevant management practices	<b>SWC</b> ; SVWQC	12/31/11
		Develop list of Management Practices	Develop list of prioritized Management Practices specific to DO and pH	<b>SWC</b> ; SVWQC; LOG	3/31/12
		Set goals and schedule for implementation	If agriculture is identified as a source, set goals and schedule for additional Management Practice implementation	<b>SWC</b> ; SVWQC	6/30/12
		Implement additional Management Practices	Implement additional Management Practices per established Management Plan goals	LOG	1/31/13
		Conduct follow-up implementation surveys	Follow-up surveys for tracking implementation progress	<b>SWC</b> ; SVWQC	TBD
		Conduct effectiveness monitoring	Conduct effectiveness monitoring for tracking goals established for implementation	SVWQC	TBD

Waterbody (Subwatershed)	Management Plan Category	Management Plan Task	Element Detail	Responsible Entities	Task End
Middle Fork Feather River (Upper Feather River)	Salinity	Review Regulatory Basis	Review regulatory basis establishing the need for the management plan. Discuss with ILRP Staff to confirm that limiting "sensitive crops" grown in the drainage, "Ag Supply" goal is correct, MUN should apply, and whether a site-specific WQO should apply.	SVWQC; ILRP	12/31/11
		Identify areas of elevated salinity	Review data and identify areas and drainages with elevated salinity	SVWQC; SWC; AC	9/30/11
		Compile information about salt-sensitive crops	Compile information about potentially salt-sensitive crops in drainages with elevated salinity	<b>SVWQC</b> ; AC	9/30/11
		Source Evaluation Report	Source Evaluation Report: Determine scope of report in coordination with CV-SALTS process	SVWQC; ILRP	9/30/11
		Source Evaluation Report	Source Evaluation Report: Document salinity source and salt-sensitive crop info (per scope determined above)	SVWQC; ILRP	12/31/11
		Participate in CV- SALTS	Participate as stakeholder in CV-SALTS Process. Bring Ag and ILRP issues to TAC Workgroup.	SVWQC	12/31/12
		Survey Coalition members	Conduct surveys of Coalition members for current level of implementation of irrigation and salinity control management practices (if not already available).	<b>SWC</b> ; SVWQC	12/31/11
		Develop list of Management Practices	Develop list of prioritized Management Practices specific to salinity management	<b>SWC</b> ; SVWQC; LOG	TBD
		Set goals and schedule for implementation	Set goals and schedule for implementation of specific additional Management Practices	SVWQC; ILRP; CVS	TBD
		Implement additional Management Practices	Implement additional Management Practices per established Management Plan goals	LOG	TBD
Conduct follow-up implementation surveys	Follow-up surveys for tracking implementation progress	<b>SWC</b> ; SVWQC	TBD		
Conduct effectiveness monitoring	Conduct effectiveness monitoring for tracking goals established for implementation	SVWQC	TBD		

Waterbody (Subwatershed)	Management Plan Category	Management Plan Task	Element Detail	Responsible Entities	Task End
Shag Slough (SolanoYolo)	Salinity	Review Regulatory Basis	Review regulatory basis establishing the need for the management plan. Discuss with ILRP Staff to confirm that limiting "sensitive crops" grown in the drainage, "Ag Supply" goal is correct, MUN should apply, and whether a site-specific WQO should apply.	SVWQC; ILRP	12/31/11
		Identify areas of elevated salinity	Review data and identify areas and drainages with elevated salinity	SVWQC; SWC; AC	9/30/11
		Compile information about salt-sensitive crops	Compile information about potentially salt-sensitive crops in drainages with elevated salinity	SVWQC; AC	9/30/11
		Source Evaluation Report	Source Evaluation Report: Determine scope of report in coordination with CV-SALTS process	SVWQC; ILRP	9/30/11
		Source Evaluation Report	Source Evaluation Report: Document salinity source and salt-sensitive crop info (per scope determined above)	SVWQC; ILRP	12/31/11
		Participate in CV-SALTS	Participate as stakeholder in CV-SALTS Process. Bring Ag and ILRP issues to TAC Workgroup.	SVWQC	12/31/12
		Survey Coalition members	Conduct surveys of Coalition members for current level of implementation of irrigation and salinity control management practices (if not already available).	SWC; SVWQC	12/31/11
		Develop list of Management Practices	Develop list of prioritized Management Practices specific to salinity management	SWC; SVWQC; LOG	TBD
		Set goals and schedule for implementation	Set goals and schedule for implementation of specific additional Management Practices	SVWQC; ILRP; CVS	TBD
		Implement additional Management Practices	Implement additional Management Practices per established Management Plan goals	LOG	TBD
		Conduct follow-up implementation surveys	Follow-up surveys for tracking implementation progress	SWC; SVWQC	TBD
		Conduct effectiveness monitoring	Conduct effectiveness monitoring for tracking goals established for implementation	SVWQC	TBD



Waterbody (Subwatershed)	Management Plan Category	Management Plan Task	Element Detail	Responsible Entities	Task End
Colusa Basin Drain (ColusaGlenn)	Pathogen Indicators	Review Regulatory Basis	Review regulatory basis establishing the need for the management plan; Confirm whether REC1 is appropriate use; [Introduce discussion of issue with TIC and ILRP staff]	SVWQC; ILRP	6/30/11
		Survey Coalition members	Survey Coalition members in the targeted drainages to inventory for application of animal wastes and for current level of implementation of relevant management practices. Compile matrix of practices and applications. [If not already available from previous surveys]	SWC; SVWQC	6/30/11
		Develop effectiveness study	Develop <u>coordinated approach to evaluate, estimate, and document</u> the effectiveness of the range of relevant practices. Base relevance on use of practices, potential risks to surface water, known effectiveness of practices. Identify gaps.	SVWQC	9/30/11
		Implement Effectiveness Study	Develop and implement literature and/or sampling based study to address significant gaps.	SVWQC	9/30/11
		Source Evaluation and Effectiveness Report	Source Evaluation and Effectiveness Report: Prioritize potential sources by reported applications of waste, drainage distance to water bodies, percent of agricultural acreage, and effectiveness of relevant management practices.	SVWQC	12/30/11
		Develop list of Management Practices	Develop guidance and matrix of <u>recommended</u> Management Practice alternatives specific to pathogens, based on application type, crop, season, and other identified site-specific factors.	SVWQC; SWC; LOG	12/30/11
		Set goals and schedule for implementation	<u>If agricultural applications are identified as a potential source in the drainage based on application inventory survey</u> , set goals and schedule for additional outreach, recommended Management Practice implementation, and effectiveness evaluation.	SVWQC; SWC	2/29/12
		Conduct additional outreach	Conduct additional outreach as needed to achieve targeted Management Practice implementation per established Management Plan goals.	SVWQC; SWC	TBD
		Implement additional Management Practices	Implement additional practices as needed to achieve per established Management Plan goals.	LOG	TBD
		Conduct implementation tracking surveys	Follow-up surveys for tracking progress toward implementation goals	SWC; SVWQC	2/28/13
Conduct effectiveness monitoring	Conduct effectiveness monitoring for tracking goals established for implementation. This can be satisfied by the follow-up surveys and the scheduled core and assessment monitoring.	SVWQC	TBD		

Waterbody (Subwatershed)	Management Plan Category	Management Plan Task	Element Detail	Responsible Entities	Task End
Middle Creek (LakeNapa)	Pathogen Indicators	Review Regulatory Basis	Review regulatory basis establishing the need for the management plan; Confirm whether REC1 is appropriate use; [Introduce discussion of issue with TIC and ILRP staff]	SVWQC; ILRP	6/30/11
		Survey Coalition members	Survey Coalition members in the targeted drainages to inventory for application of animal wastes and for current level of implementation of relevant management practices. Compile matrix of practices and applications. [If not already available from previous surveys]	SWC; SVWQC	6/30/11
		Develop effectiveness study	Develop <u>coordinated approach to evaluate, estimate, and document</u> the effectiveness of the range of relevant practices. Base relevance on use of practices, potential risks to surface water, known effectiveness of practices. Identify gaps.	SVWQC	9/30/11
		Implement Effectiveness Study	Develop and implement literature and/or sampling based study to address significant gaps.	SVWQC	9/30/11
		Source Evaluation and Effectiveness Report	Source Evaluation and Effectiveness Report: Prioritize potential sources by reported applications of waste, drainage distance to water bodies, percent of agricultural acreage, and effectiveness of relevant management practices.	SVWQC	12/30/11
		Develop list of Management Practices	Develop guidance and matrix of <u>recommended</u> Management Practice alternatives specific to pathogens, based on application type, crop, season, and other identified site-specific factors.	SVWQC; SWC; LOG	12/30/11
		Set goals and schedule for implementation	<u>If agricultural applications are identified as a potential source in the drainage based on application inventory survey</u> , set goals and schedule for additional outreach, recommended Management Practice implementation, and effectiveness evaluation.	SVWQC; SWC	2/29/12
		Conduct additional outreach	Conduct additional outreach as needed to achieve targeted Management Practice implementation per established Management Plan goals.	SVWQC; SWC	TBD
		Implement additional Management Practices	Implement additional practices as needed to achieve per established Management Plan goals.	LOG	TBD
		Conduct implementation tracking surveys	Follow-up surveys for tracking progress toward implementation goals	SWC; SVWQC	2/28/13
Conduct effectiveness monitoring	Conduct effectiveness monitoring for tracking goals established for implementation. This can be satisfied by the follow-up surveys and the scheduled core and assessment monitoring.	SVWQC	TBD		

SVWQC=Coalition; SWC=Subwatershed Coordinators; AC=Agricultural Commissioners; ILRP=Water Board ILRP Staff; LOG=Landowners and Growers; CVS=CV-SALTS

**Table 7. 2011 Schedule of Deliverables**

Deliverable	Management Plan Category	Number of Water Bodies	Proposed Submittal Date	Final Draft
Source Evaluation Report	Pathogen Indicators	22 (combined)	2/24/11	4 weeks from Regional Board comment
4th quarter 2010 data submittal	NA	All	3/1/11	NA
Annual Monitoring Report	NA	All	3/1/11	NA
Management Plan Progress Report	All	All	3/31/11	4 weeks from Regional Board comment
Mgt Practices Implementation and Performance Goals Document	Legacy Pesticides	8	4/8/11	4 weeks from Regional Board comment
Mgt Practices Implementation and Performance Goals Document	Registered Pesticides	5	4/8/11	4 weeks from Regional Board comment
Mgt Practices Implementation and Performance Goals Document	Toxicity	4	4/8/11	4 weeks from Regional Board comment
Source Evaluation Report	Toxicity	3	4/15/11	4 weeks from Regional Board comment
Source Evaluation Report	Sediment Toxicity (Cosumnes River)	1	4/15/11	4 weeks from Regional Board comment
Source Evaluation Report	Nutrients (Ulatis Creek)	1	4/15/11	4 weeks from Regional Board comment
Source Evaluation Report	Registered Pesticides	3	4/15/11	4 weeks from Regional Board comment
1st quarter 2011 data submittal	NA	All	6/1/11	NA
Survey Results Summary Report	All	All	6/30/11	4 weeks from Regional Board comment
2010 Management Practices Pilot Program Annual report	NA	All	6/30/11	4 weeks from Regional Board comment
2012 Mgt Plan Monitoring Plan	All	All	6/30/11	9/30/11
Mgt Practices Implementation and Performance Goals Document	Nutrients (Ulatis Creek)	1	6/30/11	4 weeks from Regional Board comment
Mgt Practices Implementation and Performance Goals Document	Pathogen Indicators	22 (combined)	6/30/11	4 weeks from Regional Board comment

Deliverable	Management Plan Category	Number of Water Bodies	Proposed Submittal Date	Final Draft
Mgt Practices Implementation and Performance Goals Document	Pathogen Indicators (UFRW)	2	6/30/11	4 weeks from Regional Board comment
Mgt Practices Implementation and Performance Goals Document	Toxicity	4	6/30/11	4 weeks from Regional Board comment
Mgt Practices Implementation and Performance Goals Document	Sediment Toxicity (Cosumnes River)	1	6/30/11	4 weeks from Regional Board comment
2nd quarter 2011 data submittal	NA	All	9/1/11	NA
2012 Core Monitoring Plan	All	All	9/30/11	4 weeks from Regional Board comment
Mgt Practices Implementation and Performance Goals Document	Registered Pesticides	3	9/30/11	4 weeks from Regional Board comment
Source Evaluation Report	Salinity	14 (combined)	9/30/11	Dependent on CV-SALTS process
Source Evaluation Report	DO and pH	28	9/30/11	4 weeks from Regional Board comment
Source Evaluation Report	Trace Metals - Se	1	9/30/11	4 weeks from Regional Board comment
3rd quarter 2011 data submittal	NA	All	12/1/11	NA
Source Evaluation Report	Pathogen Indicators	6 (combined)	12/31/11	4 weeks from Regional Board comment
Source Evaluation Report	DO and pH (UFRW)	2	Submitted October 1, 2010; Curently in review;	

Key:

Mgt Plan Source Evaluation Reports
Mgt Practices Implementation and Performance Goals Document
Programmatic Documents

## TMDL COMPLIANCE REPORTING

Currently, TMDL compliance monitoring by the Coalition is limited to the TMDLs for chlorpyrifos and diazinon discharges to the Sacramento and Feather Rivers and the Sacramento-San Joaquin Delta.

### Chlorpyrifos and Diazinon TMDL

The Basin Plan amendments (R5-2007-0034 and R5-2006-0061) require dischargers, either individually or as a coalition, to submit a management plan that describes the actions that they will take to reduce diazinon and chlorpyrifos discharges and meet the applicable allocations by the required compliance dates. The Coalition's Management Plan (SVWQC 2009) includes a process for source identification and identification of additional management practices that may be needed to achieve additional reductions in diazinon and chlorpyrifos discharges. Quarterly meetings are held with the Regional Water Board in order to evaluate progress in meeting these reductions, and revisions to the Management Plan will be made if sufficient progress is not being achieved.

The Coalition continues to monitor chlorpyrifos and diazinon according to the SVWQC 2010-2014 MRP Order<sup>4</sup> and the Coalition's approved 2011 ILRP Monitoring schedule. The monitoring locations are representative of discharges to the Sacramento River, Feather River, and Delta. This monitoring will continue to provide information on the wide range of discharges and hydrologic conditions likely to occur in the Sacramento Valley watershed and Delta. The Coalition's 2010 MRP and the *Addendum to Sacramento Valley Water Quality Coalition Management Plan: Chlorpyrifos and Diazinon TMDLs* present the technical approach and rationale for the monitoring. The schedule for TMDL monitoring at these locations is also included in the 2011 ILRP Monitoring Plan (the monitoring schedule specifically for TMDLs and the Management Plan is provided in **Appendix C**).

Additional monitoring beyond the routine Core and Assessment monitoring will continue to take place at existing Coalition monitoring sites in water bodies where at least one exceedance has occurred and that are directly tributary to the affected TMDL water bodies. Coalition efforts in these subwatersheds will include but not be limited to: (1) Continued monitoring at periods when peak pesticide application use occurs, (2) analysis of Pesticide Use Report (PUR) data, (3) holding subwatershed grower meetings, (4) continue to encourage and evaluate implementation of management practices, and (5) addressing the seven compliance components described in the Basin Plan and listed below in conjunction with other entities identified as potential sources of discharges. Additional activities addressing Basin Plan and MRP Order requirements for source identification, outreach, and management practice evaluation are described in the Coalition's Management Plan.

The seven Basin Plan requirements for TMDL compliance monitoring are:

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<sup>4</sup> Monitoring And Reporting Program Order No. R5-2009-0875 for Sacramento Valley Water Quality Coalition Under Amended Order No. R5-2006-0053 Coalition Group Conditional Waiver Of Waste Discharge Requirements For Discharges From Irrigated Lands. California Regional Water Quality Control Board Central Valley Region, Rancho Cordova, California. December 2009.

1. Determine compliance with established water quality objectives and loading capacities in Sacramento-San Joaquin Delta and the Sacramento and Feather rivers;
2. Determine compliance with established waste load allocations and load allocations for diazinon and chlorpyrifos;
3. Determine the degree of implementation of management practices to reduce off-site migration of diazinon and chlorpyrifos;
4. Determine the effectiveness of management practices and strategies to reduce off-site migration of diazinon and chlorpyrifos;
5. Determine whether alternatives to diazinon and chlorpyrifos are causing surface water quality impacts;
6. Determine whether the discharge causes or contributes to a toxicity impairment due to additive or synergistic effects of multiple pollutants; and
7. Demonstrate that management practices are achieving the lowest pesticide levels technically and economically achievable.

