

MAY 2011

SACRAMENTO VALLEY  
WATER QUALITY COALITION

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# Water Quality Management Plan Progress Report

*Prepared by*

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## Table of Contents

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<b>Executive Summary .....</b>	<b>iii</b>
Management Plan Monitoring.....	iii
New Management Plans.....	iii
Evaluation of Progress .....	iv
<b>Management Plan Progress Report .....</b>	<b>1</b>
<b>Results of Monitoring .....</b>	<b>9</b>
DO and pH .....	9
Legacy Pesticides .....	9
Pathogen indicators .....	9
Registered Pesticides.....	10
Salinity .....	11
Toxicity .....	11
Trace Metals.....	11
Nutrients.....	12
<b>Source Evaluations.....</b>	<b>17</b>
<b>Outreach Documentation .....</b>	<b>17</b>
<b>Member Surveys .....</b>	<b>17</b>
<b>Recommendations for Management Plan Monitoring .....</b>	<b>17</b>
<b>New Management Plans .....</b>	<b>19</b>
<b>Management Plan Status Updates.....</b>	<b>19</b>
Chlorpyrifos in Pine Creek.....	20
Chlorpyrifos in Gilsizer Slough .....	20
Copper in Lower Honcut Creek .....	20
Copper in Pine Creek .....	20
Chlorpyrifos in Ulatis Creek .....	20
DO and pH analysis.....	21
Goals for Implementation of Management Practices .....	22
Deliverables and Schedule for Ongoing Management Plan Elements .....	22
<b>TMDL Compliance Reporting.....</b>	<b>24</b>
Chlorpyrifos and Diazinon TMDL.....	24
Clear Lake Nutrient TMDL.....	26
<b>Summary: Evaluation of Management Plan Progress .....</b>	<b>30</b>
<b>Proposed Changes to the Comprehensive Surface Water Quality Management Plan.....</b>	<b>31</b>

## List of Tables

---

Table 1. Management Plan Progress Report Requirements.....	2
Table 2. Summary of Management Plan Task Activity.....	4
Table 3. Summary of Management Plan Compliance Monitoring Outcomes.....	14
Table 4. Requests for Management Plan Completions.....	19
Table 5. Status: Submitted Management Practices Implementation and Performance Goals.....	22
Table 6. 2017 Deliverables for Ongoing Management Plans.....	23

## Executive Summary

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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 (2009 Management Plan), which was reorganized into the Comprehensive Surface Water Quality Management Plan (CSQMP) in 2015. The Coalition's Waste Discharge Requirements (WDR), Order No. R5-2014-0030-R1, specify the requirements for separate surface water Management Plans, and allows the Coalition to satisfy these requirements by updating the Surface Water Quality Management Plan previously approved under the Coalition Group Conditional Waiver to conform to the Order and the Monitoring and Reporting Program (MRP). The updated CSQMP must conform to the requirements specified for separate Management Plans, but the WDR allows existing individual Management Plans developed under the Coalition's Conditional Waiver (Conditional Waiver Order R5-2006-0053) to continue to apply under this Order. The approved CSQMP was most recently updated in November 2016.

In general terms, the processes to meet the requirements of the CSQMP can be distilled to these elements – 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 individual 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 Central Valley Regional Water Quality Control Board (Regional Water Board) for a large number of management plan requirements for pesticides, toxicity, pathogen indicators, and legacy organochlorine pesticide exceedances.

### Management Plan Monitoring

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 evaluations, or surveys of agricultural practices. Except for legacy pesticide monitoring and monitoring at non-representative sites for pathogen indicators, and field measurements, all Management Plans had monitoring scheduled for source evaluation and/or compliance in 2016.

Based on the evaluations of Management Plan monitoring results through September 2016 and earlier source evaluations presented in this document, the Coalition has submitted or is preparing requests to deem complete the monitoring and other requirements for seven Management Plans.

### New Management Plans

As part of this Progress Report, data collected by the Coalition through September 2016 were evaluated to assess the necessity of any new Management Plan requirements. 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 Management Plan elements were developed, if necessary. If modifications to the existing scope or schedule for implementation of an approved Management Plan were proposed, then these changes are also described herein, if necessary. There were no new Management Plans triggered by exceedances in Coalition monitoring conducted from October 2015 through September 2016.

Since the 2015 MPPR, it was determined that an existing 2013 Management Practices Implementation and Performance Goals (MPIPG) Report for chlorpyrifos in Ulatis Creek needs to be updated to (1) conform to the requirements for Management Plans in the Coalition's WDR and (2) comply with chlorpyrifos use requirements related to the establishment of the pesticides as a state-restricted material on July 1, 2015.

### **Evaluation of Progress**

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 31 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 continues to make good progress toward meeting these requirements and expects to achieve the goals of the current approved Management Plan and the approved CSQMP update that is currently in development.

## 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 (2009 Management Plan<sup>1</sup>), which was reorganized into the Comprehensive Surface Water Quality Management Plan (CSQMP<sup>2</sup>) in 2015. The Coalition's Waste Discharge Requirements (WDR), Order No. R5-2014-0030-R1, specify the requirements for separate surface water Management Plans, and also allows the Coalition to satisfy these requirements by updating the Surface Water Quality Management Plan previously approved under the Coalition Group Conditional Waiver to conform to the Order and the Monitoring and Reporting Program (MRP). The updated CSQMP must conform to the requirements specified for separate Management Plans, but the WDR allows existing individual Management Plans developed under the Coalition's Conditional Waiver (Conditional Waiver Order R5-2006-0053<sup>3</sup>) to continue to apply under this Order. The approved CSQMP was most recently updated in November 2016.

Reporting for the CSQMP is intended to provide an overview of the Coalition's approach to meeting the requirements of the WDR, a list of all currently required Management Plans and their status, the Management Plans currently being implemented, and a schedule and process for development of newly required Management Plans. Data reports for monitoring conducted for the CSQMP 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 Progress Report provides summaries of the progress made toward completion of specific Management Plan elements, updates to the list of required Management Plan elements, and recommendations for continuation or modification of individual Management Plans. 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 provides a summary of completed baseline management practice inventories in priority drainages. Future Progress Reports will also document goals established for management practice implementation and assess progress toward these implementation goals for those recent Management Plans written to conform to WDR requirements, as opposed to those earlier Management Practices Implementation and Performance Goals (MPIPG) and Management Plans written to conform to the Coalition's Conditional Waiver.

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

<sup>2</sup> SVWQC 2016, Comprehensive Surface Water Quality Management Plan. Prepared by Larry Walker Associates for the Sacramento Valley Water Quality Coalition (SVWQC). Sacramento, California. June 2015

<sup>3</sup> Prior to adoption of the WDR, the Coalition was subject to a Conditional Waiver of Waste Discharge Requirements for the Irrigated Lands Regulatory Program (ILRP) and subsequent amendments to the ILRP requirements (WQO-2004-0003, SWRCB 2004, R5-2005-0833, R5-2008-0005, R5-2009-0875).

The Progress Report includes the following components, as specified in the MRP:

**Table 1. Management Plan Progress Report Requirements<sup>4</sup>**

MRP-1 Section	MPPR Requirement	Report Section Headings	Page
	Signed Transmittal Letter	NA	-
I.F.(1)	Title page	Title page	-
I.F.(2)	Table of contents	Table of Contents	<i>i</i>
I.F.(3)	Executive Summary	Executive Summary	<i>iii</i>
I.F.(4)	Location map(s) and a brief summary of management plans covered by the report	Results of Monitoring	4-8,13
I.F.(5)	Updated table that tallies all exceedances for the management plans	Results of Monitoring	14-16
I.F.(6)	A list of new management plans triggered since the previous report	New Management Plans	19
I.F.(7)	Status update on preparation of new management plans	Management Plan Status Update	19-21
I.F.(8)	A summary and assessment of management plan monitoring data collected during the reporting period	Results of Monitoring	9-12
I.F.(9)	A summary of management plan grower outreach conducted	Outreach Documentation	17
I.F.(10)	A summary of the degree of implementation of management practices	Summary: Evaluation of Progress	31-32
I.F.(11)	Results from evaluation of management practice effectiveness	Summary: Evaluation of Progress	31-32
I.F.(12)	An evaluation of progress in meeting performance goals and schedules	Summary: Evaluation of Progress	31-32
I.F.(13)	Any recommendations for changes to the management plan	Proposed Changes to the Management Plan	32

The activities conducted in 2016 to implement the Coalition's CSQMP continued to focus primarily on addressing the higher priority Management Plan elements triggered by exceedances of water quality objectives or trigger limits for registered pesticides and toxicity. 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. Source evaluations have been documented in the Source Evaluation Reports submitted for each

<sup>4</sup> Monitoring and Reporting Program (Attachment B to R5-2014-0030), Appendix MRP-1: Third-Party Management Plan Requirements, Section I.F.

Management Plan element.<sup>5</sup> 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. 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 completed in 2016 are listed in **Table 2**. This table provides the water body and analyte or monitoring category of concern and a summary of the major Management Plan task activity.

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<sup>5</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.

**Table 2. Summary of Management Plan Task Activity**

Management Plan Category	Subwatershed	Waterbody	Analyte(s)	Summary of Major Management Plan Activity and Status
DO and pH	Butte-Yuba-Sutter	Butte Slough	DO	Unless otherwise noted, all sites sampled in 2016; Other tasks suspended on direction from Executive Officer (EO); Source Evaluations deferred; preliminary work on a statistical analysis for the influence of agricultural activities on DO and pH exceedances began in 2016.
		Gilsizer Slough	DO, pH	
		Lower Honcut Creek	DO	
		Lower Snake River	DO	
		Pine Creek	DO	
		Sacramento Slough	DO	
		Colusa Glenn	Colusa Basin Drain	
	Freshwater Creek	DO		
	Rough and Ready Pumping Plant	DO, pH		
	Stone Corral Creek <sup>1</sup>	DO		
	Stony Creek	pH		
	Sycamore Slough <sup>1</sup>	DO		
	Walker Creek	DO, pH		
Lake	McGaugh Slough	DO		
	Middle Creek	DO		
Pit River	Fall River	pH		
	Pit River	DO, pH		
PNSSNS	Coon Creek	DO		
Sacramento/ Amador	Cosumnes River <sup>2</sup>	Dry Creek	DO, pH	
		Grand Island Drain	pH	
			DO	
		Laguna Creek <sup>1</sup>	DO, pH	
Shasta/Tehama	Anderson Creek		DO	
		Coyote Creek <sup>1</sup>	DO	
Solano	Ulatis Creek		DO, pH	
		Z-Drain	DO, pH	
Yolo	Cache Creek <sup>1</sup>	DO		

Management Plan Category	Subwatershed	Waterbody	Analyte(s)	Summary of Major Management Plan Activity and Status
DO and pH (continued)	Yolo (continued)	Tule Canal <sup>2</sup> Willow Slough	DO, pH pH	
Legacy Pesticides	Butte-Yuba-Sutter	Gilsizer Slough	DDT and degradation products	Sampled at all sites during 2015 assessment period; Other Tasks suspended on direction from EO; Revised draft completion requests for El Dorado Subwatershed water bodies prepared and submitted for review.
	Colusa Glenn	Freshwater Creek Lurline Creek Sycamore Slough		
	El Dorado	Coon Hollow Creek North Canyon Creek		
	Sacramento/ Amador	Grand Island Drain		
	Yolo	Willow Slough		
Pathogen Indicators	Butte-Yuba-Sutter	Gilsizer Slough <sup>1</sup> Lower Honcut Creek Lower Snake River Pine Creek Wadsworth Canal	<i>E. coli</i>	<p>Unless otherwise noted, sampled at all sites in 2016; Other tasks suspended pending direction from EO regarding development of a region-wide approach [December 5, 2011 comm. from EO].</p> <p>A Bacterial Source Identification Study based on bacteroidales DNA was conducted and completed for the Coalition in 2007. The results of this preliminary study indicated that the overwhelming majority of bacteria in surface waters sampled were from human sources, and that agricultural contributions from agricultural bovine sources were rare or absent.</p> <p>A Source Evaluation Report for pathogen indicators (<i>E. coli</i>) was also prepared and submitted in 2011. This evaluation integrated SVWQC monitoring data, grower survey reports of implemented practices, and information about agricultural and non-agricultural sources, and concluded that agricultural was unlikely to be a significant contributing source in most monitored drainages.</p>
	Colusa Glenn	Colusa Basin Drain Freshwater Creek Logan Creek <sup>1</sup> Lurline Creek <sup>1</sup> Stone Corral Creek <sup>1</sup> Sycamore Slough <sup>1</sup> Walker Creek		
	Lake	McGaugh Slough Middle Creek		
	Napa	Pope Creek		
	Sacramento/ Amador	Cosumnes River <sup>1</sup> Dry Creek <sup>1</sup> Grand Island Laguna Creek <sup>1</sup>		

Management Plan Category	Subwatershed	Waterbody	Analyte(s)	Summary of Major Management Plan Activity and Status
Pathogen Indicators (continued)	Shasta Tehama	Anderson Creek Burch Creek <sup>1</sup> Coyote Creek <sup>1</sup>	<i>E. coli</i> (continued)	Unless otherwise noted, sampled at all sites in 2016; Other tasks suspended pending direction from EO regarding development of a region-wide approach [December 5, 2011 comm. from EO].
	Solano	Ulati Creek <sup>2</sup> Shag Slough <sup>2</sup> Z-Drain <sup>1</sup>		
	Upper Feather River	Indian Creek Spanish Creek		
	Yolo	Tule Canal <sup>2</sup> Willow Slough		
Registered Pesticides	Butte-Yuba-Sutter	Gilsizer Slough	Chlorpyrifos	Management Plan submitted to the Regional Board on November 30, 2016; implementation in progress.
		Gilsizer Slough	Diazinon	MPIPG Addendum submitted in 2013; Request for completion submitted on January 19, 2016, and approved on July 11, 2016.
		Pine Creek	Chlorpyrifos	Management Plan submitted to the Regional Board on November 14, 2016, and approved on December 6, 2016; implementation in progress
	Colusa Glenn	Colusa Drain	Malathion	MPIPG submitted 2013; Outreach and implementation in progress; Request for completion in preparation.
	Solano	Ulati Creek	Diuron	MPIPG Addendum submitted 2013; Request for completion submitted on January 19, 2016, and approved on July 11, 2016.
		Ulati Creek	Chlorpyrifos	MPIPG Addendum submitted in 2013; Outreach and implementation in progress; MPIPG is being updated to a Management Plan in 2017 that conforms to WDR requirements.
	Yolo	Willow Slough	Chlorpyrifos	Request for completion submitted on December 15, 2015, and approved on July 11, 2016.
		Willow Slough	Diuron	Outreach and implementation continued in 2015; Request for completion submitted on December 10, 2016; Regional Board determined that additional monitoring is needed.
		Willow Slough	Malathion	MPIPG submitted in 2013; Outreach and implementation are in progress; Request for completion in preparation.