The Coalition's approach in addressing these requirements has been described previously in the *Addendum to Sacramento Valley Water Quality Coalition Management Plan: Chlorpyrifos and Diazinon TMDLs*.

The results of the Coalition's TMDL compliance monitoring through 2010 have been reported in *Management Of Chlorpyrifos And Diazinon Discharges To The Sacramento And Feather Rivers And The Sacramento-San Joaquin Delta: 2009-2010 TMDL Compliance Monitoring Report* (SVWQC 2011). The conclusions of this report of TMDL compliance monitoring results were as follows:

Based on the results of ILRP and TMDL monitoring, compliance with the TMDL water quality objectives and load allocations is achieved in the overwhelming percentage of samples. These results demonstrate that outreach and education, the resulting changes in diazinon use patterns and changes in management practices, and modifications to labeling have been successful in reducing instream ambient concentrations of chlorpyrifos and diazinon to the degree required by the TMDL. The relatively low rate of exceedances since the beginning of the ILRP suggests that much of the changes were successfully implemented prior to or soon after 2005. Although exceedances are still being observed, the overall trend from 2005-2010 has been a decrease in the rate of annual exceedances.

Continuing efforts to further reduce exceedances are being implemented through the Coalition Management Plan for sites that have triggered the Management Plan requirement for these pesticides. Additionally, the Coalition aggressively investigates all exceedances and conducts follow-up contacts with growers reporting applications with the potential to cause specific observed exceedances. These combined efforts are expected to continue the decreasing trend in the number of exceedances for these pesticides.

The complete *TMDL Compliance Monitoring Report* is provided in **Appendix D**.

## SUMMARY: EVALUATION OF PROGRESS

The Coalition's Management Plan approach implements the processes and elements needed to comply with the requirements of the Monitoring and Reporting Program (MRP) adopted by the Regional Water Board in December 2009 (*Order No. R5-2009-0875*). These requirements are addressed by specific deliverables or processes of the Management Plan as described below:

- 1) Identification of potential sources of the observed exceedances, and identification of the irrigated agriculture source that may be the cause of the water quality problem, or a study design to determine the source.  
*This requirement is addressed by the Source Evaluation Reports developed for site-specific Management Plan elements (e.g., pesticides or toxicity in specific drainages) or regionally for some categories of Management Plan parameters (e.g., pathogen indicators).*
- 2) Identification of management practices to be implemented to address the exceedances.
- 3) Management practice implementation schedule. (Implementation may occur through another Water Board regulatory program designed to address the specific exceedances.)
- 4) Management practice performance goals with a schedule.  
*Requirements 2) – 4) are being addressed in Management Practice Implementation and Performance Goals and schedule documents that are developed after agriculture is determined to be a probable contributor to exceedances of ILRP trigger limits. These are developed based on the results of surveys conducted to estimate a baseline level of management practice implementation in the specific drainages.*
- 5) Waste-specific monitoring schedule.  
*A monitoring plan and schedule for Management Plan monitoring and routine Core and Assessment monitoring is prepared annually for review and approval by the Water Board. The Coalition is currently implementing the approved monitoring plan for 2011.*
- 6) A process and schedule for evaluating management practice effectiveness. *The process and schedule is established in the Management Practice Implementation and Performance Goals and schedule documents developed for specific Management Plan requirements (e.g., for diuron in the region represented by Ulatis Creek). The overall effectiveness of the recommended practices and achievement of implementation goals will be assessed based on monitoring results and compliance with relevant water quality objectives, ILRP trigger limits, or relevant toxicity benchmarks.*
- 7) Identification of the participants and Coalition Group(s) that will implement the Management Plan.  
*The responsibilities to implement specific tasks are described generally in the Coalition's Monitoring Plan and specifically in the detailed descriptions and schedule of Management Plan tasks updated annually with this Management Plan*

*Progress Report. Responsibilities for management practice implementation are further specified in Management Practice Implementation and Performance Goals documents.*

- 8) An identified routine schedule of reporting to the Central Valley Water Board. *This requirement is addressed by the numerous specific reporting requirements for the Management Plan, including Management Plan Progress Reports, Source Evaluation Reports, Management Practice Implementation and Performance Goals documents, and Management Practices Survey Report(s). Additionally, the Coalition conducts regular (approximately quarterly) meetings with designated Water Board ILRP staff to discuss Management Plan progress, products, and decisions.*

In general terms, the processes to meet the requirements of the Management Plan can be distilled down to source evaluation; identification of management practices needed to address exceedances; implementation of management practices; evaluation of effectiveness; and regular assessment of progress toward completion of the management plan. The Coalition has successfully developed and implemented processes for source evaluation and identification of management practices needed. Source evaluations have been completed and provided to the Water Board for a large number of management plan requirements for pesticides, toxicity, pathogen indicator, and legacy organochlorine pesticide exceedances.

Changes in practices and implementation of additional management practices to minimize discharges of waste contributing to exceedances have been ongoing since the ILRP was initiated, due to the outreach and education efforts of the Coalition and its members and partners. However, specific trackable goals for implementation are just now being developed. Development of management practice implementation goals has been nearly completed for a number of pesticide and toxicity management plan requirements and will be provided to the Water Board as soon as they have been reviewed and approved internally by the Coalition. Further implementation needed to meet these goals will begin as soon as the Water Board also approves the MPIPG documents. Assessment of progress toward specific implementation goals will be conducted regularly as documented in individual MPIPG documents. Meeting water quality objectives is the ultimate goal and measure of effectiveness of the implemented management practices and progress for the Management Plan. Water quality monitoring to measure this progress is ongoing and assessed annually, and has resulted in the completion of several management plans to date. As measured by the completion and ongoing work on specific Management Plan tasks and deliverables summarized above and documented throughout this Progress Report, the Coalition is making good progress toward meeting all of these requirements and expects to achieve the goals of the Management Plan.



## Appendix A: Summary of 2010 Management Plan Outreach Efforts

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Summary of 2010 Management Plan Outreach

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Management Plan Relevance
Butte-Yuba-Sutter	10/1/09	Sutter County RCD	Newsletter – NRCS AWEP/WQ BMPs	Yuba City	Mailed to Over 1,000 members	Newsletter	General BMPs
Butte-Yuba-Sutter	12/1/09	Sutter County RCD	Conducted interviews regarding BMPs used among Coalition members in Pine Creek; Butte and Gilsizer Sloughs	Yuba City	16 Interviews completed	None	General BMPs
Colusa Glenn	11/1/09	Landowner	Septic tanks and irrigated lands	Colusa County	3	None	E. coli
Colusa Glenn	11/13/09	Colusa Glenn Subwatershed Program	Director reports, finances, assessor data for additional outreach, MOU with Glenn County RCD, Colusa County transformation to GIS, outreach and education report, draft procedure manual, monitoring results, special presentation by UCCE "General Order of Waste Discharge Requirements for Existing Milk Cow Dairies", annual meeting	Willows USDA Service Center, City of Willows	11	Agenda	E. coli
Colusa Glenn	11/23/09	Colusa Glenn Subwatershed	Management Plan Notice in Stony Creek Watershed for Sediment Toxicity: Hyalella (amphipods in sediment)	Glenn County	13	Management Plan Notice Letter, Survey	Hyalella toxicity
Colusa Glenn	11/25/09	Colusa Glenn Subwatershed Program	Annual Newsletter	Colusa & Glenn County irrigated landowner participants	1557	Newsletter	General BMPs
Colusa Glenn	12/2/09	County of Glenn Department of Agriculture	Grower Meeting	Ord Bend Community Hall, Glenn	89	Agenda, PowerPoint Presentation	Pesticides
Colusa Glenn	12/3/09	County of Colusa Department of Agriculture	Grower Meeting	Colusa Industrial Conference Room, City of Colusa	50	PowerPoint Presentation	General BMPs
Colusa Glenn	12/14/09	Colusa Glenn Subwatershed Program	Annual Meeting	Willows USDA Service Center, City of Willows	16	Agenda	Hyalella toxicity; Chlorpyrifos
Colusa Glenn	1/25/10	Colusa County Farm Bureau	Colusa Glenn Subwatershed Program and Long-Term Irrigated Lands Regulatory Program	Colusa County Farm Bureau, City of Colusa	32	Agenda, PowerPoint Presentation	General BMPs
Colusa Glenn	2/10/10	Glenn County Farm Bureau	Colusa Glenn Subwatershed Program and Long-Term Irrigated Lands Regulatory Program	Glenn County Farm Bureau, City of Orland	19	Agenda, PowerPoint Presentation	General BMPs
Colusa Glenn	2/28/10	Glenn County Resource Conservation District	Water Quality Monitoring on Stony Creek - Present and Future	Stony Creek Watershed Glenn County	500	Newsletter	Stony Creek (All)
Colusa Glenn	3/2/10	Colusa Glenn Subwatershed Program	Event 46: Exceedance of Simazine on Walker Creek near 99W and CR33, December 17, 2009; BMPs	Willows USDA Service Center, City of Willows	4	None	Ceriodaphnia toxicity
Colusa Glenn	3/11/10	Colusa County Farm Bureau	Pesticide Application and Respirator Training	Colusa County Farm Bureau, City of Colusa	40	None	Chlorpyrifos; Ceriodaphnia toxicity; Hyalella toxicity

Summary of 2010 Management Plan Outreach

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Management Plan Relevance
Colusa Glenn	4/21/10	Colusa County Resource Conservation District	Colusa Basin Management Plan	Colusa Industrial Conference Room, City of Colusa	32	None	General BMPs
Colusa Glenn	4/26/10	Central Valley Salinity Coalition	CV SALTS	Yolo County Farm Bureau, City of Woodland	45	None	Salinity
Colusa Glenn	5/6/10	University California Cooperative Extension	Water runoff and threat of toxin runoff in Almond Orchards	Arbuckle	200 Almond Growers	Agenda	Chlorpyrifos; Ceriodaphnia toxicity; Hyalella toxicity
Colusa Glenn	5/25/10	Colusa Glenn Subwatershed Program	Draft minutes, finances, SVWQC advisory council, Long-Term Irrigated Lands Regulatory Program, outreach and education report and update, outreach regarding Chlorpyrifos at Walker Creek, management plan update, AWEF, monitoring results, Malathion exceedance at Rough and Ready Pumping Plant, participant map, Director Reports	Colusa County Farm Bureau, City of Colusa	10	Agenda	Chlorpyrifos; Ceriodaphnia toxicity
Colusa Glenn	6/15/10	Colusa Glenn Subwatershed Program	PRESS RELEASE: Avoid More Water Quality Exceedances: Use Best Management Practices For Chlorpyrifos	Colusa & Glenn County's Farm Bureau, Family Water Alliance, plus distribution list	6,150	Press Release	Chlorpyrifos
Colusa Glenn	7/21/10	Colusa Glenn Subwatershed Program	LETTER: Stewardship of Chlorpyrifos to Avoid Water Quality Issues	Walker Creek Watershed Landowners & Ag Dealers, PCA's, Operators	131	Letter (Landowner & Ag Service Providers)	Chlorpyrifos
El Dorado	2/1/10	UCCE/RCD/AWQ	Soils Management Workshop (field meeting)	Placerville, CA	30	None	Sediment-related
El Dorado	4/1/10	El Dorado County Agricultural Water Quality Management Corp.	Ag Water Quality issues/updates	Watershed Connection newsletter	325 members	Newsletter	(Pilot Program)
El Dorado	Fall 2009	El Dorado County Agricultural Water Quality Management Corp.	Ag Water Quality issues/updates	Watershed Connection newsletter	325 members	Newsletter	General BMPs
El Dorado	October 2009 - June 2010	EDC Agriculture Department	Pesticide trainings	Placerville, CA	24	None	Ceriodaphnia toxicity
Lake County	2/17/10	UC Extension	Irrigating Orchards Efficiently	Big Valley Grange, Lakeport	25	Agenda	Irrigation BMPs
Lake County	3/31/10	Lake County Winegrape Commission	Pest management (how agriculture effects the water quality of Clear Lake - Erica Lundquist)	Lake County	31	None	Pesticides and toxicity
Napa Putah Ck	10/19/09	Putah Ck Watershed Steering Com. Mtg	Membership & Financial Reports, Program planning for 2009/10 year, BMPs & tools to achieve ILP goals; update on LTILP	Napa Farm Bureau	8	None	General BMPs

Summary of 2010 Management Plan Outreach

Subwatershed	Date	Organization	Topics/Exceedances Discussed	Location	# of People in Attendance or on Distribution List	Document Type	Management Plan Relevance
Napa Putah Ck	2/5/10	Putah Ck Watershed Annual Members Mtg	Grower Membership Report, Financial Report, Water Quality Report, BMP discussion, Pilot Plan concept & LTILP	Pope Valley Farm Center	45	None	General BMPs
Napa Putah Ck	6/2/10	Putah Ck Watershed Steering Com. Mtg	Membership, Financial & Water Quality Reports; Grower Survey compilation & analysis; Pilot Plan implementation	Napa Farm Bureau	8	None	General BMPs
NECWA	6/9/10	CE and NRCS	Irrigation Workshops	Susanville, CA	25	None	General BMPs
NECWA	6/10/10	CE and NRCS	Irrigation Workshops	Adin, CA	30	None	General BMPs
NECWA	7/20/10	NECWA	Board Meeting	McArthur, CA	14	Agenda	E. coli
PNSSNS	2/5/10	LIMP into ILRP; Annual Mtg. Prep.	UC Davis Coop Ext. Cow Pat Study, LIMP, LT ILRP	Placer Co. Water Agency	11	None	E. coli
PNSSNS	2/10/10	Annual Membership Mtg.	ILRP and Low Impact Concerns; BMP on Cattle; Cost Reduction Projects, What next w/ILRP	PCWA	50	None	E. coli
PNSSNS	4/30/10	Board Mtg.	E. Coli surveys, ILRP, low impact letters to RWB	WPWMA	8	None	E. coli
PNSSNS	Fall 2009	Newsletter	BMP for Cattle, pH problems		850	None	E. coli
Sacramento Amador	1/21/10	Amador RCD	sediment toxicity MP, outreach	Jackson, CA	6	Monthly report	Hyalella toxicity
Sacramento Amador	4/15/10	Amador RCD	EIR, Chlorosulfuron, general info	Jackson, Ca	6	Monthly Report	Ceriodaphnia toxicity
Sacramento Amador	5/20/10	Amador RCD	E. coli survey, Dimethoate exceedance	Jackson, CA	6	Monthly Report	Ceriodaphnia toxicity
Sacramento Amador	8/17/10	Amador RCD	EIR, CV SALTS, E. coli	Jackson, CA	6	Monthly Report	E. coli, salinity
Solano-Yolo	10/20/09	Dixon Solano Water Quality Coalition	Pyrethroid information for Coalition members	Sent with membership bills by mail	675	Two documents	Hyalella toxicity
Solano-Yolo	12/1/09	Dixon Resource Conservation District	Best Management Practices Interest Survey for Dixon RCD members	Sent with ditch fee billing by mail	250	Survey	E. coli, Hyallela toxicity, pH, DO
Solano-Yolo	6/23/10	Yolo County Farm Bureau Education Corporation	Spray Safe Seminar	Woodland	1658 Invited 225 Attended	Flyer	Registered pesticides
Solano-Yolo	6/23/10	Yolo/Solano County Farm Bureaus, Ag Commissioners & Dixon/Solano Water Quality Coalition	SPRAY SAFE meeting presentation of local pesticide exceedances & recommendations	Yolo County Fairgrounds	200 +	None	Registered pesticides
Solano-Yolo	May-10	Yolo County Farm Bureau Education Corporation	Irrigated Lands Waiver Newsletter Volume 3 Issue 1	Woodland	1650	Newsletter	Registered pesticides
UFRWG	10/16/09	UFRWG Annual Membership Mtg	DO/pH and E.coli BMPs DO/pH Special Study Report completion Surveys for IV and AV members	Community Ctr Blairsden, CA	15	Agenda	DO, pH, E. coli
UFRWG	2/1/10	Newsletter	Grazing BMPs, General Information	Watershed wide	105 Membership	May Newsletter	E. coli
UFRWG	5/17/10	UCCE Field Visits	Grazing BMPs & ranch water quality implementation projects	Sierra Valley Member Ranches	20	None	E. coli
UFRWG	5/18/10	UCCE Field Visits	Grazing BMPs & ranch water quality implementation projects	Indian Valley Member Ranches	12	None	E. coli

Summary of 2010 Management Plan Outreach

<b>Subwatershed</b>	<b>Date</b>	<b>Organization</b>	<b>Topics/Exceedances Discussed</b>	<b>Location</b>	<b># of People in Attendance or on Distribution List</b>	<b>Document Type</b>	<b>Management Plan Relevance</b>
UFRWG	5/19/10	UCCE Field Visits	Grazing BMPs & ranch water quality implementation projects	American Valley Member Ranches	10	None	E. coli
UFRWG	7/27/10	Plumas-Sierra Farm Bureau	Ag Water Topics: ILRP update; Water Diversion Reporting regs. D. Merkley CFBF speaker	Fairgrounds Quincy, CA	45	Agenda	General BMPs
UFRWG	9/1/10	UFRWG Newsletter	General ILRP Information	Watershed wide	105 Membership	Fall Newsletter	E. coli

## Appendix B: 2011 Management Plan Monitoring

2011 Management Plan Monitoring from Attachment D of the *2011 ILRP Monitoring Plan*. Prepared by Larry Walker Associates for the Sacramento Valley Water Quality Coalition, November 2011.