Management Plan Category	Subwatershed	Waterbody	Analyte(s)	Summary of Major Management Plan Activity and Status
Salinity	Butte-Yuba-Sutter	Gilsizer Slough	EC	Unless otherwise noted, sampled at all sites in 2016; Continued active participation in CV-SALTS; SVWQC joined CV Salinity Coalition as funding partner.
		Lower Snake River	EC	
	Colusa Glenn	Colusa Basin Drain	EC	
		Freshwater Creek	EC	
		Lurline Creek <sup>1</sup>	EC	
		Stone Corral Creek <sup>1</sup>	EC	
		Sycamore Slough <sup>1</sup>	EC	
		Walker Creek	EC	
	Lake	McGaugh Slough	EC	
	Sacramento/ Amador	Dry Creek <sup>1</sup>	TDS	
		Grand Island Drain	EC	
	Solano	Ulatis Creek	EC	
		Shag Slough <sup>2</sup>	EC	
		Z-Drain	EC	
	Upper Feather River	MF Feather River	EC	
Yolo	Cache Creek <sup>1</sup>	EC		
	Tule Canal <sup>2</sup>	Boron, EC		
	Willow Slough	Boron, EC		
Toxicity	Butte-Yuba-Sutter	Lower Snake River	<i>Ceriodaphnia</i> (unidentified cause)	Monitoring of toxicity and potential causes continued in 2016; No toxicity exceedances in last 23 samples (9 samples in 2014), no cause identified. Request for completion submitted on September 1, 2016, and approved on January 19, 2017.
	Colusa Glenn	Stony Creek	<i>Ceriodaphnia</i> (unidentified cause)	Monitoring of toxicity and potential causes continued in 2016; No toxicity exceedance in last 7 samples (0 in 2014 due to site being dry); Request for completion submitted on July 10, 2013, and approved on March 30, 2017.
	Solano	Ulatis Creek	<i>Selenastrum</i> (diuron)	Monitoring of toxicity and diuron continued in 2016; No toxicity or pesticide exceedances observed; Request for completion submitted on January 19, 2016, and approved on July 11, 2016.
		Z-Drain	<i>Hyaella</i> (pyrethroids)	Monitoring of toxicity continued in 2016; No toxicity exceedances in 2016; MPIP Addendum submitted in 2013; Implementation of MPIP is in progress; Request for completion in preparation.

Management Plan Category	Subwatershed	Waterbody	Analyte(s)	Summary of Major Management Plan Activity and Status
	Yolo	Willow Slough	<i>Ceriodaphnia</i> (chlorpyrifos)	Chlorpyrifos MPIPGs submitted in 2013; Implementation is in progress; Monitoring continued in 2016 with no toxicity exceedances observed in last 32 samples; Request for completion submitted on December 15, 2015; Regional Board determined that additional monitoring is needed.
		Willow Slough	<i>Selenastrum</i> (diuron)	No toxicity or diuron exceedances observed in 2016; request for completion submitted on December 10, 2015, and approved on July 11, 2016.
Trace Metals	Butte-Yuba-Sutter	Lower Honcut Creek	Copper	Management plan submitted to Regional Board on January 20, 2017, and approved on March 7, 2017; implementation in progress.
		Pine Creek	Copper	Monitoring initiated in 2016; Management Plan submitted in March 2017 and currently under revision by Coalition.
	Pit River	Pit River	Lead	Monitoring continued in 2016; Source Evaluation submitted in 2013 in review; Supplemental Source Evaluation analysis requested by Regional Water Board in 2015; Request for completion submitted on May 9, 2016, and approved on September 22, 2016.
	Butte-Yuba-Sutter	Lower Honcut Creek	Arsenic	Monitoring continued in 2016; Source Evaluation submitted August 2013
	Sacramento/Amador	Grand Island Drain	Arsenic	Monitoring continued in 2016.

## Notes:

DO = Dissolved Oxygen

EC = Electrical Conductivity

[1] Non-representative site. Addressed with representative monitoring.

[2] Addressed by Delta Regional Monitoring Program (RMP) monitoring.

## RESULTS OF MONITORING

Management Plan monitoring was conducted as scheduled in the Coalition's 2016 Monitoring Plan Update, as approved by the Regional Water Board. The results of monitoring conducted in the 2016 monitoring year (October 1, 2015 through September 30, 2016) for all Management Plan analytes through September 2016 have been reported in the Coalition's 2016 Annual Monitoring Report (AMR) and submitted to the Regional Water Board. Additionally, exceedances for all Management Plan sampling conducted from October 1, 2015 through September 30, 2016, have been reported in Exceedance Reports as required by the ILRP MRP.

The 2016 monitoring year was a "non-assessment" monitoring year for all representative Coalition sites, and most Management Plan monitoring was coordinated with scheduled monitoring or conducted independently as needed for the specific locations and parameters. Management Plan monitoring for the 2016 monitoring year was conducted at the sites shown in **Figure 1** and the results are summarized below. The results of Management Plan compliance monitoring are summarized in **Table 3**.

### DO and pH

There are 23 sites with active Management Plan requirements for DO and 13 sites with active Management Plan requirements for pH.

- There were 85 events sampled for 18 sites with active Management Plan requirements for DO. There were 21 exceedances (25%) of the *ILRP* Trigger Limit for DO observed at 13 sites.
- There were 43 samples collected from eight sites with active Management Plan requirements for pH. There were only four exceedances observed (4%) of the *ILRP* Trigger Limit for pH at four different sites.

### Legacy Pesticides

Management Plan monitoring for legacy organochlorine pesticides was last conducted during the Coalition's most recent assessment period (2015) and there was no planned monitoring of these pesticides during the 2016 monitoring year. All uses of DDT have been banned in the United States since 1972, except for control of emergency public health problems.<sup>6</sup>

### Pathogen indicators

There are 29 sites with Management Plan requirements for pathogen indicator bacteria. Management Plan tasks for pathogen indicators have been suspended at the direction of the Executive Officer of the Regional Water Board, pending development of a region-wide approach for this category (December 5, 2011 comm.). Management Plan monitoring for *E. coli* consisted of sampling at representative monitoring sites, which resulted in the collection of 30 samples from 10 sites with active Management Plan requirements for pathogen indicators. There were 15

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<sup>6</sup> Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for DDT. U.S. Department of Health and Human Services. September 2002.

exceedances (50% of total samples) of the *ILRP* Trigger Limit for *E. coli* observed at these sites during 2016 monitoring.

### Registered Pesticides

- Six samples were analyzed for chlorpyrifos and diazinon in Gilsizer Slough. Chlorpyrifos was detected in two of the samples, but neither of the samples exceeded any water quality objectives.
- Six samples were analyzed for diazinon in Gilsizer Slough. Diazinon was not detected in any of the samples.
- Four sample events were conducted for chlorpyrifos in Pine Creek. Chlorpyrifos was detected in the July 2016 sample (0.11 µg/L) and it resulted in an exceedance of the Basin Plan's acute and chronic objective for the pesticide.
  - There were five reported applications of chlorpyrifos in the month prior to the July 19, 2016, exceedance. Chlorpyrifos was applied to approximately 232 acres of walnuts and 38 acres of walnuts (two separate applications) in the Pine Creek drainage during that time. Although water was present in the creek, field crews were unable to measure flow at this site. The field crew visually inspected the water body and noted that there was no observed flow. In the preceding weeks before the event, there had been no recorded precipitation. Toxicity tests were not performed during this event
- 12 events were conducted for chlorpyrifos in Ulatis Creek. Chlorpyrifos was not detected in any of the samples.
- 12 sample events for diuron were conducted in Ulatis Creek. Diuron was detected in ten of the samples, but none of the samples exceeded the water quality objective for the pesticide.
- Four sample events were conducted for chlorpyrifos and *Ceriodaphnia* toxicity in Willow Slough, which has a linked Management Plan requirement for chlorpyrifos and *Ceriodaphnia* toxicity. There were no detections of the pesticide in any of these samples and none of the samples showed toxicity. There was one additional *Ceriodaphnia* toxicity event that did not result in toxicity.
- Two sample events were conducted for diuron and algae toxicity at Willow Slough, which has a Management Plan requirement for diuron and algae toxicity. None of the samples collected were toxic to *Selenastrum*, and there were no detections of diuron. One additional sampling event was conducted for algae toxicity and it did not result in toxicity. There have been no observations of toxicity in the last 50 events where samples were tested with *Selenastrum*.
- Four sample events were conducted for malathion in Willow Slough. There were no detections nor exceedances in any of these samples.
- Four sample events were conducted for malathion in Colusa Basin Drain. There were no detections nor exceedances in any of these samples.

## Salinity

There are 17 sites with active Management Plan requirements for parameters related to salinity (EC and boron). There were 54 sample events for EC at these 11 sites, with 16 observed exceedances (30%) of the *ILRP* Trigger Limit for EC. Willow Slough also has a requirement for boron. Two of the three samples collected from Willow Slough exceeded the *ILRP* Trigger Limit for boron.

## Toxicity

- Lower Snake River has a Management Plan requirement for *Ceriodaphnia* toxicity and samples for three events were analyzed for toxicity to this test organism. None of these samples were observed to be toxic to *Ceriodaphnia*.
- Stony Creek has a Management Plan requirement for *Ceriodaphnia* toxicity and samples for two events were analyzed for toxicity to this test organism. None of these samples were observed to be toxic to *Ceriodaphnia*.
- Willow Slough has a Management Plan requirement for *Ceriodaphnia* toxicity and samples for five events were analyzed for toxicity to this test organism. None of these samples were observed to be toxic to *Ceriodaphnia*.
- Willow Slough has a Management Plan requirement for *Selenastrum* toxicity and samples for three events were analyzed for toxicity to this test organism. None of these samples were observed to be toxic to *Selenastrum*.
- Ulatis Creek has a Management Plan requirement for algae toxicity and diuron, and 12 sample events were conducted for *Selenastrum* toxicity. None of the samples were observed to be toxic to the alga.
- Z-Drain has a Management Plan requirement for sediment toxicity, and sediment samples were analyzed for two events for *Hyalella* toxicity and pesticides. Toxicity was not observed in either of the samples.

## Trace Metals

There were four active Management Plans for trace metals in 2016 for which monitoring was conducted: lead in the Pit River, copper in Pine Creek and Lower Honcut Creek, and arsenic in Grand Island Drain.

Three events were conducted for arsenic in Grand Island Drain, and two of the samples analyzed resulted in exceedances of the *ILRP* Trigger Limit for arsenic (10 µg/L). There are both legacy and a few potential current sources of arsenic. There is very little remaining agricultural use of arsenic-based pesticide products (based on review of DPR's PUR data), and arsenic has only a few potentially significant sources: (1) natural background from arsenic in the soils, (2) arsenic remaining from legacy lead arsenate use in orchards, (3) arsenic used in various landscape maintenance and structural pest control applications (non-agriculture), and (4) arsenic used in wood preservatives. One possible source is the wooden bridge structure just upstream of the GIDLR sampling site, if arsenic-based preservatives were used in the wood. A final, but somewhat unlikely source is an arsenic-based additive that may still be used for chicken feed and

which can potentially make its way into agricultural fields and runoff if the poultry litter is used on the field.

Six samples were analyzed for copper (total and dissolved) in Pine Creek and none exceeded Basin Plan objectives or *ILRP* Trigger Limits.

Four samples were analyzed for copper (total and dissolved) in Lower Honcut Creek and none exceeded Basin Plan objectives or *ILRP* Trigger Limits.

Four samples were analyzed for lead (total and dissolved) in the Pit River and none exceeded Basin Plan objectives or *ILRP* Trigger Limits.

## **Nutrients**

There were no active Management Plans for nutrients in 2016 for which monitoring was conducted.

However, a nutrient-related Management Plan requirement exists for the Clear Lake Nutrient TMDL. Monitoring for this Management Plan requirement consisted of nine sample events at the McGaugh Slough and Middle Creek sites in the Lake County Subwatershed. McGaugh Slough typically has zero or near-zero flow, even when water is present, and was dry for all but three of the nine events. The three samples that were collected at McGaugh Slough did not result in any exceedances. Samples were collected at Middle Creek for all nine of the events, but none of the results exceeded any objectives. Compliance with the agriculture TMDL load allocations for phosphorus requires evaluation of a larger set of coordinated monitoring data not yet available; therefore, compliance has not yet been determined.

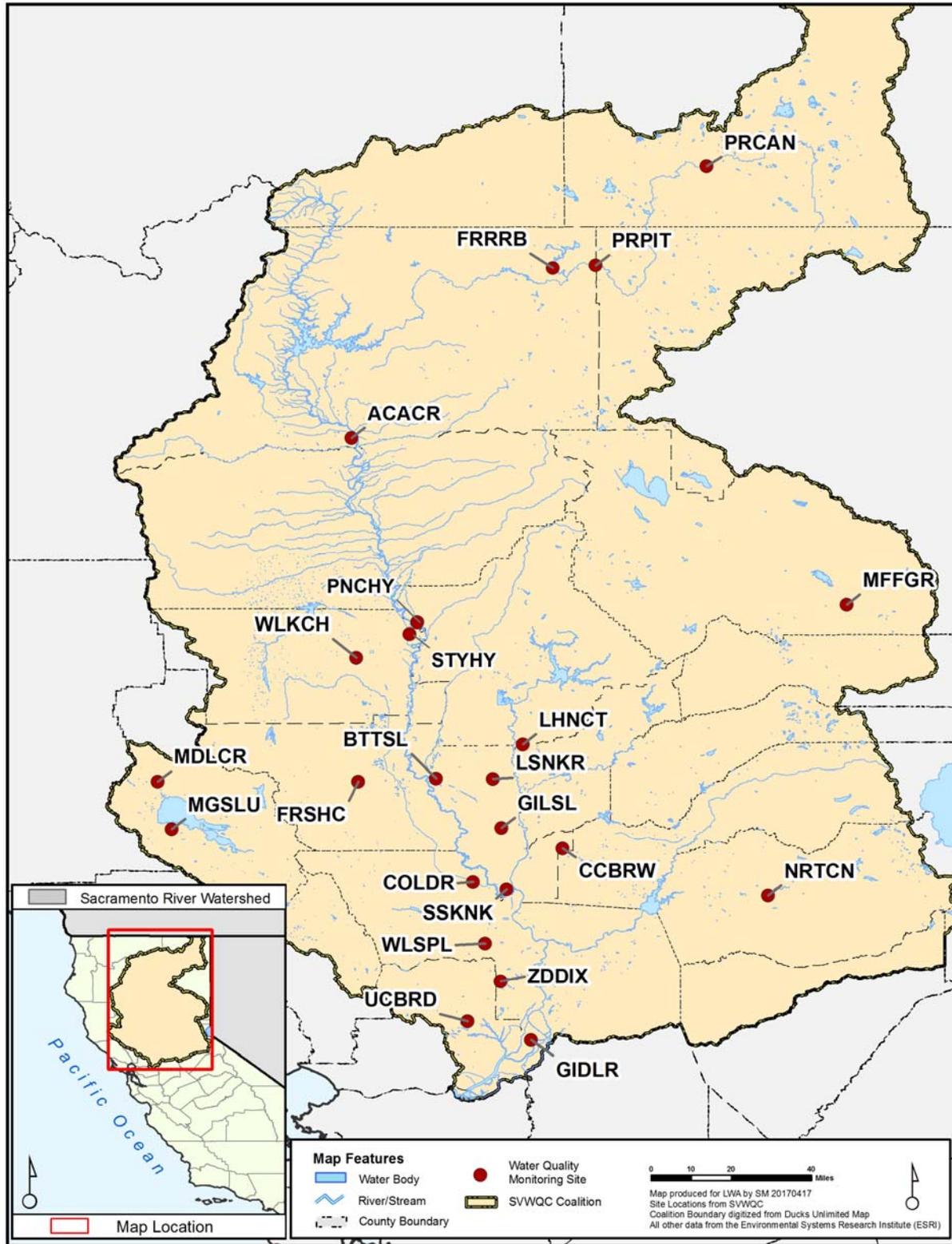


Figure 1. Coalition Monitoring Sites with Management Plans, 2016

**Table 3. Summary of Management Plan Compliance Monitoring Outcomes**

Management Plan Category	Analyte	Subwatershed	Site Name	Events Sampled	Pesticide Detections	Exceedances
DO and pH	Dissolved Oxygen	Butte-Yuba-Sutter	Butte Slough at Pass Road	2	NA	2
			Gilsizer Slough at George Washington Road	6	NA	2
			Lower Honcut Creek at Hwy 70	5	NA	2
			Lower Snake River	6	NA	0
			Pine Creek at Highway 32	6	NA	2
			Sacramento Slough bridge near Karnak	4	NA	1
		Colusa Glenn	Colusa Basin Drain above KL	4	NA	2
			Freshwater Creek at Gibson Rd	3	NA	0
			Walker Creek near 99W and CR33	3	NA	0
		Lake	McGaugh Slough at Finley Road East	2	NA	1
			Middle Creek u/s from Highway 20	5	NA	1
		Pit River	Pit River at Pittville	6	NA	1
		PNSSNS	Coon Creek at Brewer Road	4	NA	0
		Sacramento/Amador	Grand Island Drain near Leary Road	4	NA	2
		Shasta/Tehama	Anderson Creek at Ash Creek Road	3	NA	1
		Solano	Ulatis Creek at Brown Road	12	NA	1
			Z Drain	2	NA	0
		Yolo	Willow Slough Bypass at Pole Line	8	NA	3
	pH	Butte-Yuba-Sutter	Gilsizer Slough at George Washington Road	6	NA	1
		Colusa Glenn	Stony Creek on Hwy 45 near Rd 24	2	NA	0
			Walker Creek	3	NA	0
		Pit River	Fall River at Fall River Ranch Bridge	4	NA	0
			Pit River at Pittville	6	NA	1
		Solano	Ulatis Creek at Brown Road	12	NA	1
			Z Drain	2	NA	0
		Yolo	Willow Slough Bypass at Pole Line	8	NA	1