D. Site Specific Monitoring Tables v2.xlsx

Subwatershed	Water Body	Monitoring Site	MgtPlanCategory	Mgt Plan Analyte	Monitored Analytes	Parameter-specific Schedule	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Count of events	
Butte Yuba Sutter	Butte Slough	Butte Slough at Pass Road	DO and pH	DO	TBD dependent on SER [DEC 2011]	None in 2011													0	
Butte Yuba Sutter	Butte Slough	Butte Slough at Pass Road	Toxicity	Toxicity - Selenastrum	Toxicity - Selenastrum	NOV-APR	X	X	X	X								X	X	6
Butte Yuba Sutter	Butte Slough	Butte Slough at Pass Road	Toxicity	Toxicity - Selenastrum	OXYFLUORFEN	NOV-APR	X	X	X	X								X	X	0
Butte Yuba Sutter	Gilsizer Slough	Gilsizer Slough at George Washington Road	DO and pH	pH	TBD dependent on SER [DEC 2011]	None in 2011														0
Butte Yuba Sutter	Gilsizer Slough	Gilsizer Slough at George Washington Road	DO and pH	DO	TBD dependent on SER [DEC 2011]	None in 2011														0
Butte Yuba Sutter	Gilsizer Slough	Gilsizer Slough at George Washington Road	Legacy Pesticides	DDE	None proposed;	None;														0
Butte Yuba Sutter	Gilsizer Slough	Gilsizer Slough at George Washington Road	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD														0
Butte Yuba Sutter	Gilsizer Slough	Gilsizer Slough at George Washington Road	Registered Pesticides	Diazinon	Diazinon	2 Wet Season Storms	X		X											2
Butte Yuba Sutter	Gilsizer Slough	Gilsizer Slough at George Washington Road	Registered Pesticides	Malathion	Malathion	2 Wet Season Storms	X		X											2
Butte Yuba Sutter	Gilsizer Slough	Gilsizer Slough at George Washington Road	Salinity	EC	None (regionally elevated salinity)	None;														0
Butte Yuba Sutter	Lower Honcut Creek	Lower Honcut Creek at Hwy 70	DO and pH	DO	DO	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	X	12
Butte Yuba Sutter	Lower Honcut Creek	Lower Honcut Creek at Hwy 70	Pathogen Indicators	E. coli	E. coli	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	X	12
Butte Yuba Sutter	Lower Snake River	Lower Snake R. at Nuestro Rd	Pathogen Indicators	E. Coli	E. coli	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	X	12
Butte Yuba Sutter	Lower Snake River	Lower Snake R. at Nuestro Rd	Registered Pesticides	Chlorpyrifos	Chlorpyrifos	MAY-SEP					X	X	X	X	X					5
Butte Yuba Sutter	Lower Snake River	Lower Snake R. at Nuestro Rd	Toxicity	Toxicity - Ceriodaphnia	Toxicity - Ceriodaphnia	JAN-SEP	X	X	X	X	X	X	X	X	X					9
Butte Yuba Sutter	Pine Creek	Pine Creek at Nord Gianella Road	DO and pH	DO	DO	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	X	12
Butte Yuba Sutter	Pine Creek	Pine Creek at Nord Gianella Road	Pathogen Indicators	E. Coli	E. coli	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	X	12
Butte Yuba Sutter	Pine Creek	Pine Creek at Nord Gianella Road	Registered Pesticides	Chlorpyrifos	Chlorpyrifos	MAY-SEP					X	X	X	X	X					5
Butte Yuba Sutter	Sacramento Slough	Sacramento Slough bridge near Karnak	DO and pH	DO	DO	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	X	12
Butte Yuba Sutter	Wadsworth Canal	Wadsworth Canal at South Butte Rd	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD														0
Colusa Glenn	Colusa Basin Drain	Colusa Basin Drain above KL	DO and pH	DO	DO	NOV-AUG	X	X	X	X	X	X	X	X				X	X	10
Colusa Glenn	Colusa Basin Drain	Colusa Basin Drain above KL	Pathogen Indicators	E. Coli	E. coli	NOV-AUG	X	X	X	X	X	X	X	X				X	X	10
Colusa Glenn	Colusa Basin Drain	Colusa Basin Drain above KL	Salinity	EC	EC	NOV-AUG	X	X	X	X	X	X	X	X				X	X	10
Colusa Glenn	Colusa Basin Drain	Colusa Basin Drain at Maxwell road	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD														0
Colusa Glenn	Freshwater Creek	Freshwater Creek at Gibson Rd	DO and pH	DO	DO	NOV-AUG	X	X	X	X	X	X	X	X				X	X	10
Colusa Glenn	Freshwater Creek	Freshwater Creek at Gibson Rd	Legacy Pesticides	DDE	DDE	2 wet season storms		X	X											2
Colusa Glenn	Freshwater Creek	Freshwater Creek at Gibson Rd	Pathogen Indicators	E. coli	E. coli	NOV-AUG	X	X	X	X	X	X	X	X				X	X	10
Colusa Glenn	Freshwater Creek	Freshwater Creek at Gibson Rd	Salinity	EC	EC	NOV-AUG	X	X	X	X	X	X	X	X				X	X	10
Colusa Glenn	Logan Creek	Logan Creek at 4 Mile-Excelsior Rd	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD														0
Colusa Glenn	Logan Creek	Logan Creek at 4 Mile-Excelsior Rd	Salinity	TDS	None (regionally elevated salinity)	None;														0
Colusa Glenn	Lurline Creek	Lurline Creek at 99W	Legacy Pesticides	DDE	None proposed;	None;														0
Colusa Glenn	Lurline Creek	Lurline Creek at 99W	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD														0
Colusa Glenn	Lurline Creek	Lurline Creek at 99W	Salinity	EC	None (regionally elevated salinity)	None;														0
Colusa Glenn	Lurline Creek	Lurline Creek at 99W	Salinity	TDS	None (regionally elevated salinity)	None;														0
Colusa Glenn	Sycamore Slough	Rough and Ready Pumping Plant (RD 108)	DO and pH	DO	TBD dependent on SER [DEC 2011]	None in 2011														0
Colusa Glenn	Sycamore Slough	Rough and Ready Pumping Plant (RD 108)	Legacy Pesticides	DDE	None proposed;	None;														0
Colusa Glenn	Sycamore Slough	Rough and Ready Pumping Plant (RD 108)	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD														0
Colusa Glenn	Sycamore Slough	Rough and Ready Pumping Plant (RD 108)	Salinity	EC	None (regionally elevated salinity)	None;														0
Colusa Glenn	Sycamore Slough	Rough and Ready Pumping Plant (RD 108)	Salinity	TDS	None (regionally elevated salinity)	None;														0
Colusa Glenn	Stone Corral Creek	Stone Corral Creek near Maxwell Road	DO and pH	DO	TBD dependent on SER [DEC 2011]	None in 2011														0
Colusa Glenn	Stone Corral Creek	Stone Corral Creek near Maxwell Road	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD														0
Colusa Glenn	Stone Corral Creek	Stone Corral Creek near Maxwell Road	Salinity	EC	None (regionally elevated salinity)	None;														0
Colusa Glenn	Stony Creek	Stony Creek on Hwy 45 near Rd 24	DO and pH	pH	TBD dependent on SER [DEC 2011]	None in 2011														0
Colusa Glenn	Stony Creek	Stony Creek on Hwy 45 near Rd 24	Toxicity	Toxicity - Hyalella	sediments	APR, AUG				X				X						2
Colusa Glenn	Stony Creek	Stony Creek on Hwy 45 near Rd 24	Toxicity	Toxicity - Ceriodaphnia	Toxicity - Ceriodaphnia, OP Pesticides	2 Wet season storm events		X	X											2
Colusa Glenn	Walker Creek	Walker Creek at Co Rd 48	DO and pH	DO	DO	NOV-AUG	X	X	X	X	X	X	X	X				X	X	10
Colusa Glenn	Walker Creek	Walker Creek at Co Rd 48	Pathogen Indicators	E. Coli	E. coli	NOV-AUG	X	X	X	X	X	X	X	X				X	X	10
Colusa Glenn	Walker Creek	Walker Creek at Co Rd 48	Registered Pesticides	Chlorpyrifos	Chlorpyrifos	MAR, JUN-AUG			X		X	X	X							4
Colusa Glenn	Walker Creek	Walker Creek at Co Rd 48	Toxicity	Toxicity - Ceriodaphnia	Toxicity - Ceriodaphnia	JAN-AUG	X	X	X	X	X	X	X	X						8
El Dorado	Coon Hollow Creek	Coon Hollow Creek	Legacy Pesticides	DDE	None (Completed); Pilot BMP Program;	None (Completed); Pilot BMP Program;														0
El Dorado	Coon Hollow Creek	Coon Hollow Creek	Toxicity	Toxicity - Ceriodaphnia	None (Completed);	Completed; (Pilot BMP Program)														0
El Dorado	North Canyon Creek	North Canyon Creek	Legacy Pesticides	DDE	None proposed; Pilot BMP Program;	None proposed; Pilot BMP Program;														0
El Dorado	North Canyon Creek	North Canyon Creek	Pathogen Indicators	E. Coli	E. coli	None; (Pilot BMP Program)														0
El Dorado	North Canyon Creek	North Canyon Creek	Pathogen Indicators	E. Coli	E. coli	None; (Pilot BMP Program)														0
Lake Napa	Capell Creek	Capell Creek upstream from Lake Berryessa	Pathogen Indicators	E. Coli	E. coli	None; (Pilot BMP Program)														0
Lake Napa	McGaugh Slough	McGaugh Slough	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD														0
Pit River	Fall River	Fall River at Fall River Ranch Bridge	DO and pH	pH	TBD dependent on SER [DEC 2011]	None in 2011														0

D. Site Specific Monitoring Tables v2.xlsx

Subwatershed	Water Body	Monitoring Site	MgtPlanCategory	Mgt Plan Analyte	Monitored Analytes	Parameter-specific Schedule	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Count of events
Pit River	Pit River	Pit River at Canby Bridge	DO and pH	DO	TBD dependent on SER [DEC 2011]	None in 2011													0
Pit River	Pit River	Pit River at Canby Bridge	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD													0
Pit River	Pit River	Pit River at Pittville Bridge	DO and pH	DO	DO	MAR-AUG, DEC			X	X	X	X	X	X				X	7
Pit River	Pit River	Pit River at Pittville Bridge	DO and pH	pH	pH	MAR-AUG, DEC			X	X	X	X	X	X				X	7
PNSSNS	Coon Creek	Coon Creek at Brewer Road	DO and pH	DO	DO	FEB-SEP		X	X	X	X	X	X	X	X				8
PNSSNS	Coon Creek	Coon Creek at Brewer Road	Pathogen Indicators	E. Coli	E. coli	FEB-SEP		X	X	X	X	X	X	X	X				8
PNSSNS	Coon Creek	Coon Creek at Striplin Road	DO and pH	DO	TBD dependent on SER [DEC 2011]	None in 2011													0
PNSSNS	Coon Creek	Coon Creek at Striplin Road	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD													0
PNSSNS	Coon Creek	Coon Creek at Striplin Road	Registered Pesticides	Chlorpyrifos	None (Completed);	None (Completed);													0
Sacramento Amador	Cosumnes River	Cosumnes River at Twin Cities Road	DO and pH	DO	DO	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	12
Sacramento Amador	Cosumnes River	Cosumnes River at Twin Cities Road	Pathogen Indicators	E. coli	E. coli	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	12
Sacramento Amador	Cosumnes River	Cosumnes River at Twin Cities Road	DO and pH	pH	pH	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	12
Sacramento Amador	Cosumnes River	Cosumnes River at Twin Cities Road	Toxicity	Toxicity - Hyalella	Sediment toxicity; pesticides in toxic sediments	APR, AUG				X				X					2
Sacramento Amador	Dry Creek	Dry Creek at Alta Mesa Rd	DO and pH	pH	TBD dependent on SER [DEC 2011]	None in 2011													0
Sacramento Amador	Dry Creek	Dry Creek at Alta Mesa Rd	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD													0
Sacramento Amador	Dry Creek	Dry Creek at Alta Mesa Rd	Salinity	TDS	None (regionally elevated salinity)	None;													0
Sacramento Amador	Grand Island	Grand Island Drain near Leary Road	DO and pH	DO	DO	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	12
Sacramento Amador	Grand Island	Grand Island Drain near Leary Road	Pathogen Indicators	E. coli	E. coli	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	12
Sacramento Amador	Grand Island	Grand Island Drain near Leary Road	Legacy Pesticides	DDE/DDT	DDE/DDT	2 Wet Season Storms			X	X									2
Sacramento Amador	Grand Island	Grand Island Drain near Leary Road	Salinity	EC	EC	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	12
Sacramento Amador	Grand Island	Grand Island Drain near Leary Road	Salinity	TDS	None (monitored as EC)	None (monitored as EC)													0
Sacramento Amador	Laguna Creek	Laguna Crk at Alta Mesa Rd	DO and pH	pH	TBD dependent on SER [DEC 2011]	None in 2011													0
Sacramento Amador	Laguna Creek	Laguna Crk at Alta Mesa Rd	DO and pH	DO	DO	TBD dependent on SER [DEC 2011]													0
Sacramento Amador	Laguna Creek	Laguna Crk at Alta Mesa Rd	Pathogen Indicators	E. coli	TBD Dependent on SER [DEC 2010]	TBD													0
Sacramento Amador	Laguna Creek	Laguna Crk at Alta Mesa Rd	Toxicity	Toxicity - Ceriodaphnia	None (Completed);	None; Mgt Plan Completed;													0
Shasta Tehama	Andersen Creek	Andersen Creek at Ash Creek Rd	DO and pH	DO	DO	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	12
Shasta Tehama	Andersen Creek	Andersen Creek at Ash Creek Rd	Pathogen Indicators	E. Coli	E. coli	JAN-DEC	X	X	X	X	X	X	X	X	X	X	X	X	12
Shasta Tehama	Burch Creek	Burch Creek above Woodson Ave Bridge	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD													0
Shasta Tehama	Coyote Creek	Coyote Creek at Tyler Road	DO and pH	DO	TBD dependent on SER [DEC 2011]	None in 2011													0
Shasta Tehama	Coyote Creek	Coyote Creek at Tyler Road	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD													0
Solano Yolo	Cache Creek	Cache Creek at Capay Diversion Dam	DO and pH	DO	TBD dependent on SER [DEC 2011]	None in 2011													0
Solano Yolo	Cache Creek	Cache Creek at Capay Diversion Dam	Salinity	EC	None (regionally elevated salinity)	None;													0
Solano Yolo	Cache Creek	Cache Creek at Capay Diversion Dam	Salinity	Boron	None (regionally elevated salinity)	None;													0
Solano Yolo	Cache Creek	Cache Creek at Capay Diversion Dam	Toxicity	Toxicity - Ceriodaphnia	Toxicity - Ceriodaphnia, OP Pesticides	MAY-AUG				X	X	X	X						4
Solano Yolo	Shag Slough	Shag Slough at Liberty Island Bridge	Pathogen Indicators	E. coli	E. coli	NOV-AUG	X	X	X	X	X	X	X				X	X	10
Solano Yolo	Tule Canal	Tule Canal at I-80	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD													0
Solano Yolo	Tule Canal	Tule Canal at I-80	Salinity	Boron	None (regionally elevated salinity)	None;													0
Solano Yolo	Tule Canal	Tule Canal at I-80	Salinity	EC	None (regionally elevated salinity)	None;													0
Solano Yolo	Tule Canal	Tule Canal at I-80	Salinity	TDS	None (regionally elevated salinity)	None;													0
Solano Yolo	Ulatis Creek	Ulatis Creek at Brown Road	DO and pH	pH	pH	NOV-SEP	X	X	X	X	X	X	X	X			X	X	11
Solano Yolo	Ulatis Creek	Ulatis Creek at Brown Road	DO and pH	DO	DO	NOV-SEP	X	X	X	X	X	X	X	X			X	X	11
Solano Yolo	Ulatis Creek	Ulatis Creek at Brown Road	Nutrients	Nitrate as N	Nitrate as N	2 Storm Events JAN-APR, MAY-SEP, NOV-DEC			X	X	X	X	X	X			X	X	9
Solano Yolo	Ulatis Creek	Ulatis Creek at Brown Road	Pathogen Indicators	E. Coli	E. coli	NOV-SEP	X	X	X	X	X	X	X	X			X	X	11
Solano Yolo	Ulatis Creek	Ulatis Creek at Brown Road	Registered Pesticides	Malathion	Malathion	MAR, MAY-AUG			X		X	X	X						5
Solano Yolo	Ulatis Creek	Ulatis Creek at Brown Road	Registered Pesticides	Diuron	Diuron	DEC-FEB	X	X										X	3
Solano Yolo	Ulatis Creek	Ulatis Creek at Brown Road	Salinity	EC	EC	NOV-SEP	X	X	X	X	X	X	X	X			X	X	11
Solano Yolo	Ulatis Creek	Ulatis Creek at Brown Road	Salinity	TDS	None (monitored as EC)	None (monitored as EC)													0
Solano Yolo	Ulatis Creek	Ulatis Creek at Brown Road	Toxicity	Toxicity - Selenastrum	Selenastrum toxicity	NOV-JUL	X	X	X	X	X	X					X	X	9
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	DO and pH	pH	pH	NOV-AUG	X	X	X	X	X	X	X				X	X	10
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	Legacy Pesticides	DDE	DDE	2 Wet season storm events			X	X									2
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	Pathogen Indicators	E. Coli	E. coli	NOV-AUG	X	X	X	X	X	X	X				X	X	10
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	Registered Pesticides	Chlorpyrifos	Chlorpyrifos	MAR-AUG			X	X	X	X	X						6
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	Registered Pesticides	Diuron	Diuron	DEC-FEB	X	X										X	3
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	Registered Pesticides	Malathion	Malathion	MAR-APR, JUN-AUG			X	X		X	X	X					5
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	Salinity	EC	EC	NOV-AUG	X	X	X	X	X	X	X				X	X	10