Management Plan Category	Analyte	Subwatershed	Site Name	Events Sampled	Pesticide Detections	Exceedances
Pathogen Indicators	<i>E. coli</i>	Butte-Yuba-Sutter	Lower Honcut Creek at Hwy 70	2	NA	0
			Lower Snake R. at Nuestro Rd	3	NA	1
			Pine Creek at Highway 32	4	NA	1
		Colusa Glenn	Colusa Basin Drain above KL	4	NA	1
			Freshwater Creek at Gibson Rd	3	NA	2
			Walker Creek near 99W and CR33	1	NA	1
		Lake	Middle Creek u/s from Highway 20	3	NA	1
		Sacramento/Amador	Grand Island Drain near Leary Road	4	NA	4
		Shasta/Tehama	Anderson Creek at Ash Creek Road	3	NA	3
Yolo	Willow Slough Bypass at Pole Line	3	NA	1		
Registered Pesticides	Chlorpyrifos	Butte-Yuba-Sutter	Gilsizer Slough at George Washington Road	6	2	0
			Pine Creek at Highway 32	4	1	1
		Solano	Ulatis Creek at Brown Road	12	0	0
		Yolo	Willow Slough Bypass at Pole Line	4	0	0
	Diazinon	Butte-Yuba-Sutter	Gilsizer Slough at George Washington Road	6	0	0
	Diuron	Solano	Ulatis Creek at Brown Road	12	10	0
		Yolo	Willow Slough Bypass at Pole Line	2	0	0
	Malathion	Colusa Glenn	Colusa Basin Drain above KL	4	0	0
Yolo		Willow Slough Bypass at Pole Line	4	0	0	
Salinity	Boron	Yolo	Willow Slough Bypass at Pole Line	3	NA	2
	Conductivity	Butte-Yuba-Sutter	Gilsizer Slough at George Washington Road	6	NA	0
			Lower Snake R. at Nuestro Rd	6	NA	0
		Colusa Glenn	Colusa Basin Drain above KL	4	NA	3
			Freshwater Creek at Gibson Rd	3	NA	0
			Walker Creek near 99W and CR33	3	NA	0
		Lake	McGaugh Slough at Finley Road East	2	NA	1
		Sacramento/Amador	Grand Island Drain near Leary Road	4	NA	1
Solano	Ulatis Creek at Brown Road	12	NA	10		
Z Drain		2	NA	1		

Management Plan Category	Analyte	Subwatershed	Site Name	Events Sampled	Pesticide Detections	Exceedances
Salinity (continued)	Conductivity (continued)	Upper Feather River	Middle Fork Feather River above Grizzly Cr	4	NA	0
		Yolo	Willow Slough Bypass at Pole Line	8	NA	0
Toxicity	Ceriodaphnia survival	Butte-Yuba-Sutter	Lower Snake R. at Nuestro Rd	3	NA	0
		Colusa Glenn	Stony Creek on Hwy 45 near Rd 24	2	NA	0
		Yolo	Willow Slough Bypass at Pole Line	5	NA	0
	Selenastrum Growth	Solano	Ulatis Creek at Brown Road	12	NA	0
		Yolo	Willow Slough Bypass at Pole Line	3	NA	0
	Hyalella survival	Solano	Z Drain	2	NA	0
Trace Metals	Arsenic	Sacramento/Amador	Grand Island Drain near Leary Road	3	NA	2
		Butte-Yuba-Sutter	Lower Snake R. at Nuestro Rd	1	NA	0
	Copper	Butte-Yuba-Sutter	Lower Honcut Creek at Hwy 70	4	NA	0
			Pine Creek at Highway 32	6	NA	0
Lead	Pit River	Pit River at Pittville	4	NA	0	

NA = Not applicable

## SOURCE EVALUATIONS

There were no new Source Evaluations conducted for Management Plan elements in 2016.

## OUTREACH DOCUMENTATION

The Coalition and its subwatersheds 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 CSQMP to address exceedances of water quality objectives 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 initially focused on, but not limited to, growers who operate directly adjacent to or within proximity to a waterbody showing an exceedance of a water quality objective or *ILRP* Trigger Limit. 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.

To identify 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 options to address the specific exceedances using BMPs. This same approach has been used to conduct management practice surveys in areas targeted by individual Management Plans.

Descriptions of the outreach and education activities conducted by the Coalition's subwatersheds in 2016 are provided in Appendix F (*SVWQC Outreach Materials*) of the Coalition's 2016 AMR.

## MEMBER SURVEYS

Starting in 2014, the WDR required that the Coalition collect and aggregate summarized information from Farm Evaluations. The summary of the management practice data includes:

- A quality assessment of the information by township
- A description of corrective actions to be taken regarding any deficiencies in the quality of data submitted

This information is provided as a separate report developed by Michael Johnson, LLC (MLJ) for SVWQC (Farm Evaluation Summary Report). The Farm Evaluation Summary Report will be submitted to the Regional Water Board no later than June 30, 2017.

The Farm Evaluations and the annual Farm Evaluation Summary Report will be the primary source for management practices and member surveys, but additional surveys might be conducted on an as needed basis (see the Management Plan Status Updates section for a description of Focused Outreach Surveys).

## RECOMMENDATIONS FOR MANAGEMENT PLAN MONITORING

Special project monitoring for the Management Plan elements includes specific targeted monitoring or studies to address implementation of a TMDL or implementation of an individual 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 general schedule for Management Plans have been presented previously in the Sacramento Valley Coalition Group's approved *2009 Management Plan, Management Plan Progress Reports* (2010, 2011, 2012), the *Addendum to Sacramento Valley Water Quality Coalition Management Plan: Chlorpyrifos and Diazinon TMDLs*, and in the Coalition's monitoring plan updated annually for approval by the Executive Officer of the Regional Water Board.

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 evaluations, or surveys of agricultural practices. Except for legacy pesticide monitoring and monitoring at non-representative sites for pathogen indicators, and field

measurements, all Management Plans had monitoring scheduled for source evaluation and/or compliance in 2016. The monitoring proposed and conducted in 2016 was submitted to and approved by the Regional Water Board's Executive Officer in 2015. The Coalition's approved 2016 monitoring plan includes the recommended monitoring schedule for the Management Plan, as well as monitoring required in 303(d)-listed water bodies and TMDLs for chlorpyrifos and diazinon, legacy OC pesticides, and Group A OC pesticides (Attachment D (Site Specific Monitoring Tables) of the 2016 ILRP Monitoring Plan).

Based on the evaluations of Management Plan monitoring results through 2016 and source evaluations presented earlier in this document, the Coalition has submitted or is preparing requests to deem complete the requirements and monitoring for seven Management Plans. These Management Plans are summarized in **Table 4**. Monitoring scheduled for these management plans will continue until completion is approved by the Executive Officer of the Regional Water Board, as required by the Coalition's MRP.