D. Site Specific Monitoring Tables v2.xlsx

Subwatershed	Water Body	Monitoring Site	MgtPlanCategory	Mgt Plan Analyte	Monitored Analytes	Parameter-specific Schedule	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Count of events	
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	Salinity	TDS	None (monitored as EC)	None (monitored as EC)													0	
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	Salinity	Boron	Boron	JAN-APR	X	X	X	X									4	
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	Toxicity	Toxicity - Selenastrum	Selenastrum toxicity	NOV-JUL	X	X	X	X	X	X	X					X	X	9
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	Toxicity	Toxicity - Ceriodaphnia	Toxicity - Ceriodaphnia	FEB-AUG		X	X	X	X	X	X	X					7	
Solano Yolo	Willow Slough	Willow Slough Bypass at Pole Line	Trace Metals	Selenium	Selenium	JAN-APR	X	X	X	X									4	
Solano Yolo	Z Drain	Z Drain – Dixon RCD	DO and pH	pH	TBD dependent on SER [DEC 2011]	None in 2011													0	
Solano Yolo	Z Drain	Z Drain – Dixon RCD	DO and pH	DO	TBD dependent on SER [DEC 2011]	None in 2011													0	
Solano Yolo	Z Drain	Z Drain – Dixon RCD	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD													0	
Solano Yolo	Z Drain	Z Drain – Dixon RCD	Salinity	TDS	None (regionally elevated salinity)	None;													0	
Solano Yolo	Z Drain	Z Drain – Dixon RCD	Salinity	EC	None (regionally elevated salinity)	None;													0	
Solano Yolo	Z Drain	Z Drain – Dixon RCD	Toxicity	Toxicity - Hyalella	Pyrethroids and Chlorpyrifos in sediment	1 post-storm event, APR, MAY, AUG		X		X		X		X					4	
Upper Feather River	Indian Creek	Indian Creek at Arlington Bridge	DO and pH	DO	None proposed;	None;													0	
Upper Feather River	Indian Creek	Indian Creek at Arlington Bridge	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD													0	
Upper Feather River	Middle Fork Feather River	Middle Fork Feather River at Co Rd A-23	DO and pH	DO	DO	MAY-SEP					X	X	X	X	X				5	
Upper Feather River	Middle Fork Feather River	Middle Fork Feather River at Co Rd A-23	DO and pH	pH	pH	MAY-SEP					X	X	X	X	X				5	
Upper Feather River	Spanish Creek	Spanish Creek below Greenhorn Creek	Pathogen Indicators	E. Coli	TBD Dependent on SER [DEC 2010]	TBD													0	
Upper Feather River	Spanish Creek	Spanish Creek below Greenhorn Creek	DO and pH	DO	None proposed;	None;													0	
Butte Yuba Sutter	Gilsizer Slough	Gilsizer Slough at George Washington Road	Chlorpyrifos/diazinon TMD	Chlorpyrifos, diazinon	Chlorpyrifos, diazinon	3 events JAN-MAY	X		X	X									3	
Colusa Glenn	Sycamore Slough	Rough and Ready Pumping Plant (RD 108)	Chlorpyrifos/diazinon TMD	Chlorpyrifos, diazinon	Chlorpyrifos, diazinon	3 events JAN-MAY	X		X	X									3	
PNSNS	Coon Creek	Coon Creek at Striplin Road	Chlorpyrifos/diazinon TMD	Chlorpyrifos, diazinon	Chlorpyrifos, diazinon	MAR, MAY			X		X									

## Appendix C: January 31, 2011 Memorandum to Water Board ILRP Staff

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*Rationales for constituent-water body combinations not scheduled to be monitored in 2011. Memorandum to Mark Cady, Central Valley RWQCB, January 31, 2011.*



# Memorandum

DATE: January 31, 2011

TO: Mark Cady, Central Valley RWQCB

COPY TO: Susan Fregien, Central Valley RWQCB

**Claus Suverkropp**

707 4th Street, Suite 200  
Davis, CA 95616  
530.753.6400  
530.753.7030 fax  
ClausS@LWA.com

SUBJECT: **Rationales for constituent-water body combinations not scheduled to be monitored in 2011**

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The purpose of this memorandum is to document the rationales for not including specific Management Plan monitoring for constituent-water body combinations not scheduled for monitoring in 2011.

The need for management plan monitoring is determined primarily based on the potential to provide useful information for source identification, in establishing causes of toxicity, and to evaluate management practice effectiveness. This monitoring may consist of water column or sediment sampling, field surveys, or surveys of agricultural practices. There are five currently active management plan categories with water bodies that do not have monitoring scheduled for 2011 (Table 1).

**Table 1. Water body-constituent combinations with no scheduled monitoring in 2011.**

<b>Category</b>	<b># of water body-constituent combinations</b>
Toxicity	1
Legacy Pesticides	5
DO and pH	18
Salinity	18
Pathogen Indicators	20

**General Considerations**

The current ILRP monitoring model is premised on the idea that the regular Core and Assessment monitoring at current sites is considered to be representative of conditions in the other water bodies in the represented region, including compliance and the effectiveness of implemented management practices. With the exception of North Canyon Creek in the El Dorado subwatershed, all of the 18 water bodies without Management Plan monitoring scheduled in 2011 are currently represented by other Coalition monitoring sites. These sites are no longer used as representative Core and Assessment monitoring sites and the drainages are now represented by other monitoring sites in their watersheds.

For broad regional issues such as DO and pH, salinity, pathogen indicators, and legacy pesticides, the goals and schedules for any implementation of management practices in these drainages should ultimately be consistent with those developed for their representative sites. If this policy is not followed, it sets up potential conflicts and inconsistencies in implementation goals and can create “islands” of compliance (or noncompliance) within the larger represented region (Table 2). These potential inconsistencies are the consequence of the changes in ILRP requirements and strategies over time. While these conflicts may not be completely avoidable, additional compliance monitoring at these “legacy” sites for constituents that will be addressed through a broader regional strategy will exacerbate the problem without providing data useful for management.

**Table 2. Outcomes for monitoring or implementation goals for “legacy” sites within a represented region**

		Condition for the representative site or drainage	
		Compliance	Non-compliance
Condition for the included non-representative “legacy” monitoring site within represented region	Compliance	No conflict	Results in lower implementation goals and an “island of compliance” within the larger represented region
	Non-compliance	Results in higher implementation goals and an “island of non-compliance” within the larger represented region	No conflict

Additional rationales for specific constituents are provided in the following sections.

**Toxicity**

Coon Hollow Creek in the El Dorado subwatershed is the only water body (out of 11) with a current management plan for toxicity that does not have monitoring scheduled in 2011. The El Dorado subwatershed is currently participating in the optional Pilot Watershed Management Practices Plan alternative monitoring strategy, which replaces Core and Assessment water quality monitoring with tracking and documentation of management practices. The Coalition requested on July 23, 2010 that this Management Plan requirement be deemed complete for Coon Hollow Creek and this request is currently under review by the Water Board. The basis for the Coalition’s request, and the

reasons for not scheduling any additional monitoring are based on the following results of Management Plan evaluations.

- The exceedances observed in Coon Hollow Creek were exhaustively investigated and discussed by members of the El Dorado subwatershed, the Coalition, and their contractors. This included examination of all the water quality monitoring data, site investigations, pesticide application reports, and discussions with all of the growers in this water body. The conclusion of this investigation and analysis is that appropriate and adequate management practices are implemented and the observed *Ceriodaphnia dubia* toxicity in the Coon Hollow Creek water body samples is unlikely to be due to contributions by agricultural sources.
- The extensive source identification and evaluation monitoring that has already been conducted resulted in no determination of the cause of toxicity, no indication that agricultural uses were the cause of toxicity, and no reasonable expectation that additional monitoring would result in such a determination. Consequently, no additional source evaluation monitoring has been planned.
- Since no specific cause was identified and agriculture does not appear to be the cause of the exceedances, no additional monitoring is proposed to evaluate effectiveness.

### **Legacy Pesticides**

Elevated concentrations of legacy organochlorine (OC) pesticides in soils, sediments and water is a regional issue that affects virtually all historically agricultural areas of the Central Valley to some degree. In the Sacramento Valley watershed, there are 5 water bodies (out of 7 total with a current management plan for legacy OC pesticides) with no monitoring scheduled in 2011. Two water bodies are in the El Dorado subwatershed (Coon Hollow Creek, North Canyon Creek), two in the Colusa-Glenn subwatershed (Lurline Creek, Sycamore Slough), and one in the Butte-Yuba-Sutter subwatershed (Gilsizer Slough). Source identification sampling has been conducted in these water bodies with the following results (as reported in the Coalition's April 2010 *Water Quality Management Plan Progress Report*):

- The spatial pattern of concentrations in Coon Hollow Creek was not consistent with a diffuse upstream agricultural source of legacy OCs in eroded soils. The results indicate a localized elevated source near the upstream location. The El Dorado County Department of Transportation has sometimes stockpiled soils from ditch cleaning along North Canyon Road adjacent to Coon Hollow Creek at CNHFU, and others may also have added soil to the stockpiles. Runoff from these piles can flow directly into the creek if erosion control measures are absent (as was observed on at least one occasion). The DOT and landowner have installed erosion control measures to mitigate this erosion potential. A request for completion of the management plan requirement for Coon Hollow Creek is under review by the Water Board.
- The spatial patterns of concentrations in sediments of the other four water bodies were consistent with a diffuse upstream source of legacy OCs in eroded soils. This result indicated that additional monitoring would not provide any further useful source identification information. Since the only feasible options for reducing exceedances of legacy OC pesticides are time and management of sediments, it was determined that management of legacy OCs would not benefit from additional spatial focus or monitoring.

Based on the results of the source evaluation monitoring conducted in these water bodies, no additional source identification sampling for legacy OC pesticides was proposed for these water bodies. Additionally, because no specific additional implementation of management practices has yet been proposed for these water bodies, sampling to assess effectiveness of additional implementation is not yet warranted. If and when additional implementation is determined to be appropriate for any of these water bodies, effectiveness monitoring would be scheduled following implementation of these additional practices.

### **DO and pH**

Low dissolved oxygen and pH exceedances are regional issues that affects the most Central Valley water bodies with seasonally natural low flows. The Coalition's source evaluation process for DO and pH is currently in progress. This evaluation includes an assessment of existing monitoring data, including seasonal patterns, flows, ambient nutrient concentrations, and nutrient applications and crops to determine whether there is a connection between agricultural uses and the exceedances. It is already well established that seasonal and diurnal factors, flows, and riparian condition have a very large influence on these parameters and are responsible for many of the "exceedances", which can reasonably be expected to continue to occur. Consequently, compliance sampling of the type used for Core and Assessment monitoring will not provide additional insight into the potential contributions of agriculture. If the source evaluation indicates that agriculture is a likely contributor to these exceedances, a sampling strategy more focused on isolating agricultural impacts may be developed if appropriate.

There are currently 29 water bodies with a DO or pH Management Plan requirement (see Attachment D of the Coalition's 2011 Monitoring Plan). Fifteen of these waterbodies are no longer used for representative Core and Assessment monitoring sites for the ILRP and have no monitoring scheduled specifically for DO and pH. However, seven of those fifteen sites have monitoring scheduled for other management plan requirements, during which pH and DO measurements will be collected. No specific agricultural causes have yet been identified in any of these 29 water bodies, and no additional management practices have been proposed or implemented to address exceedances of DO or pH. Consequently, continued monitoring for compliance or monitoring for effectiveness assessment is not yet warranted in the absence of monitoring for other parameters.

### **Salinity**

Salinity is a regional issue that affects the entire Central Valley and Sacramento-San Joaquin Delta. As documented in the Coalition's approved *Water Quality Management Plan* (January 2009), monitoring to be performed as part of the salinity management plan includes two elements. The first is to continue the Coalition's ongoing monitoring efforts to routinely monitor conductivity and boron. This is being done at regionally representative locations in each subwatershed, as required by the 2010 MRP.

The second monitoring component specified in the Management Plan is to conduct additional monitoring for drainages that are determined not to have sufficient available data to characterize EC, TDS, and boron in irrigation supply waters to support source identification. The performance of additional monitoring (beyond Core and Assessment monitoring) is intended to support and augment the source identification and data compilation efforts of the CV-SALTS program. As of January 2011, CV-SALTS is in the process of re-evaluating data needs and has not yet identified the specific needs that would guide additional monitoring or investigation of sources by the Coalition. Because integration with CV-SALTS is the basis of the Coalition's salinity management

plan, we believe that it only makes sense to design and conduct additional source identification monitoring based on CV-SALTS source identification needs. Based on the most recent meeting of the CV-SALTS Executive Committee, it is expected that these data needs will be identified in the first half of 2011.

### **Pathogen Indicators**

The Coalition's *Management Plan Progress Report* (April 2010) provides the following rationale for a modified approach to addressing *E. coli* exceedances:

*"The Source Identification element of the pathogen indicator approach currently includes development of a study to definitively identify sources of pathogen indicators in affected drainages. Development of this study was to be coordinated with the Central Valley Regional Water Board and include peer review to ensure the scientific validity of the study strategy and methods. The specific objectives and time frame for conducting the study have not yet been established. While such a study is possible, implementing a scientifically valid study at the proposed regional scale would be prohibitively costly and the expense cannot be borne by the Coalition (or even all of the coalitions in the ILRP). Additionally, based on the current development of scientific methods in pathogen source identification, it is not expected that even a scientifically valid study at a regional scale would provide results adequately definitive to address the primary source question at the scale needed for individual affected water bodies (e.g., Is agriculture a significant source in the specific water body?)."*

In addition, the following simple facts were considered when assessing the value of conducting additional management plan sampling for *E. coli* in these water bodies.

- Exceedances of ILRP trigger limits for *E. coli* are observed in virtually every water body sampled by the Coalition, regardless of the kinds or intensity of agriculture in those waterbodies, the use (or lack of use) of manure, or the management practices implemented.
- All water bodies sampled by the Coalition are affected by uncontrollable wildlife sources of the pathogen indicator, *E. coli*.
- Conventional *E. coli* monitoring can't distinguish between categories of sources (agriculture vs. wildlife vs. human, etc.). Available methods that are capable of distinguishing wildlife and other sources of *E. coli* from agricultural sources (e.g., DNA "fingerprinting") are not adequately definitive at the regional scale and cost-prohibitive at the water body scale. Consequently, sampling for source identification or assessment purposes will not provide information that will support the key management evaluations and decisions (e.g., *Is agriculture a source? Are there sufficient management practices in place?*).
- No additional management practices have been proposed or implemented to address *E. coli* exceedances in these water bodies. Consequently, effectiveness assessment is not warranted.
- Even if all agricultural sources could be eliminated, exceedances will continue to be observed in all of these water bodies due to continued "contributions" from wildlife and other non-agricultural sources. The (mostly) natural background concentrations of *E. coli* make it impossible to assess effectiveness of any additional implementation of management practices in reducing exceedances. Acknowledging this, *E. coli* monitoring for the purpose of effectiveness assessment can reasonably be expected to be inconclusive for every water body and will never result in a determination that a management plan is "complete" based

on compliance with water quality objectives or adequate implementation of management practices.

Based on these limiting factors, it is apparent that water quality monitoring will provide little useful information about agricultural sources of *E. coli*, or about the effectiveness of management practices in reducing pathogens. Consequently, the only practical means of assessing potential agricultural contributions or management effectiveness is to survey and document the relevant management practices. This is in fact the “monitoring” strategy implemented by the Coalition as part of the Management Plan for pathogen indicators.



## Appendix D: Chlorpyrifos and Diazinon Compliance Monitoring Results

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*Management Of Chlorpyrifos And Diazinon Discharges To The Sacramento And Feather Rivers And The Sacramento-San Joaquin Delta: 2009-2010 TMDL Compliance Monitoring Report.* Prepared by Larry Walker Associates for the Sacramento Valley Water Quality Coalition, January 2011.

JANUARY 2011

SACRAMENTO VALLEY  
WATER QUALITY COALITION

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**Management Of Chlorpyrifos And Diazinon  
Discharges To The Sacramento And Feather  
Rivers And The Sacramento-San Joaquin Delta:  
2009-2010 TMDL Compliance Monitoring Report**

*prepared by*

LARRY WALKER ASSOCIATES

L A R R Y  
W A L K E R



ASSOCIATES

**Management Of Chlorpyrifos And Diazinon Discharges  
To The Sacramento And Feather Rivers And The  
Sacramento-San Joaquin Delta:**

**2009-2010 TMDL Compliance Monitoring Report**

Sacramento Valley Water Quality Coalition

455 Capitol Mall, Suite 335

Sacramento, California 95814

Prepared by

Larry Walker Associates

JANUARY 2011

**TABLE OF CONTENTS**

<b>A Introduction</b> .....	<b>1</b>
<b>B Background</b> .....	<b>1</b>
Monitoring Objectives .....	3
Sampling Sites .....	4
<b>C Monitoring Results</b> .....	<b>5</b>
Data interpretation .....	5
Assessment Of Data Quality Objectives.....	5
Comparison with TMDL Objectives and Discussion of Exceedances .....	7
<b>D Discussion</b> .....	<b>12</b>
<b>E Summary</b> .....	<b>13</b>
<b>Appendix A</b> .....	<b>1</b>
Chlorpyrifos and Diazinon TMDL Monitoring Results, January 2009 – September 2010.....	1

**TABLES AND FIGURES**

Table 1. Compliance Monitoring Sites for Diazinon Runoff Management Plan .....	4
Table 2. TMDL Compliance Sampling Completeness Summary .....	6
Table 3. Summary of TMDL Monitoring Results For Chlorpyrifos .....	8
Table 4. Summary of TMDL Monitoring Results For Diazinon .....	8
Table 5. Load Estimates for Detected Chlorpyrifos and Diazinon, 2009-September 2010 .....	10
Table 6. Compliance with Load Capacity Objectives for Detected Chlorpyrifos and Diazinon, 2009-September 2010 .....	11
Table 7. Summary of chlorpyrifos and diazinon exceedances in Coalition ILRP monitoring, 2005-2009 .....	15
Figure 1. Trends in Agricultural Use of Chlorpyrifos and Diazinon.....	14
Figure 2. Annual Exceedance Rates at TMDL Compliance Sites, 2005-2010.....	15

## A Introduction

The Sacramento Valley Water Quality Coalition (Coalition) submitted a Management Plan in December 2008 to address water quality impairments within the Coalition area. An additional requirement of the Management Plan is to document monitoring and management activities on behalf of members of the Coalition required by the Regional Board's Basin Plan Amendments for the Control of Diazinon and Chlorpyrifos Runoff into the Sacramento and Feather Rivers (Resolution No. R5-2007-0034) and the Sacramento-San Joaquin Delta (R5-2006-0061). The Basin Plan Amendments set forth Total Maximum Daily Load (TMDL) requirements for dischargers and require that dischargers comply with the monitoring and management criteria defined in the Basin Plan. An Addendum<sup>1</sup> to the Coalition's approved Management Plan addresses requirements for compliance with these TMDLs for chlorpyrifos and diazinon. The Addendum for TMDL compliance monitoring was developed in collaboration with ILRP Staff beginning in 2009, and was formally submitted to the Regional Water Board on April 30, 2010 as part of the *Management Plan Progress Report*. At the request of ILRP Staff it was resubmitted as a separate document on December 7, 2010 for approval by the Executive Officer of the Water Board. No formal review or approval of this monitoring document had been provided as of January 11, 2011. The following narrative documents the Coalition's planned activities to comply with the TMDL requirements.

In fulfillment of the requirements set forth in the Management Plan, the Sacramento Valley Water Quality Coalition (Coalition) is submitting this Annual Report summarizing the 2009-2010 monitoring objectives, locations and results, outreach efforts, and management practices effectiveness.

## B Background

The federal Clean Water Act requires each State to identify waters within its boundaries that are not currently meeting or maintaining water quality standards (33 USC 1313 (d)(1)). Water quality standards consist of the beneficial uses for which waterways are used and water quality objectives set at specified levels to maintain beneficial uses. The Sacramento and Feather Rivers were listed as impaired by diazinon in 1994 for the Sacramento and Feather Rivers by the Central Valley Regional Water Quality Control Board (Regional Board), in part due to an error in the data set used in the calculation of the water quality objective for diazinon.

Due to the 303(d) listing, the Regional Board adopted a total maximum daily load (TMDL) in accordance with the federal Clean Water Act (33 USC 1313 (d)(1)). Loads

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<sup>1</sup> Addendum to Sacramento Valley Water Quality Coalition Management Plan: Chlorpyrifos and Diazinon TMDLs. Sacramento Valley Water Quality Coalition, Sacramento, California. April 2010.

established in a TMDL are required to implement the applicable water quality standards with seasonal variations and a margin of safety (Id.). In addition to adopting a TMDL, the Regional Board also prepared and adopted a Basin Plan amendment that included new water quality objectives for diazinon and an implementation plan. The Basin Plan amendment was intended to establish an orchard runoff control program that focused on protecting the Sacramento and Feather Rivers from the impacts of diazinon.

More specifically, the Regional Board adopted (and the State Water Resources Control Board and U.S. EPA approved) diazinon water quality objectives of 0.080 µg/L as a 1-hour average (i.e. acute objective) and 0.050 µg/L as a 4-day average (i.e. chronic objective). At the time of adoption (and subsequently), questions were raised about the validity of the objectives and the studies from which the objectives were derived. As a result of subsequent litigation, the Regional Board committed to reviewing the objectives by July 1, 2007, and potentially amending the objectives by July 1, 2008. The Regional Board adopted new amendments to revise the diazinon objectives of 0.16 µg/L as a 1-hour average and 0.1 µg/L as a 4-day average (*Basin Plan Amendments to the Water Quality Control Plan For the Sacramento River and San Joaquin River Basins For The Control of Diazinon and Chlorpyrifos Runoff into the Sacramento and San Joaquin River Basins*). The previously approved Basin Plan amendment contained requirements for an Orchard Pesticide Runoff and Diazinon Runoff Control Program. As part of the Control Program, the Regional Board required dischargers of diazinon to submit a management plan that “describes actions that the discharger will take to reduce diazinon discharges and meet the applicable allocations by the required compliance date.” In lieu of individual plans, the Basin Plan amendment allows a discharger group or a coalition to submit management plans.

The Basin Plan amendments (R5-2007-0034 and R5-2006-0061) require dischargers, either individually or as a coalition, to submit a management plan that describes the actions that they will take to reduce chlorpyrifos and diazinon discharges and meet the applicable allocations by the required compliance dates. The Coalition’s Management Plan (SVWQC 2009) includes a process for source identification and identification of additional management practices that may be needed to achieve additional reductions in chlorpyrifos and diazinon discharges. Quarterly meetings are held with the Regional Water Board in order to evaluate progress in meeting these reductions, and revisions to the Management Plan will be made if sufficient progress is not being achieved.

The Coalition continues to monitor chlorpyrifos and diazinon according to the Coalition’s approved 2009 Monitoring and Reporting Program Plan (MRPP) Core and Assessment monitoring schedule and the SVWQC 2010-2014 MRP Order (CVRWQCB 2009). The monitoring locations are representative of discharges to the Sacramento River, Feather River, and Delta. This monitoring will continue to provide information on the wide range of discharges and hydrologic conditions likely to occur in the Sacramento Valley watershed and Delta. The Coalition’s Addendum to the Management Plan presents the technical rationale for selecting the representative monitoring locations for the TMDL compliance monitoring and for the schedule for chlorpyrifos and diazinon monitoring.

Additional monitoring beyond the routine MRPP Core and Assessment monitoring is conducted at existing Coalition monitoring sites in water bodies where at least one

exceedance has occurred and that are directly tributary to the affected TMDL water bodies. Coalition efforts in these subwatersheds will include but are not be limited to: (1) Continued monitoring at periods when peak pesticide application use occurs, (2) analysis of Pesticide Use Report (PUR) data, (3) holding subwatershed grower meetings, (4) continue to encourage and evaluate implementation of management practices, and (5) address the seven compliance components described in the Basin Plan and listed below in conjunction with other entities identified as potential sources of discharges. Additional activities addressing Basin Plan and MRP Order requirements for source identification, outreach, and management practice evaluation are described in the Coalition's Management Plan.

The Coalition's monitoring frequency and locations for chlorpyrifos and diazinon will be evaluated and updated in the form of an addendum or annual updates to the Management Plan, subject to approval of the Executive Officer of the Regional Water Quality Control Board.

## MONITORING OBJECTIVES

The purpose of the TMDL monitoring is to determine whether numeric water quality objectives for chlorpyrifos and diazinon contained in the *Basin Plan Amendment* are continuing to be met in the Sacramento and Feather rivers. Specifically, the *Basin Plan Amendment* identifies the following goals for compliance monitoring for the TMDL:

1. Determine compliance with established water quality objectives for chlorpyrifos and diazinon in the Sacramento and Feather Rivers and the Sacramento-San Joaquin Delta;
2. Determine compliance with established waste load allocations and load allocations for chlorpyrifos and diazinon ;
3. Determine the degree of implementation of management practices to reduce off-site migration of chlorpyrifos and diazinon ;
4. Determine the effectiveness of management practices and strategies to reduce off-site migration of chlorpyrifos and diazinon ;
5. Determine whether alternatives to chlorpyrifos and diazinon are causing surface water quality impacts;
6. Determine whether the discharge causes or contributes to a toxicity impairment due to additive or synergistic effects of multiple pollutants; and
7. Demonstrate that management practices are achieving the lowest pesticide levels technically and economically achievable.

Water quality monitoring results presented in this report address goals 1 and 2. Information relevant to Goals 3, 4, and 7 is also discussed this report. Adequate data are not yet available to address Goals 5 and 6 because these data are generated primarily during assessment monitoring (aquatic toxicity, and sediment toxicity and chemistry). Results from the Coalition Irrigated Lands Program monitoring will be used to address Goals 5 and 6 in the future.

## SAMPLING SITES

Coalition locations for monitoring of chlorpyrifos and diazinon for the TMDL are presented in Table 1. Compliance with TMDL objectives and loading capacity concentrations is assessed at the 14 sites identified as compliance sites. These sites were selected because they are within the TMDL watersheds, are tributary to the TMDL water bodies, and have minimal non-agricultural influences. The schedule of monitoring for organophosphate pesticides at these compliance sites is documented in the Coalition Addendum to the Management Plan. The seasonal timing of the Coalition's ILRP pesticide monitoring at individual sites is based on pesticide use patterns in each subwatershed, as characterized in the Coalition's approved 2009 MRPP. These schedules were retained for the TMDL monitoring in 2010 and 2011. Subsequent to the first year of TMDL monitoring in 2009, the need for continued compliance monitoring was determined based on the results of monitoring at each site. The same sampling schedule was continued in the following year if an exceedance was observed at a site. If no exceedances were observed, monitoring reverted to the assessment sampling schedule (every third year) established in the Coalition's approved 2009 MRPP and 2010 MRP.

**Table 1. Compliance Monitoring Sites for Diazinon Runoff Management Plan**

Location	Site ID	Subwatershed	Lat	Long	Delta, Sacramento, or Feather River Basin Subarea
Lower Snake R. at Nuestro Rd	LSNKR	ButteYubaSutter	39.1853	-121.7036	Feather River
Sacramento Slough bridge near Karnak	SSKNK	ButteYubaSutter	38.7850	-121.6533	Sac. River, Northern Delta
Gilsizer Sl. at G. Washington Rd	GILSL	ButteYubaSutter	39.0090	-121.6716	Sac. River
Lower Honcut Creek at Hwy 70	LHNCT	ButteYubaSutter	39.3092	-121.5954	Feather River
Pine Creek at Nord Gianelli Rd	PNCGR	ButteYubaSutter	39.7811	-121.9877	Sac. River
Colusa Drain above KL	COLDR	ColusaGlenn	38.8121	-121.7741	Sac River
Walker Creek at 99W and CR33	WLKCH	ColusaGlenn	39.6242	-122.1965	Sac River
Rough and Ready Pumping Plant	RARPP	ColusaGlenn	38.8621	-121.7927	NW Delta
Coon Creek at Striplin Rd	CCSTR	PNSSNS	38.8661	-121.5803	Sac River
Cosumnes River at Twin Cities Rd	CRTWN	SacramentoAmador	38.2910	-121.3804	Eastern Delta
Grand Island Drain near Leary Rd	GIDLR	SacramentoAmador	38.2399	-121.5649	Northern Delta
Shag Sl. At Liberty Island Bridge	SSLIB	SolanoYolo	38.3068	-121.6934	NW Delta
Willow Sl. Bypass at Pole Line	WLSPL	SolanoYolo	38.5902	-121.7306	NW Delta
Ulati Creek at Brown Road	UCBRD	SolanoYolo	38.3070	-121.7940	NW Delta



## C Monitoring Results

All TMDL data through September 2010 have been previously submitted to the Regional Water Quality Control Board as required by the ILRP. A complete set of relevant monitoring data for compliance sites for 2005 through September 2010 is also provided in Appendix A.

### DATA INTERPRETATION

#### Assessment Of Data Quality Objectives

The data quality objectives for the TMDL monitoring effort are described in the Coalition's QAPP for the ILRP program. All quality assurance for TMDL compliance monitoring is integrated into the Coalition's ILRP monitoring program. These results have been submitted to the Water Quality Control Board on a quarterly basis as required by the ILRP.