**Table 4. Requests for Management Plan Completions**

Subwatershed	Water Body	Category	Analyte	Status
Butte Yuba Sutter	Gilsizer Slough	Registered Pesticides	Diazinon	Approved for completion (July 2016)
	Lower Snake River	Toxicity	<i>Ceriodaphnia</i>	Approved for completion (January 2017)
Colusa Glenn	Colusa Drain	Registered Pesticides	<i>Malathion</i>	Continue monitoring; RTC in preparation for 2017
	Stony Creek	Toxicity	<i>Ceriodaphnia</i>	Approved for completion (March 2017)
El Dorado	Coon Hollow Creek	Legacy Pesticides	DDE/DDT	Monitoring required; Other tasks suspended; Draft RTC submitted in 2013, revisions submitted May 2013 and April 2015
	North Canyon Creek	Legacy Pesticides	DDE	Monitoring required; Other tasks suspended; Draft RTC submitted in 2013, revision submitted May 2013 and April 2015
Pit River	Pit River	Trace Metals	Lead	Approved for completion (September 2016)
Solano	Ulati Creek	Registered Pesticides	Diuron	Approved for completion (July 2016)
	Ulati Creek	Toxicity	<i>Selenastrum</i>	Approved for completion (July 2016)
	Z Drain	Toxicity	<i>Hyalella</i>	Continue monitoring; RTC in preparation for 2017
Yolo	Willow Slough	Registered Pesticides	<i>Malathion</i>	Continue monitoring; RTC in preparation for 2017
	Willow Slough	Registered Pesticides	Chlorpyrifos	Approved for completion (July 2016)
	Willow Slough	Registered Pesticides	Diuron	Continue monitoring; RTC submitted December 2015; Regional Board requiring additional monitoring
	Willow Slough	Toxicity	<i>Ceriodaphnia</i>	Continue monitoring; RTC submitted December 2015; Regional Board requiring additional monitoring
	Willow Slough	Toxicity	<i>Selenastrum</i>	Approved for completion (July 2016)

## NEW MANAGEMENT PLANS

As part of this Progress Report, data collected by the Coalition through September 2016 were evaluated to assess the necessity of any new Management Plan requirements. 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 Management Plan elements were developed, if necessary. If modifications to the existing scope or schedule for implementation of an approved Management Plan were proposed, then these changes are also described herein, if necessary. There were no new Management Plans triggered by exceedances in Coalition monitoring conducted from October 2015 through September 2016. Since the 2015 MPPR, it was determined that an existing 2013 Management Practices Implementation and Performance Goals (MPIPG) Report for chlorpyrifos in Ulati Creek needs to be updated to (1) conform to the requirements for Management Plans in the Coalition's WDR and (2) comply with chlorpyrifos use requirements related to the establishment of the pesticide as a state-restricted material on July 1, 2015.

## MANAGEMENT PLAN STATUS UPDATES

New Management Plans submitted to the Regional Water Board in 2016 and early 2017 (see **Table 2**) were crafted to conform to the requirements for separate Management Plans specified in the Coalition's WDR, Order No. R5-2014-0030-R1, under the ILRP. In some ways, these new requirements differ from those set forth in the previously approved 2009 Management Plan. Current Management Plan requirements emphasize a sound Management Plan approach that includes performance goals, mechanisms for achieving goals, quantitative measures of progress, and a schedule for achieving goals. This approach requires more quantitative tracking of outreach and education efforts, as well as pesticide application practices and management practices implemented by growers that are targeted toward eliminating or reducing the concentrations of the constituent for which a particular Management Plan is developed.

In order to track changes in the implementation of specific categories of management practices by growers, the Butte-Yuba-Sutter Water Quality Coalition (BYSWQC) has developed a Focused Outreach Survey that is designed to document on an annual basis the management practices implemented by growers who apply the pesticide that is the subject of a particular Management Plan. Subwatersheds will target Focused Outreach Surveys to those growers who apply the target pesticide in the representative and represented drainages, as applicable. The initial Focused Outreach Survey sent to growers will be used to capture baseline management practice implementation information and subsequent surveys will be used to track changes in management practice implementation over the course of Management Plan implementation. New Management Plans submitted to the Regional Water Board in 2016 and those scheduled for near-term completion and submittal are discussed below.

### **Chlorpyrifos in Pine Creek**

A Management Plan for Chlorpyrifos in Pine Creek was approved by the Regional Water Board on December 6, 2016. A Focused Outreach Survey (FOS) was sent to growers in the Pine Creek Drainage and represented drainages on February 1, 2017, to collect baseline information upon which to compare management practice implementation information provided by future surveys from those growers who apply chlorpyrifos. Baseline FOS information received from growers is currently being compiled. BYSWQA held an outreach and education meeting on December 13, 2016 to discuss the chlorpyrifos exceedances observed in Pine Creek and the associated Management Plan.

### **Chlorpyrifos in Gilsizer Slough**

A draft Management Plan for Chlorpyrifos in Gilsizer Slough was submitted to the Regional Water Board on November 30, 2016. A FOS was sent to growers in the Gilsizer Slough Drainage on March 20, 2017, to collect baseline information upon which to compare management practice implementation information provided by future surveys from those growers who apply chlorpyrifos. Baseline FOS information submitted by growers is still being received by BYSWQC.

### **Copper in Lower Honcut Creek**

A Management Plan for Copper in Lower Honcut Creek was approved by the Regional Water Board on March 7, 2017. A FOS was sent to growers in the Lower Honcut Creek Drainage and represented drainages on March 20, 2017 to collect baseline information upon which to compare management practice implementation information provided by future surveys from those growers who apply copper. Baseline FOS information submitted by growers is still being received by BYSWQC.

### **Copper in Pine Creek**

A draft Management Plan for Copper in Pine Creek was submitted to the Regional Water Board on March 24, 2017. The Coalition received minor comments on the Management Plan on March 31, 2017, from the Regional Water Board, and is currently working to address those comments. BYSWQA sent a FOS to growers in the Pine Creek Drainage and represented drainages on February 1, 2017, to collect baseline information upon which to compare management practice implementation information provided by future surveys from those growers who apply copper. Baseline FOS information received from growers is currently being compiled.

### **Chlorpyrifos in Ulatis Creek**

The Dixon/Solano Resource Conservation District Agricultural Water Quality Coalition submitted to the Regional Water Board a Management Practices Implementation and Performance Goals (MPIPG) Report for Chlorpyrifos in Ulatis Creek in March 2013. In 2016, Regional Water Board staff requested that the Coalition review the MPIPG to determine if it conforms to the requirements for separate Management Plans specified in the Coalition's WDR because the Management Plan was not yet amenable to completion. The Coalition determined that the existing MPIPG needs to be updated to a Management Plan for Chlorpyrifos in Ulatis Creek to (1) conform to WDR requirements and (2) comply with chlorpyrifos use requirements related to the establishment of the pesticide as a state-restricted material on July 1, 2015. The Management Plan will be submitted to the Regional Water Board in May 2017.

## DO and pH analysis

Management Plans for dissolved oxygen (DO) and pH were triggered at numerous Coalition monitoring sites during the earliest years of Coalition monitoring and these parameters continue to exceed their relevant water quality objectives (WQOs) at many monitoring sites. The development of DO and pH Management Plans has been given a low priority by the Regional Water Board and the Coalition, relative to other parameters, for the following reasons:

DO and pH show (1) moderate potential for affecting aquatic life; (2) low probability of affecting other uses; (3) low probability of significant direct agricultural sources with high probability of natural causes; (4) long-term management of multiple sources likely required even with successful management of agricultural sources; and (5) lower probability of meeting WQOs by implementing management practices.

Regional Water Board Management have decided in recent months to pursue the development of DO and pH Management Plans for all Central Valley Coalitions where such Management Plans have been triggered and asked the SVWQC to develop a Management Plan approach/methodology for these two parameters.

The Coalition is currently pursuing a multistep analysis approach that will use statistical methods (conventional parametric multiple regression/ANOVA and/or non-parametric methods) and typical graphical methods to first evaluate all Coalition DO and pH data for relationships with non-agricultural environmental event-based factors including: flow, water temperature, time of day, time of year (season), event type (wet/dry), and electrical conductivity. Next, statistics will be calculated for each site for frequency of exceedance and residuals of regression on non-agricultural environmental factors. These tasks constitute Step 1 in the analysis.