Representativeness of the data collected was assured by selection of appropriate sampling and analytical methods. There was no deviation from the standard operating procedures specified in the QAPP, and the data are considered adequately representative for the purpose of the compliance monitoring program. Analytical precision is assessed by analyzing laboratory-prepared matrix spike duplicates, and sampling precision is assessed by analyzing field-collected sample replicates. Analytical accuracy is assessed by routine calibration and analysis of laboratory-prepared matrix and by addition of surrogate organic compounds to sample matrices. Based on the results of field and laboratory QA analyses, precision and accuracy met program data quality objectives and were adequate for the purposes of the monitoring compliance program.

*Completeness* is defined as the percent of planned data that was successfully collected and analyzed. Completeness for planned chlorpyrifos and diazinon analyses was 96% for 2009 and 2010 overall (Table 2). All planned TMDL compliance parameters were successfully collected and analyzed, with the following exceptions.

- Three samples were planned for Walker Creek in 2010 due to an exceedance observed late in 2009, but were not collected due to an error in updating the sample plans. All planned samples were collected in 2009. Walker Creek was not included as a compliance site in early Addendum drafts. Compliance samples will be collected at this site in 2011 as part of the scheduled assessment monitoring.
- The schedule for Lower Snake River was modified to collect compliance samples in September and October in 2010, and the October data are not due to be submitted to the Water Quality Control Board until March 2011.
- Flow measurements could not be collected for all sites and events due to site access or site conditions during some events. This prevented calculation of loads for 2 chlorpyrifos detections and one diazinon detection in Shag Slough, and for three diazinon detections at three different sites. Loads were successfully characterized for 142 of 148 total TMDL compliance results for 2009-2010 (96%).

**Table 2. TMDL Compliance Sampling Completeness Summary**

Compliance Site	2009		2010		Total		Note
	Planned	Collected	Planned	Collected	Planned	Collected	
Colusa Basin Drain above KL	0	0	6	6	6	6	
Coon Creek at Striplin Road	5	5	0	0	5	5	
Cosumnes River at Twin Cities Rd	0	0	4	4	4	4	
Gilsizer Slough at George Washington Road	2	2	2	2	4	4	
Grand Island Drain near Leary Road	0	0	4	4	4	4	
Lower Honcut Creek	8	8	0	0	8	8	
Lower Snake R. at Nuestro Rd	0	0	1	1	1	1	(1)
Pine Creek at Nord Gianella Road	2	2	0	0	2	2	
Rough and Ready Pumping Plant (RD 108)	0	0	7	7	7	7	
Sacramento Slough bridge near Karnak	0	0	2	2	2	2	
Shag Slough at Liberty Island Bridge	0	0	8	8	8	8	
Ulatis Creek at Brown Road	7	7	0	0	7	7	
Walker Creek near 99W and CR33	8	8	3	0	11	8	(2)
Willow Slough Bypass at Pole Line	5	5	3	3	8	8	
<i>Totals</i>	37	37	40	37	77	74	
<i>Percent Completeness</i>		100%		93%		96%	

(1) Planned sampling was rescheduled to September-October to better characterize seasonal chlorpyrifos use on orchard crops.

(2) Added as a TMDL compliance site for 2010, but not monitored due to an error in updating the sample plans. All planned samples were collected in 2009. Walker Creek was not included as a compliance site in early Addendum drafts.

### Comparison with TMDL Objectives and Discussion of Exceedances

A summary of the results of the analyses of water quality samples collected 2009 through September 2010 for TMDL compliance monitoring are presented in Table 3 and Table 4.

Instantaneous loads were also calculated for all compliance sites. Loads were calculated as:

$$Load = Q \times C \times UCF$$

Where, *Load* is the instantaneous load expressed in g/day,

*Q* = instantaneous discharge in CFS

*C* = sample chlorpyrifos or diazinon concentration, in µg/L, and

*UCF* = a unit conversion factor of 2.4446.

Loads for all detected concentrations are provided in Table 5.

**Table 3. Summary of TMDL Monitoring Results For Chlorpyrifos**

Compliance Site	2009		JAN-SEP 2010		2009 – Sep 2010	
	>WQO	Samples	>WQO	Samples	>WQO	Total Samples
Colusa Basin Drain above KL		–		6		6
Coon Creek at Striplin Road		5		–		5
Cosumnes River at Twin Cities Rd		–		4		4
Gilsizer Slough at George Washington Road		2		2		4
Grand Island Drain near Leary Road		–	1	4	1	4
Lower Honcut Creek		8		–		8
Lower Snake R. at Nuestro Rd		–		1		1
Pine Creek at Nord Gianella Road		2		–		2
Rough and Ready Pumping Plant (RD 108)		–		7		7
Sacramento Slough bridge near Karnak		–		2		2
Shag Slough at Liberty Island Bridge		–	1	8	1	8
Ulati Creek at Brown Road		7		–		7
Walker Creek near 99W and CR33	1	8		–	1	8
Willow Slough Bypass at Pole Line		5	1	3	1	8
<i>Totals</i>	1	37	3	37	4	74

**Table 4. Summary of TMDL Monitoring Results For Diazinon**

Compliance Site	2009		2010		2009 – Sep 2010	
	>WQO	Total Samples	>WQO	Total Samples	>WQO	Total Samples
Colusa Basin Drain above KL		–		6		6
Coon Creek at Striplin Road		5		–		5
Cosumnes River at Twin Cities Rd		–		4		4
Gilsizer Slough at George Washington Road	1	2		2	1	4
Grand Island Drain near Leary Road		–		4		4
Lower Honcut Creek		8		–		8
Lower Snake R. at Nuestro Rd		–		1		1
Pine Creek at Nord Gianella Road		2		–		2
Rough and Ready Pumping Plant (RD 108)		–		7		7
Sacramento Slough bridge near Karnak		–		2		2
Shag Slough at Liberty Island Bridge		–		8		8
Ulati Creek at Brown Road		7		–		7
Walker Creek near 99W and CR33		8		–		8
Willow Slough Bypass at Pole Line		5		3		8
<i>Totals</i>	1	37	0	37	1	74

### **Compliance with Concentration-Based and Load-Based TMDL Objectives**

Concentrations of chlorpyrifos and diazinon were compared to the adopted Basin Plan Amendment objectives for the Sacramento and Feather rivers and Delta. All detected concentrations are presented in Table 5.

Chlorpyrifos was detected in 9 of 74 samples (12%) collected at the 14 compliance monitoring locations. Four samples (5.4% of samples) exceeded the adopted Basin Plan Amendment 4-day objective for chlorpyrifos (0.015 µg/L) and three of these samples exceeded the 1-hour objective (0.025 µg/L). One of the four exceedances occurred at Walker Creek in July 2009. Three of the four exceedances occurred in 2010 (Grand Island Drain in January, Willow Slough in March, and Shag Slough in May).

Diazinon was detected in 11 of 74 samples (15%) collected at the 14 compliance monitoring locations. Only one sample exceeded the adopted Basin Plan Amendment 4-day and 1-hour objectives for diazinon (0.16 µg/L and 0.1 µg/L, respectively), representing 1.5% of the total samples collected. None of the other samples exceeded either diazinon objective.

The Basin Plan TMDL Amendments also implement measures designed to address the additive toxicity of chlorpyrifos and diazinon. Compliance with the TMDL Load Allocations for nonpoint sources was determined using the methodology outlined in the Basin Plan Amendments for Control of Diazinon and Chlorpyrifos Runoff (Resolutions R5-2007-0034 and R5-2006-0061). This methodology takes into account the additive effects of chlorpyrifos and diazinon. Compliance was calculated using the following equation:

$$S = \frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$

Where the loading concentration may not exceed the (*S*)um of one (1.0),

$C_D$  = diazinon concentration in µg/L; analytical results reported as “nondetectable” concentrations are considered to be zero

$C_C$  = chlorpyrifos concentration in µg/L; analytical results reported as “nondetectable” concentrations are considered to be zero

$WQO_D$  = 1-hour or 4-day average diazinon water quality objective in µg/L

$WQO_C$  = 1-hour or 4-day average chlorpyrifos water quality objective in µg/L

Each of the five samples that exceeded the individual TMDL concentration objectives for chlorpyrifos and diazinon also exceeded the 4-day TMDL Load Allocation based on combined toxic units, and four of the samples also exceeded the 1-hour TMDL Load Allocation (Table 6).

**Table 5. Load Estimates for Detected Chlorpyrifos and Diazinon, 2009-September 2010**

Site ID	Water Body	Sample Date	Discharge, CFS	Concentrations, ug/L		Instantaneous Loads, g/day		Notes
				Chlorpyrifos	Diazinon	Chlorpyrifos	Diazinon	
COLDR	Colusa Basin Drain	1/20/10	2255.2	ND	0.057	0	315.35	(1)
GIDLR	Grand Island Drain	1/19/10	0	0.119	0.006	0	0	(2, 3)
GILSL	Gilsizer Slough	1/27/09	0	ND	0.600	0	0	(2, 3)
GILSL	Gilsizer Slough	2/18/09	3.21	ND	0.093	0	0.73	(1)
GILSL	Gilsizer Slough	1/19/10	0	ND	0.063	0	0	(1, 3)
GILSL	Gilsizer Slough	2/17/10	0	ND	0.018	0	0	(1, 3)
LHNCT	Lower Honcut Creek	1/27/09	NM	ND	0.010	0	NM	(1, 5)
PNCGR	Pine Creek	6/18/09	0	0.013	ND	0	0	(1, 3)
RARPP	Rough and Ready PP	3/17/10	4.77	0.011	ND	0.13	0	(1)
SSKNK	Sacramento Slough	1/20/10	NM	ND	0.027	0	NM	(1, 5)
SSLIB	Shag Slough	2/16/10	NM	ND	0.010	0	NM	(1, 4)
SSLIB	Shag Slough	5/18/10	NM	0.0271	ND	NM	0	(2, 4)
SSLIB	Shag Slough	6/15/10	NM	0.002	ND	NM	0	(1, 4)
WLKCH	Walker Creek	6/18/09	0	0.014	ND	0	0	(1, 3)
WLKCH	Walker Creek	7/22/09	0	0.022	ND	0	0	(2, 3)
WLSPL	Willow Slough	1/26/09	0.24	ND	0.007	0	0.0042	(1)
WLSPL	Willow Slough	1/19/10	NM	ND	0.014	0	NM	(1, 5)
WLSPL	Willow Slough	3/16/10	2.21	0.152	ND	0.82	0	(2)
WLSPL	Willow Slough	5/18/10	14.19	0.010	ND	0.35	0	(1)

Notes: Exceedances of TMDL concentration objectives are highlighted;

(1) Concentrations were below WQO; No contribution to exceedances;

(2) Concentrations exceeded WQO;

(3) No measureable flow;

(4) Unable to measure flows at this site;

(5) Conditions unsafe to measure flows;

**Table 6. Compliance with Load Capacity Objectives for Detected Chlorpyrifos and Diazinon, 2009-September 2010**

Site ID	Water Body	Sample Date	Discharge, CFS	Concentration, ug/L		Load Allocation Compliance <sup>(1)</sup>		
				Chlorpyrifos	Diazinon	1-Hour	4-Day Average	Notes
COLDR	Colusa Basin Drain	1/20/10	2255	ND	0.057	0.36	0.57	(2)
GIDLR	Grand Island Drain	1/19/10	0	0.119	0.006	4.80	8.01	(3, 4)
GILSL	Gilsizer Slough	1/27/09	0	ND	0.601	3.75	6.01	(3, 4)
GILSL	Gilsizer Slough	2/18/09	3.21	ND	0.093	0.58	0.93	(2)
GILSL	Gilsizer Slough	1/19/10	0	ND	0.063	0.39	0.63	(2)
GILSL	Gilsizer Slough	2/17/10	0	ND	0.018	0.11	0.18	(2)
LHNCT	Lower Honcut Creek	1/27/09	NM	ND	0.010	0.06	0.10	(2)
PNCGR	Pine Creek	6/18/09	0	0.013	ND	0.53	0.88	(2)
RARPP	Rough and Ready PP	3/17/10	4.77	0.011	ND	0.44	0.74	(2)
SSKNK	Sacramento Slough	1/20/10	NM	ND	0.027	0.17	0.27	(2)
SSLIB	Shag Slough	2/16/10	NM	ND	0.010	0.06	0.10	(2)
SSLIB	Shag Slough	5/18/10	NM	0.027	ND	1.08	1.81	(3)
SSLIB	Shag Slough	6/15/10	NM	0.002	ND	0.10	0.17	(2)
WLKCH	Walker Creek	6/18/09	0	0.014	ND	0.55	0.91	(2)
WLKCH	Walker Creek	7/22/09	0	0.022	ND	0.87	1.45	(5, 4)
WLSPL	Willow Slough Bypass	1/26/09	0.24	ND	0.007	0.04	0.07	(2)
WLSPL	Willow Slough BP	1/19/10	NM	ND	0.014	0.09	0.14	(2)
WLSPL	Willow Slough BP	3/16/10	2.21	0.152	ND	6.08	10.14	(3)
WLSPL	Willow Slough BP	5/18/10	14.2	0.010	ND	0.40	0.67	(2)

## Notes:

- (1) Exceedances of TMDL load allocations are highlighted; Compliance is assessed based on the sum of chlorpyrifos and diazinon toxic units; Exceedances are indicated for values greater than 1.0 (highlighted values).
- (2) Concentrations were below WQO; No contribution to exceedances;
- (3) Concentrations exceeded WQO;
- (4) No measureable flow;
- (5) Concentrations exceeded 4-day average based Load Allocation;

## D Discussion

The California Department of Pesticide Regulation has documented the decline in use of insecticide organophosphate chemicals, including chlorpyrifos and diazinon, for nearly every year since 1995. Statewide diazinon use decreased by 63% and chlorpyrifos use decreased by 65% from 1997 to 2007<sup>2,3</sup>. In the five Coalition subwatersheds in the TMDL compliance region (Butte-Yuba-Sutter; Glenn-Colusa; Placer-Nevada-South Sutter-North Sacramento; Sacramento-Amador; Solano-Yolo), similar decreases are also evident for diazinon, but the pattern is somewhat different for chlorpyrifos. As illustrated in Figure 1, agricultural diazinon use decreased by about 70% in these five subwatersheds from 1999-2009. However, chlorpyrifos use in the region increased from 1999 to 2005 and has since decreased approximately to 1999 levels. The period of decrease in chlorpyrifos use coincides with the monitoring timeframe of the ILRP.

From 2005 through September 2010, there have been 274 samples collected for the ILRP and analyzed for chlorpyrifos and diazinon at the 14 compliance sites. Results for Coalition ILRP monitoring at TMDL compliance sites are summarized in Table 7. There have been a total of only 19 exceedances of chlorpyrifos and diazinon (approximately 7% of samples) observed in Coalition ILRP monitoring at the TMDL compliance sites. Of the 19 total exceedances, 15 have been for chlorpyrifos (~5.5% of total samples) and 4 have been for diazinon (~1.5% of total samples). These exceedances have been observed at 9 of 14 compliance sites, with only 4 sites having more than one exceedance. At 5 of the sites identified as compliance sites, there have been no exceedances observed in ILRP monitoring. In 2009-September 2010 TMDL compliance monitoring, there were 5 exceedances of 74 samples, at 5 different sites. The rates of exceedance have been highly variable from year to year, and although the longer trend appears to be a decrease in exceedances, the rates of exceedance are essentially the same for 2005-2008 and 2009-2010 at the compliance sites.

In separate TMDL monitoring conducted previously by the Coalition, there were 2 diazinon exceedances observed at one of the compliance sites (Colusa Drain) in 2008 TMDL monitoring conducted by the Coalition<sup>4</sup> and no exceedances observed in previous monitoring in 2006 and 2007. Chlorpyrifos was not detected in any TMDL sample collected from the five TMDL monitoring locations sampled from 2006-2008 (Sacramento River at Colusa, Colusa Basin Drain above Knight's Landing, Sacramento Slough, Feather River above Yuba City, and Feather River near Verona). Although two diazinon exceedances were observed in 2008, the majority of the 95 samples collected from 2006 through 2008 and all of the 21 concentrations estimated at the Sacramento

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<sup>2</sup> <http://www.cdpr.ca.gov/docs/pur/pur06rep/trends06.pdf>, California Department of Pesticide Regulation, 2007

<sup>3</sup> [http://www.cdpr.ca.gov/docs/pur/pur07rep/top100\\_ais.pdf](http://www.cdpr.ca.gov/docs/pur/pur07rep/top100_ais.pdf), California Department of Pesticide Regulation, 2008

<sup>4</sup> Diazinon Runoff Management Plan For Orchard Growers In the Sacramento Valley: 2008 Annual Report. Sacramento Valley Water Quality Coalition. June 2008.



River at Verona were in compliance with the TMDL objectives. The overall monitoring results for the Sacramento and Feather River diazinon TMDL indicate that the combination of outreach and education, the resulting changes in diazinon use patterns and changes in management practices, and the modifications to labeling have been successful in reducing instream ambient chlorpyrifos and diazinon concentrations and loads below the historically observed levels that resulted in listing the Sacramento River and Feather River as impaired for chlorpyrifos and diazinon. The relatively low rate of exceedances observed in the current TMDL compliance monitoring of the tributaries to these water bodies further indicates that the TMDL objectives will continue to be met.

Changes that were implemented in Yolo County to make chlorpyrifos and diazinon restricted materials have also proven successful in further increasing compliance. ILRP monitoring conducted at Yolo County sites since the implementation in 2007 of these additional label and use restriction restrictions have resulted in only two additional exceedances in a total of 65 samples at 4 different sites sampled in the Solano–Yolo subwatershed (Willow Slough, Cache Creek, Ulatis Creek, and Shag Slough). The exceedances occurred at Shag Slough and Willow Slough.

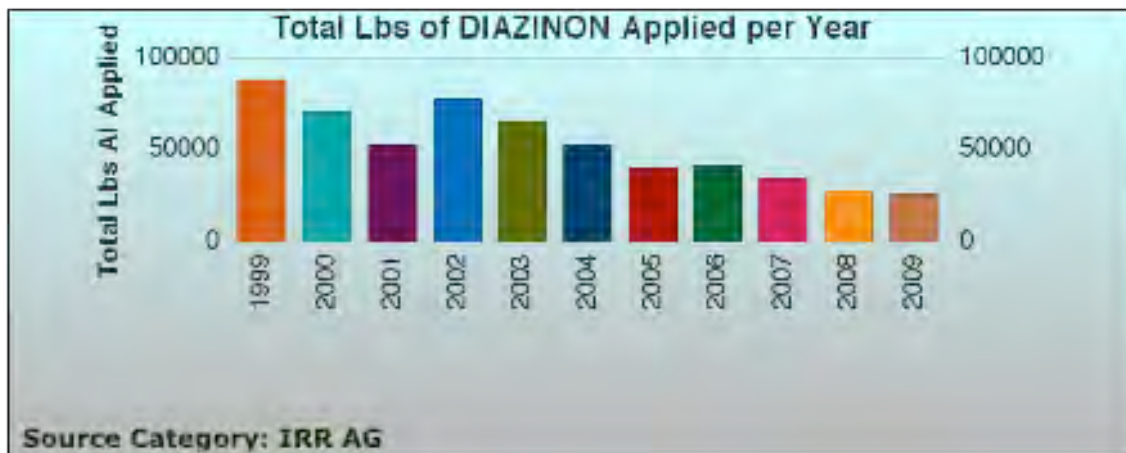
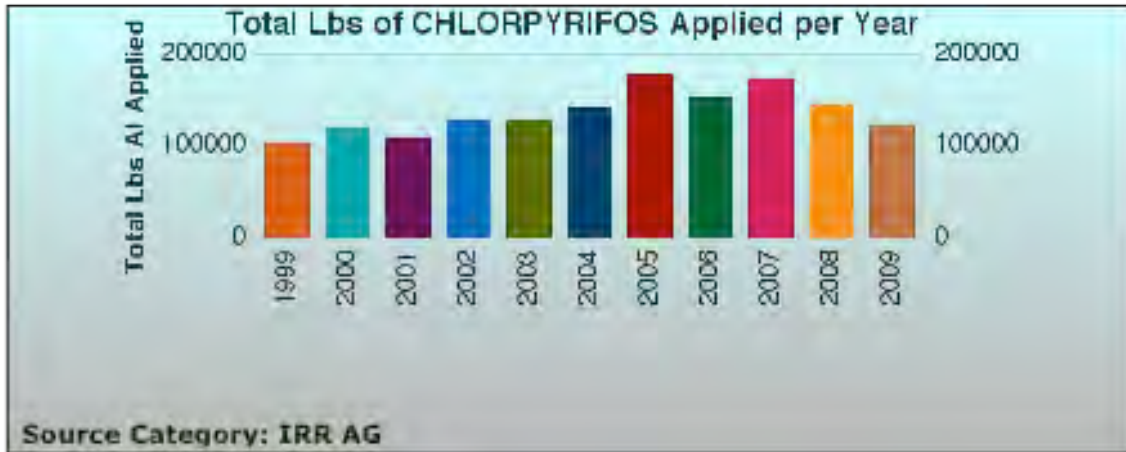
## E Summary

Based on the results of ILRP and TMDL monitoring, compliance with the TMDL water quality objectives and load allocations is achieved in the overwhelming percentage of samples. These results demonstrate that outreach and education, the resulting changes in diazinon use patterns and changes in management practices, and modifications to labeling have been successful in reducing instream ambient concentrations of chlorpyrifos and diazinon to the degree required by the TMDL. The relatively low rate of exceedances since the beginning of the ILRP suggest that much of the changes were successfully implemented prior to or soon after 2005. Although exceedances are still being observed, the overall trend from 2005-2010 has been a decrease in the rate of annual exceedances (Figure 2).

Continuing efforts to further reduce exceedances are being implemented through the Coalition Management Plan for sites that have triggered the Management Plan requirement for these pesticides. Additionally, the Coalition aggressively investigates all exceedances and conducts follow-up contacts with growers reporting applications with the potential to cause specific observed exceedances. These combined efforts are expected to continue the decreasing trend in the number of exceedances for these pesticide.

**Figure 1. Trends in Agricultural Use of Chlorpyrifos and Diazinon**

Data are for the five Coalition subwatersheds in the TMDL compliance region (Butte-Yuba-Sutter; Glenn-Colusa; Placer-Nevada-South Sutter-North Sacramento; Sacramento-Amador; Solano-Yolo) from California Department of Pesticide Regulation PUR Database.



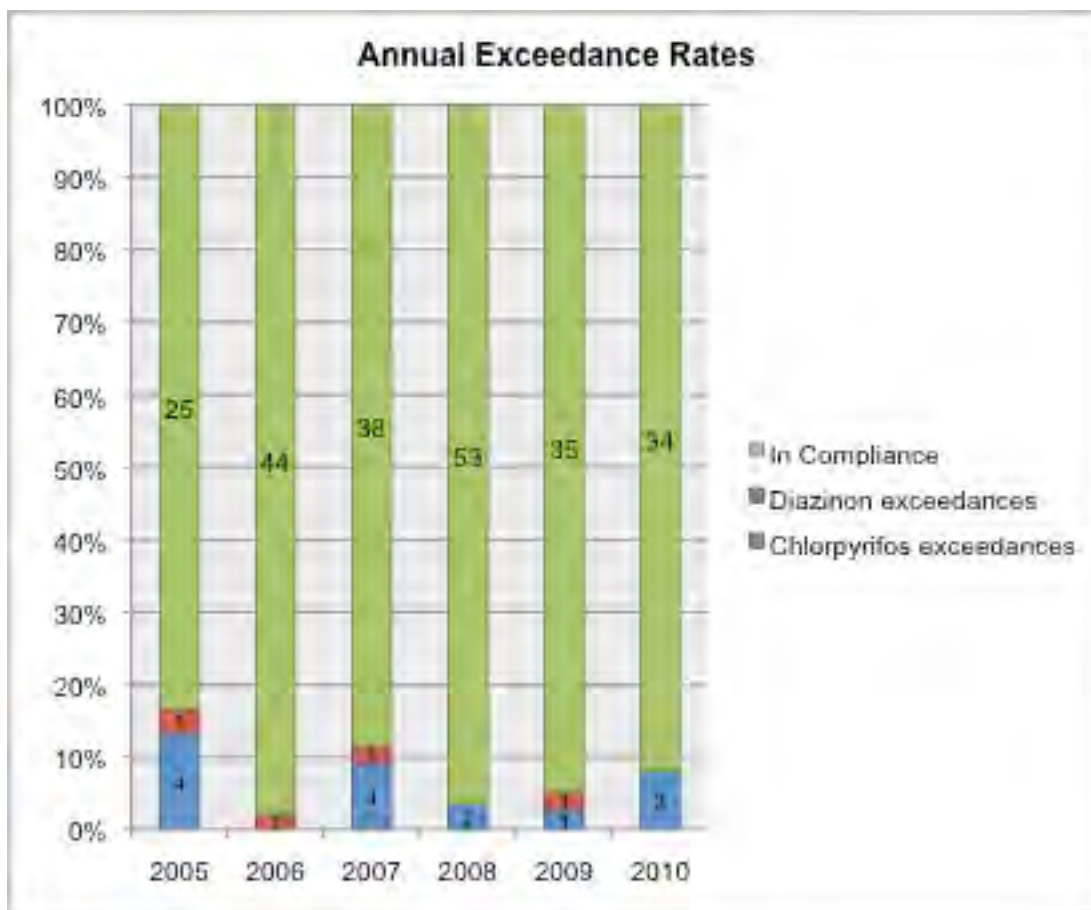
**Table 7. Summary of Chlorpyrifos and Diazinon Exceedances in Coalition ILRP Monitoring, 2005-2009**

Data for Coalition subwatersheds in the TMDL region (Butte-Yuba-Sutter, Colusa-Glenn, Placer-Nevada-S.Sutter-N.Sacramento, Sacramento-Amador, Solano-Yolo)

	Exceedances	Non-Exceedances	Total Samples
<b>Chlorpyrifos</b>	15	259	274
<b>Diazinon</b>	4	269	274

**Figure 2. Annual Exceedance Rates at TMDL Compliance Sites, 2005-2010**

Annual exceedance rates are calculated as the number of exceedances for each pesticide divided by the total number of samples analyzed for the year. Value labels indicate actual number of samples in compliance or exceedances for each pesticide.



## Appendix A

### **CHLORPYRIFOS AND DIAZINON TMDL MONITORING RESULTS, JANUARY 2009 – SEPTEMBER 2010.**

Appendix A: TMDL Compliance Monitoring Data, 2009-2010

Site Name	Replicate	Sample Date	Analyte Category	Method	Analyte	Fraction	Result	Result Qual Code	MDL	RL	Unit
Colusa Basin Drain above KL	1	1/20/10	Physical	FieldMeasure	Discharge	NA	2255.21	=	-88	-88	CFS
Colusa Basin Drain above KL	1	1/20/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Colusa Basin Drain above KL	1	1/20/10	Pesticide	EPA 625	Diazinon	UNFILTERED	0.0572	=	0.002	0.004	µg/L
Colusa Basin Drain above KL	1	2/17/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Colusa Basin Drain above KL	1	2/17/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Colusa Basin Drain above KL	1	2/17/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Colusa Basin Drain above KL	1	3/17/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Colusa Basin Drain above KL	1	4/21/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Colusa Basin Drain above KL	1	4/21/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Colusa Basin Drain above KL	1	4/21/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Colusa Basin Drain above KL	1	5/18/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Colusa Basin Drain above KL	1	6/16/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Colusa Basin Drain above KL	1	6/16/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Colusa Basin Drain above KL	1	6/16/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Colusa Basin Drain above KL	1	7/20/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.00103	ND	0.00103	0.00205	µg/L
Colusa Basin Drain above KL	1	7/20/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.00205	ND	0.00205	0.0041	µg/L
Colusa Basin Drain above KL	1	7/20/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Colusa Basin Drain above KL	1	8/24/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.00103	ND	0.00103	0.00205	µg/L
Colusa Basin Drain above KL	1	8/24/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.00205	ND	0.00205	0.0041	µg/L
Colusa Basin Drain above KL	1	8/24/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Colusa Basin Drain above KL	1	9/21/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Coon Creek at Striplin Road	1	5/19/09	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Coon Creek at Striplin Road	1	5/19/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Coon Creek at Striplin Road	1	5/19/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Coon Creek at Striplin Road	1	6/16/09	Physical	FieldMeasure	Discharge	NA	5.66	=	-88	-88	CFS
Coon Creek at Striplin Road	1	6/16/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Coon Creek at Striplin Road	2	6/16/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Coon Creek at Striplin Road	1	6/16/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Coon Creek at Striplin Road	2	6/16/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Coon Creek at Striplin Road	1	7/21/09	Physical	FieldMeasure	Discharge	NA	4	=	-88	-88	CFS
Coon Creek at Striplin Road	1	7/21/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Coon Creek at Striplin Road	1	7/21/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Coon Creek at Striplin Road	1	8/18/09	Physical	FieldMeasure	Discharge	NA	3.27	=	-88	-88	CFS
Coon Creek at Striplin Road	1	8/18/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Coon Creek at Striplin Road	2	8/18/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Coon Creek at Striplin Road	1	8/18/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Coon Creek at Striplin Road	2	8/18/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Coon Creek at Striplin Road	1	9/22/09	Physical	FieldMeasure	Discharge	NA	8.86	=	-88	-88	CFS
Coon Creek at Striplin Road	1	9/22/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Coon Creek at Striplin Road	1	9/22/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Cosumnes River at Twin Cities Rd	1	1/19/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Cosumnes River at Twin Cities Rd	1	1/19/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Cosumnes River at Twin Cities Rd	1	1/19/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Cosumnes River at Twin Cities Rd	1	2/16/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Cosumnes River at Twin Cities Rd	1	2/16/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Cosumnes River at Twin Cities Rd	1	2/16/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L

Appendix A: TMDL Compliance Monitoring Data, 2009-2010

Site Name	Replicate	Sample Date	Analyte Category	Method	Analyte	Fraction	Result	Result Qual Code	MDL	RL	Unit
Cosumnes River at Twin Cities Rd	1	3/16/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Cosumnes River at Twin Cities Rd	1	3/16/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Cosumnes River at Twin Cities Rd	2	3/16/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Cosumnes River at Twin Cities Rd	1	3/16/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Cosumnes River at Twin Cities Rd	2	3/16/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Cosumnes River at Twin Cities Rd	1	4/20/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Cosumnes River at Twin Cities Rd	1	4/20/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Cosumnes River at Twin Cities Rd	1	4/20/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Cosumnes River at Twin Cities Rd	1	5/18/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Cosumnes River at Twin Cities Rd	1	6/15/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Cosumnes River at Twin Cities Rd	1	7/20/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Gilsizer Slough at George Washington Road	1	1/27/09	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Gilsizer Slough at George Washington Road	1	1/27/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Gilsizer Slough at George Washington Road	1	1/27/09	Pesticide	EPA 625	Diazinon	UNFILTERED	0.6007	=	0.002	0.004	µg/L
Gilsizer Slough at George Washington Road	1	2/18/09	Physical	FieldMeasure	Discharge	NA	3.21	=	-88	-88	CFS
Gilsizer Slough at George Washington Road	1	2/18/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Gilsizer Slough at George Washington Road	1	2/18/09	Pesticide	EPA 625	Diazinon	UNFILTERED	0.0931	=	0.002	0.004	µg/L
Gilsizer Slough at George Washington Road	1	6/16/09	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Gilsizer Slough at George Washington Road	1	1/21/10	Pesticide	EPA 625	Chlorpyrifos	NA	-0.001	=	0.001	0.002	µg/L
Gilsizer Slough at George Washington Road	1	1/21/10	Pesticide	EPA 625	Diazinon	NA	0.0628	=	0.002	0.004	µg/L
Gilsizer Slough at George Washington Road	1	1/21/10	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Gilsizer Slough at George Washington Road	1	2/17/10	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Gilsizer Slough at George Washington Road	1	2/17/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Gilsizer Slough at George Washington Road	1	2/17/10	Pesticide	EPA 625	Diazinon	UNFILTERED	0.0175	=	0.002	0.004	µg/L
Grand Island Drain near Leary Road	1	1/19/10	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Grand Island Drain near Leary Road	1	1/19/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	0.1192	=	0.001	0.002	µg/L
Grand Island Drain near Leary Road	1	1/19/10	Pesticide	EPA 625	Diazinon	UNFILTERED	0.0059	=	0.002	0.004	µg/L
Grand Island Drain near Leary Road	1	2/16/10	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Grand Island Drain near Leary Road	1	2/16/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Grand Island Drain near Leary Road	1	2/16/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Grand Island Drain near Leary Road	1	3/16/10	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Grand Island Drain near Leary Road	1	3/16/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Grand Island Drain near Leary Road	1	3/16/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Grand Island Drain near Leary Road	1	4/20/10	Physical	FieldMeasure	Discharge	NA	29.79	=	-88	-88	CFS
Grand Island Drain near Leary Road	1	4/20/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Grand Island Drain near Leary Road	1	4/20/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Grand Island Drain near Leary Road	1	5/18/10	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Grand Island Drain near Leary Road	1	6/15/10	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Grand Island Drain near Leary Road	1	7/20/10	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Grand Island Drain near Leary Road	1	8/17/10	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Grand Island Drain near Leary Road	1	9/23/10	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	1/27/09	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	1/27/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Lower Honcut Creek at Hwy 70	1	1/27/09	Pesticide	EPA 625	Diazinon	UNFILTERED	0.0103	=	0.002	0.004	µg/L
Lower Honcut Creek at Hwy 70	1	2/18/09	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	2/18/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L