Step 2 of the analysis will be to plot data and analyze for relationships between relevant drainage (site) characteristics and DO or pH exceedance statistics for each site. Drainage characteristics will be divided into the following two groups with a check for inter-relationships between non-agricultural and agricultural characteristics:

Non-agricultural characteristics: average gradient, drainage size, elevation

Agriculture-related characteristics: % crop type, % irrigate acres, % irrigation method, average nutrient concentrations, % implementation of nitrogen management practices, % implementation of sediment and erosion control practices

The next sub-step in the analysis is to evaluate drainage characteristic relationships with DO and pH for geographic patterns and inferences about agriculture's potential role and ability to manage exceedances of DO and pH.

- Relationships with non-agricultural factors indicate exceedance frequencies and patterns that are attributable to "natural background".
- Relationships with management practices and other agriculturally controllable factors indicate potential for agricultural contribution and management of exceedances.

The last sub-step in Step 2 is to characterize and prioritize drainages with DO and pH controlled by non-agricultural factors, and those warranting additional investigation, such as Source Identification Studies and/or development of formal Management Plans based on strengths of evidence for agriculture's role in contributing to exceedances. Drainages where DO and pH exceedances are determined to be controlled by non-agricultural factors would be recommended to not require a Management Plan.

For those drainages that warrant additional investigation based on evidence of agriculture's role in contributing to DO and/or pH exceedances, Step 3 in the analysis would be to determine what potential additional management practices could be implemented to reduce exceedances, followed by Step 4 that would include an assessment of the potential for increased implementation of specific management practices to actually result in an improvement in surface water quality and therefore, a reduction in exceedances.

The Coalition is currently performing Step 1 of this analysis and will share forthcoming results with Regional Water Board staff to get its approval to continue with the additional steps outlined above.

## Goals for Implementation of Management Practices

Under the previous Conditional Waiver, the Coalition was 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 Management Practice Implementation Performance Goals (MPIPG) were developed as independent documents for specific Management Plan elements. The WDR incorporated these elements into the requirements for Management Plans. Following the adoption of the WDR, MPIPGs have either been completed or are in the process of being completed with Request for Completions, or are in the process of being incorporated into updated Management Plans that conform to WDR requirements. **Table 5** contains the status of previously prepared MPIPGs as they are transitioned to meet the Management Plan requirements of the WDR.

**Table 5. Status: Submitted Management Practices Implementation and Performance Goals**

Management Plan Analytes	Water Body	Status
Malathion	Colusa Drain	RTC in preparation for 2017
Chlorpyrifos	Pine Creek	MP submitted in July 2016
Chlorpyrifos	Ulatis Creek	MP will be updated to meet WDR requirements and submitted in 2017
Malathion	Willow Slough	RTC in preparation for 2017
<i>Hyalella</i> toxicity and pyrethroid pesticides	Z-Drain	RTC in preparation for 2017

## Deliverables and Schedule for Ongoing Management Plan Elements

Deliverables to be completed in 2016 for existing Management Plans are listed in **Table 6**. The specific detailed tasks for these existing Management Plans have been provided previously.

Table 6. 2017 Deliverables for Ongoing Management Plans

	Analytes	Subwatershed	Water Body	Status	Next Deliverable <sup>(1)</sup>
Registered Pesticides	Chlorpyrifos	Butte-Yuba-Sutter	Pine Creek	Continue monitoring and implementation; Management Plan submitted;	None
	Chlorpyrifos	Solano	Ulatis Creek	Continue monitoring & implementation; MPIPG updated to a MP	Management Plan, 2017
	Diuron	Yolo	Willow Slough	Continue monitoring; RTC submitted; Requires additional monitoring	None
	Malathion	Colusa Glenn	Colusa Drain	Continue monitoring & implementation; RTC in preparation	Prepare RTC, 2017
	Malathion	Yolo	Willow Slough	Continue monitoring & implementation; RTC in preparation	Prepare RTC, 2017
Toxicity	Ceriodaphnia	Yolo	Willow Slough	Continue monitoring & implementation; RTC submitted for approval; Requires additional monitoring	None
	Hyalella	Solano	Z Drain	Continue monitoring and implementation; RTC in preparation	Prepare RTC, 2017
Trace Metals	Arsenic	Sacramento Amador	Grand Island Drain	Continue monitoring; SER submitted in 2013;	None established
	Arsenic	Butte-Yuba-Sutter	Lower Snake River	Continue monitoring;	None established
	Copper	Butte-Yuba-Sutter	Lower Honcut Creek	Continue monitoring & implementation; MP submitted and approved;	None established
	Copper	Butte-Yuba-Sutter	Pine Creek	Continue monitoring; Management Plan in preparation;	Management Plan, 2017
Legacy Pesticides	DDE	Butte-Yuba-Sutter	Gilsizer Slough	Monitoring required; Other tasks suspended by Executive Officer of the CVRWQCB;	None established
	DDE	Colusa Glenn	Lurline Creek		
	DDE	Yolo	Willow Slough		
	DDE/DDT	Colusa Glenn	Sycamore Slough	Monitoring required; Other tasks suspended; Amended RTC submitted in 2015;	None established
	DDE/DDT	Sacramento Amador	Grand Island Drain		
	DDE/DDT	El Dorado	Coon Hollow Creek		
DDE	El Dorado	North Canyon Creek			
Pathogen Indicators	<i>E. coli</i>	Butte-Yuba-Sutter, Colusa Glenn, Lake, Napa, Sacramento-Amador, Shasta-Tehama, Pit River, Solano, Yolo, Upper Feather River	29 water bodies	All Management Plan tasks suspended by Executive Officer of the CVRWQCB pending development of a region-wide strategy;	Workplan for Source ID Studies
Salinity	Conductivity, TDS, Boron	Butte-Yuba-Sutter, Colusa Glenn, Lake, Sacramento-Amador, Solano, Yolo, Upper Feather River	18 water bodies	Monitoring required; Other tasks suspended by Executive Officer of the CVRWQCB;	No deliverable requirements established
DO and pH	DO, pH	Butte-Yuba-Sutter, Colusa Glenn, Lake, Sacramento-Amador, Shasta Tehama, Pit River, PNSSNS, Solano, Yolo,	34 water bodies	Monitoring required; Other tasks suspended by Executive Officer of the CVRWQCB;	Workplan for Source ID Studies

1 MPIPG = Management Practices Implementation and Performance Plan; RTC = Request to Complete Management Plan; CSQMP = Comprehensive Surface Water Management Plan;

## TMDL COMPLIANCE REPORTING

Currently, TMDL compliance monitoring and reporting 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 (Delta), and for the Clear Lake Nutrient TMDL.

### 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 to evaluate progress in meeting these reductions and other Management Plan element requirements, and revisions to a 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>7</sup> and the Coalition's approved 2014 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 Addendum to the Management Plan presents the technical rationale for selecting the representative monitoring locations for the TMDL compliance monitoring and the schedule for chlorpyrifos and diazinon monitoring. The schedule for TMDL monitoring at these locations is included in the Coalition's annual monitoring plan updates.

The seven Basin Plan requirements for TMDL compliance monitoring are:

- Determine compliance with established water quality objectives and loading capacities in Sacramento-San Joaquin Delta and the Sacramento and Feather rivers;
- Determine compliance with established waste load allocations and load allocations for diazinon and chlorpyrifos;
- Determine the degree of implementation of management practices to reduce off-site migration of diazinon and chlorpyrifos;
- Determine the effectiveness of management practices and strategies to reduce off-site migration of diazinon and chlorpyrifos;
- Determine whether alternatives to diazinon and chlorpyrifos are causing surface water quality impacts;
- Determine whether the discharge causes or contributes to a toxicity impairment due to additive or synergistic effects of multiple pollutants; and

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<sup>7</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.