Appendix A: TMDL Compliance Monitoring Data, 2009-2010

Site Name	Replicate	Sample Date	Analyte Category	Method	Analyte	Fraction	Result	Result Qual Code	MDL	RL	Unit
Lower Honcut Creek at Hwy 70	1	2/18/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Lower Honcut Creek at Hwy 70	1	3/17/09	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	4/21/09	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	5/19/09	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	5/19/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Lower Honcut Creek at Hwy 70	1	5/19/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Lower Honcut Creek at Hwy 70	1	6/16/09	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	6/16/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Lower Honcut Creek at Hwy 70	1	6/16/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Lower Honcut Creek at Hwy 70	1	7/21/09	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	7/21/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Lower Honcut Creek at Hwy 70	1	7/21/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Lower Honcut Creek at Hwy 70	1	8/18/09	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	8/18/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Lower Honcut Creek at Hwy 70	1	8/18/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Lower Honcut Creek at Hwy 70	1	9/22/09	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	9/22/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Lower Honcut Creek at Hwy 70	2	9/22/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Lower Honcut Creek at Hwy 70	1	9/22/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Lower Honcut Creek at Hwy 70	2	9/22/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Lower Honcut Creek at Hwy 70	1	10/20/09	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	11/17/09	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	12/16/09	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Lower Honcut Creek at Hwy 70	1	12/16/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Lower Honcut Creek at Hwy 70	2	12/16/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Lower Honcut Creek at Hwy 70	1	12/16/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Lower Honcut Creek at Hwy 70	2	12/16/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Lower Snake R. at Nuestro Rd	1	9/22/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.000975	ND	0.000975	0.00195	µg/L
Lower Snake R. at Nuestro Rd	1	9/22/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.00195	ND	0.00195	0.0039	µg/L
Lower Snake R. at Nuestro Rd	1	9/22/10	Physical	FieldMeasure	Discharge	NA	129.9 =		-88	-88	CFS
Pine Creek at Nord Gianella Road	1	5/20/09	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Pine Creek at Nord Gianella Road	1	5/20/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Pine Creek at Nord Gianella Road	1	5/20/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Pine Creek at Nord Gianella Road	1	6/18/09	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Pine Creek at Nord Gianella Road	1	6/18/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	0.0132 =		0.001	0.002	µg/L
Pine Creek at Nord Gianella Road	1	6/18/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Rough and Ready Pumping Plant (RD 108)	1	1/19/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Rough and Ready Pumping Plant (RD 108)	1	1/19/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Rough and Ready Pumping Plant (RD 108)	2	1/19/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Rough and Ready Pumping Plant (RD 108)	1	1/19/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Rough and Ready Pumping Plant (RD 108)	2	1/19/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Rough and Ready Pumping Plant (RD 108)	1	2/16/10	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Rough and Ready Pumping Plant (RD 108)	1	2/16/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Rough and Ready Pumping Plant (RD 108)	1	2/16/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Rough and Ready Pumping Plant (RD 108)	1	3/17/10	Physical	FieldMeasure	Discharge	NA	4.77 =		-88	-88	CFS
Rough and Ready Pumping Plant (RD 108)	1	3/17/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	0.0111 =		0.001	0.002	µg/L

Appendix A: TMDL Compliance Monitoring Data, 2009-2010

Site Name	Replicate	Sample Date	Analyte Category	Method	Analyte	Fraction	Result	Result Qual Code	MDL	RL	Unit
Rough and Ready Pumping Plant (RD 108)	1	3/17/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Rough and Ready Pumping Plant (RD 108)	1	4/21/10	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Rough and Ready Pumping Plant (RD 108)	1	4/21/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Rough and Ready Pumping Plant (RD 108)	1	4/21/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Rough and Ready Pumping Plant (RD 108)	1	5/19/10	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Rough and Ready Pumping Plant (RD 108)	1	5/19/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Rough and Ready Pumping Plant (RD 108)	1	5/19/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Rough and Ready Pumping Plant (RD 108)	1	6/15/10	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Rough and Ready Pumping Plant (RD 108)	1	6/15/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Rough and Ready Pumping Plant (RD 108)	2	6/15/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Rough and Ready Pumping Plant (RD 108)	1	6/15/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Rough and Ready Pumping Plant (RD 108)	2	6/15/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Rough and Ready Pumping Plant (RD 108)	1	7/20/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.00101	ND	0.00101	0.00202	µg/L
Rough and Ready Pumping Plant (RD 108)	2	7/20/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.00102	ND	0.00102	0.00204	µg/L
Rough and Ready Pumping Plant (RD 108)	1	7/20/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.00202	ND	0.00202	0.00404	µg/L
Rough and Ready Pumping Plant (RD 108)	2	7/20/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.00204	ND	0.00204	0.00408	µg/L
Rough and Ready Pumping Plant (RD 108)	1	7/20/10	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Rough and Ready Pumping Plant (RD 108)	1	8/17/10	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Sacramento Slough bridge near Karnak	1	1/20/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Sacramento Slough bridge near Karnak	1	1/20/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Sacramento Slough bridge near Karnak	1	1/20/10	Pesticide	EPA 625	Diazinon	UNFILTERED	0.0269	=	0.002	0.004	µg/L
Sacramento Slough bridge near Karnak	1	2/17/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Sacramento Slough bridge near Karnak	1	2/17/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Sacramento Slough bridge near Karnak	1	2/17/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Shag Slough at Liberty Island Bridge	1	1/19/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Shag Slough at Liberty Island Bridge	1	1/19/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Shag Slough at Liberty Island Bridge	1	1/19/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Shag Slough at Liberty Island Bridge	1	2/16/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Shag Slough at Liberty Island Bridge	2	2/16/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Shag Slough at Liberty Island Bridge	1	2/16/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Shag Slough at Liberty Island Bridge	2	2/16/10	Pesticide	EPA 625	Diazinon	UNFILTERED	0.0099	=	0.002	0.004	µg/L
Shag Slough at Liberty Island Bridge	1	2/16/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Shag Slough at Liberty Island Bridge	1	3/16/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Shag Slough at Liberty Island Bridge	1	3/16/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Shag Slough at Liberty Island Bridge	1	3/16/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Shag Slough at Liberty Island Bridge	1	4/20/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Shag Slough at Liberty Island Bridge	1	4/20/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Shag Slough at Liberty Island Bridge	2	4/20/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Shag Slough at Liberty Island Bridge	1	4/20/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Shag Slough at Liberty Island Bridge	2	4/20/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Shag Slough at Liberty Island Bridge	1	5/18/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Shag Slough at Liberty Island Bridge	1	5/18/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	0.0271	=	0.001	0.002	µg/L
Shag Slough at Liberty Island Bridge	1	5/18/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Shag Slough at Liberty Island Bridge	1	6/15/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Shag Slough at Liberty Island Bridge	1	6/15/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	0.00248	=	0.001	0.002	µg/L
Shag Slough at Liberty Island Bridge	1	6/15/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L



Appendix A: TMDL Compliance Monitoring Data, 2009-2010

Site Name	Replicate	Sample Date	Analyte Category	Method	Analyte	Fraction	Result	Result Qual Code	MDL	RL	Unit
Shag Slough at Liberty Island Bridge	1	7/20/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.00104	ND	0.00104	0.00207	µg/L
Shag Slough at Liberty Island Bridge	1	7/20/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.00207	ND	0.00207	0.00415	µg/L
Shag Slough at Liberty Island Bridge	1	7/20/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Shag Slough at Liberty Island Bridge	1	8/17/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Shag Slough at Liberty Island Bridge	1	9/21/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.000971	ND	0.000971	0.00194	µg/L
Shag Slough at Liberty Island Bridge	2	9/21/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.000964	ND	0.000964	0.00193	µg/L
Shag Slough at Liberty Island Bridge	1	9/21/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.00194	ND	0.00194	0.00389	µg/L
Shag Slough at Liberty Island Bridge	2	9/21/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.00193	ND	0.00193	0.00386	µg/L
Shag Slough at Liberty Island Bridge	1	9/21/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Ulatis Creek at Brown Road	1	3/19/09	Physical	FieldMeasure	Discharge	NA	70.78	=	-88	-88	CFS
Ulatis Creek at Brown Road	1	3/19/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Ulatis Creek at Brown Road	1	3/19/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Ulatis Creek at Brown Road	1	4/20/09	Physical	FieldMeasure	Discharge	NA	10.04	=	-88	-88	CFS
Ulatis Creek at Brown Road	2	4/20/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Ulatis Creek at Brown Road	1	4/20/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Ulatis Creek at Brown Road	2	4/20/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Ulatis Creek at Brown Road	1	4/20/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Ulatis Creek at Brown Road	1	5/19/09	Physical	FieldMeasure	Discharge	NA	8.65	=	-88	-88	CFS
Ulatis Creek at Brown Road	2	5/19/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Ulatis Creek at Brown Road	1	5/19/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Ulatis Creek at Brown Road	2	5/19/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Ulatis Creek at Brown Road	1	5/19/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Ulatis Creek at Brown Road	1	6/16/09	Physical	FieldMeasure	Discharge	NA	4.17	=	-88	-88	CFS
Ulatis Creek at Brown Road	1	6/16/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Ulatis Creek at Brown Road	1	6/16/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Ulatis Creek at Brown Road	1	7/21/09	Physical	FieldMeasure	Discharge	NA	9.01	=	-88	-88	CFS
Ulatis Creek at Brown Road	1	7/21/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Ulatis Creek at Brown Road	1	7/21/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Ulatis Creek at Brown Road	1	8/18/09	Physical	FieldMeasure	Discharge	NA	8.14	=	-88	-88	CFS
Ulatis Creek at Brown Road	1	8/18/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Ulatis Creek at Brown Road	1	8/18/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Ulatis Creek at Brown Road	1	9/22/09	Physical	FieldMeasure	Discharge	NA	20.04	=	-88	-88	CFS
Ulatis Creek at Brown Road	1	9/22/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Ulatis Creek at Brown Road	1	9/22/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Walker Creek near 99W and CR33	1	2/19/09	Physical	FieldMeasure	Discharge	NA	120.18	=	-88	-88	CFS
Walker Creek near 99W and CR33	1	2/19/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Walker Creek near 99W and CR33	2	2/19/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Walker Creek near 99W and CR33	1	2/19/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Walker Creek near 99W and CR33	2	2/19/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Walker Creek near 99W and CR33	1	3/17/09	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Walker Creek near 99W and CR33	1	3/17/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Walker Creek near 99W and CR33	1	3/17/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Walker Creek near 99W and CR33	1	4/22/09	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS
Walker Creek near 99W and CR33	1	4/22/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Walker Creek near 99W and CR33	1	4/22/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Walker Creek near 99W and CR33	1	5/20/09	Physical	FieldMeasure	Discharge	NA	0	=	-88	-88	CFS

Appendix A: TMDL Compliance Monitoring Data, 2009-2010

Site Name	Replicate	Sample Date	Analyte Category	Method	Analyte	Fraction	Result	Result Qual Code	MDL	RL	Unit
Walker Creek near 99W and CR33	1	5/20/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Walker Creek near 99W and CR33	1	5/20/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Walker Creek near 99W and CR33	1	6/18/09	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Walker Creek near 99W and CR33	1	6/18/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	0.0137	=	0.001	0.002	µg/L
Walker Creek near 99W and CR33	1	6/18/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Walker Creek near 99W and CR33	1	7/22/09	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Walker Creek near 99W and CR33	1	7/22/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	0.0217	=	0.001	0.002	µg/L
Walker Creek near 99W and CR33	1	7/22/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Walker Creek near 99W and CR33	1	8/19/09	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Walker Creek near 99W and CR33	1	8/19/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Walker Creek near 99W and CR33	1	8/19/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Walker Creek near 99W and CR33	1	9/23/09	Physical	FieldMeasure	Discharge	NA	0 =		-88	-88	CFS
Walker Creek near 99W and CR33	1	9/23/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Walker Creek near 99W and CR33	1	9/23/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Willow Slough Bypass at Pole Line	1	1/26/09	Physical	FieldMeasure	Discharge	NA	0.24 =		-88	-88	CFS
Willow Slough Bypass at Pole Line	2	1/26/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Willow Slough Bypass at Pole Line	1	1/26/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Willow Slough Bypass at Pole Line	2	1/26/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Willow Slough Bypass at Pole Line	1	1/26/09	Pesticide	EPA 625	Diazinon	UNFILTERED	0.0071	=	0.002	0.004	µg/L
Willow Slough Bypass at Pole Line	1	3/19/09	Physical	FieldMeasure	Discharge	NA	8 =		-88	-88	CFS
Willow Slough Bypass at Pole Line	2	3/19/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Willow Slough Bypass at Pole Line	1	3/19/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Willow Slough Bypass at Pole Line	2	3/19/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Willow Slough Bypass at Pole Line	1	3/19/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Willow Slough Bypass at Pole Line	1	5/19/09	Physical	FieldMeasure	Discharge	NA	2.48 =		-88	-88	CFS
Willow Slough Bypass at Pole Line	1	5/19/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Willow Slough Bypass at Pole Line	1	5/19/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Willow Slough Bypass at Pole Line	1	6/16/09	Physical	FieldMeasure	Discharge	NA	2.72 =		-88	-88	CFS
Willow Slough Bypass at Pole Line	1	8/18/09	Physical	FieldMeasure	Discharge	NA	1.17 =		-88	-88	CFS
Willow Slough Bypass at Pole Line	1	8/18/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Willow Slough Bypass at Pole Line	1	8/18/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Willow Slough Bypass at Pole Line	1	9/22/09	Physical	FieldMeasure	Discharge	NA	2.9 =		-88	-88	CFS
Willow Slough Bypass at Pole Line	1	9/22/09	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Willow Slough Bypass at Pole Line	1	9/22/09	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Willow Slough Bypass at Pole Line	1	1/19/10	Physical	FieldMeasure	Discharge	NA	-88	NA	-88	-88	CFS
Willow Slough Bypass at Pole Line	1	1/19/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	-0.001	ND	0.001	0.002	µg/L
Willow Slough Bypass at Pole Line	1	1/19/10	Pesticide	EPA 625	Diazinon	UNFILTERED	0.0137	=	0.002	0.004	µg/L
Willow Slough Bypass at Pole Line	1	3/16/10	Physical	FieldMeasure	Discharge	NA	2.21 =		-88	-88	CFS
Willow Slough Bypass at Pole Line	1	3/16/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	0.1521	=	0.001	0.002	µg/L
Willow Slough Bypass at Pole Line	1	3/16/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L
Willow Slough Bypass at Pole Line	1	5/18/10	Physical	FieldMeasure	Discharge	NA	14.19 =		-88	-88	CFS
Willow Slough Bypass at Pole Line	1	5/18/10	Pesticide	EPA 625	Chlorpyrifos	UNFILTERED	0.01	=	0.001	0.002	µg/L
Willow Slough Bypass at Pole Line	1	5/18/10	Pesticide	EPA 625	Diazinon	UNFILTERED	-0.002	ND	0.002	0.004	µg/L