- 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 September 2016 were reported in *Management of Chlorpyrifos And Diazinon Discharges to The Sacramento And Feather Rivers and The Sacramento-San Joaquin Delta: 2016 TMDL Compliance Monitoring Report* (SVWQC, 2017). The conclusions of this report of TMDL compliance monitoring results were as follows:

- Based on the results of the routine Coalition 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 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 many of the changes were successfully implemented prior to or soon after 2005. Although exceedances are still occasionally observed, the overall trend from 2005 through September 2016 has been a decrease in the rate of annual exceedances. Exceedances observed in the TMDL tributaries monitored for compliance were determined unlikely to cause exceedances of the TMDL Load Allocations in the named TMDL receiving water bodies under any reasonably probable scenario.
- Continuing efforts to further reduce exceedances are being implemented through the Coalition Management Plans for sites that have triggered a Management Plan requirement for these pesticides. Additionally, the Coalition aggressively investigates all exceedances and conducts follow-up contact with growers reporting applications with the potential to cause specific observed exceedances. These combined efforts and the implementation of state-restricted status for chlorpyrifos are expected to result in continuation of the decreasing trend in the number of exceedances for these pesticides.

With regard to chlorpyrifos, it should also be noted that the pesticide has been identified as a high priority constituent by the California Department of Pesticide Regulation (CDPR) and was classified as a state-restricted material<sup>8</sup> on July 1, 2015. As a state-restricted material, chlorpyrifos is subject to the following restrictions:

- Chlorpyrifos can only be sold to, purchased by, possessed or used by, a person who holds a restricted material permit issued by the local County Agricultural Commissioner.

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<sup>8</sup> State-restricted materials are pesticides deemed to have a higher potential to cause harm to public health, farm workers, domestic animals, honeybees, the environment, wildlife, or other crops compared to other pesticides. Additional information available at: <http://www.cdpr.ca.gov/docs/enforce/permitting.htm>

- Chlorpyrifos must be added to an applicant's restricted materials permit. The local County Agricultural Commissioner's office must be contacted to amend a restricted materials permit to include the use of chlorpyrifos.
- A Notice of Intent (NOI) must be submitted to the local County Agricultural Commissioner's office at least 24 hours prior to the use of chlorpyrifos.

These additional restrictions on the use of chlorpyrifos are anticipated to further reduce the discharge of this pesticide to surface waters.

### **Clear Lake Nutrient TMDL**

In 2006, the Regional Water Board adopted the Clear Lake Nutrient TMDL with the goal of achieving a 40% reduction in non-point source contributions. Nonpoint source dischargers – the U.S. Bureau of Land Management, the U.S. Forest Service, irrigated agricultural dischargers, and Lake County – were given a combined load allocation of 85,000 kg phosphorus per year. As specified in the TMDL, responsible parties may choose to estimate their phosphorus loading through monitoring. At the request of Regional Water Board staff, the Coalition provided information to assist them in their preparation of the 2012 update of the Clear Lake Nutrient TMDL<sup>9</sup>. Key findings and conclusions of the TMDL Update that were relevant to agricultural stakeholders in the region include:

- The TMDL adopted by the Regional Water Board in 2006 for control of phosphorus in Clear Lake is still appropriate.
- TMDL responsible parties have taken numerous actions directed toward reducing phosphorus inputs to the lake, including developing management plans, implementing sediment reduction BMPs, applying for planning and implementation grants, and conducting monitoring. Nevertheless, there is inadequate information available to 1) determine current phosphorus loading to the Lake from the various sources, 2) evaluate the effectiveness of implemented phosphorus control practices, and 3) evaluate overall compliance with the TMDL.
- The 2017 TMDL compliance date may be unrealistic because a major component of the implementation plan (Middle Creek Flood Damage Reduction and Ecosystem Restoration Project) is behind schedule despite efforts by Lake County to move this project forward.
- Responsible parties should 1) aggressively implement sediment reduction BMPs to decrease phosphorus loading to the Lake, 2) evaluate the effectiveness of BMPs in reducing phosphorus loading to the Lake, and 3) provide this information to the Regional Water Board on an annual basis. Staff will consider regulatory options if the above actions are not implemented.

A Memorandum of Understanding (MOU) developed in October 2008 documented a roadmap for a collective approach among all the “responsible parties” for proceeding with the development of the Nutrient TMDL and resulted in a five (5) year plan. The Coalition, in

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<sup>9</sup> *Clear Lake Nutrient Total Maximum Daily Load Control Program 5-Year Update*. Regional Water Quality Control Board Central Valley Region. September 2012.

coordination with the Lake County Farm Bureau's Lake County Farm Bureau Education Corporation (LCFBEC), conducted water quality monitoring as part of the 5-year plan. The Coalition's November 2011 memorandum<sup>10</sup> to the Water Board provides the results of that monitoring and information on management practices documented by the LCFBEC in 2007, current efforts to increase the use of management practices, and additional goals the LCFBEC will consider as more becomes known about the causes of algae blooms in Clear Lake.

Based on the information provided by the Coalition in 2011, the Coalition is already meeting the "aggressive BMP implementation" objective recommended by the Regional Water Board staff in the TMDL Update:

*"To mitigate erosion, Lake County has regulated development of conversion of agricultural properties for over 10 years due to the erosion hazard. Under the current Grading Ordinance (Chapter 30, LCC, adopted July 17, 2007) implementation of BMP's is required for new agricultural properties (native vegetation to agriculture) and conversions of deep rooted crops (orchard to vineyard) on soils with a moderate to severe hazard rating. Erosion control management practices are implemented to limit the amount of sediment runoff and fertilizer runoff.*

*A 2007 survey conducted by the Lake County Farm Bureau Watershed Program indicated that 90% of vineyard acreage is maintaining a permanent or winter annual cover crop. The Lake County Winegrape Commission reports that 70% of the vineyard acreage and 145 winegrape growers have begun the process to become certified as sustainable winegrowers as part of the California Sustainable Winegrowing Alliance (CSWA). Management practices promoted by the CSWA include: soil management, cover cropping for erosion control and irrigation and nutrient management practices."*

Additionally, the Coalition initiated monitoring at a second site in 2012 to provide additional data for the TMDL and BMP effectiveness assessments. This monitoring has continued through 2016. All of the relevant data for the Clear Lake monitoring sites are routinely provided to the Regional Water Board for use in their TMDL assessments.

In July 2016, the Coalition prepared a second memorandum<sup>11</sup> to support Regional Water Board staff in its 2016 update of the Clear Lake Nutrient TMDL. The 2016 memorandum provides follow-up responses to a set of questions originally asked by Regional Water Board staff in 2011. A summary of the responses included in the 2016 memorandum are provided below:

**1. Have there been changes to the agricultural land use?**

Most of the agriculture in Lake County is irrigated, and the total irrigated acreage has decreased by about 6% between 2002 and 2016. There may be greater reduction in the actual amount of water applied because the wine grapes are commonly grown under a deficit irrigation program, and are never flood-irrigated. Based on these factors, there is an expected greater than proportional decrease in sediment and phosphorus loading based on the reduced irrigation runoff from agriculture.

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<sup>10</sup> Memorandum: Clear Lake Nutrient TMDL Progress Information Request. November 23, 2011. Prepared for the Sacramento Valley Water Quality Coalition by Larry Walker Associates, Davis, CA.

<sup>11</sup> Memorandum: Clear Lake Nutrient TMDL Progress Information Update Request: July 15, 2016. Prepared for the Sacramento Valley Water Quality Coalition by Larry Walker Associates, Davis, CA.

## 2. How have these changes in agricultural land use affected sediment and nutrient loads?

The decrease in overall irrigated agricultural acreage translates directly to less runoff from irrigated lands. How the net decrease in agriculture land use affects overall sediment and nutrient loads remains less clear, because at least some of the change has likely been due to conversion to residential land uses.

It is possible that the process of converting acreage to vineyards over the past 20 years may have resulted in some short-term increases in sediment loading (and associated phosphorus loads), due solely to the process of preparing the soils for planting the grape vines. Because grapes are long-term perennial crops, this is not expected to have a long-term effect. Although most of the agricultural acreage in the Clear Lake watershed already consists of perennial crops (~81% is grapes, walnuts, pears), it is expected that the long-term impact of the shift to vineyard acreage will be to continue to reduce net sediment loads. Additionally, some of the acreage converted to wine grapes in the Red Hills area was previously planted in dry farmed walnuts. These walnut orchards were characterized as "...not irrigated and poorly managed, leading to erosion problems on the steeper slopes in the 1980s and 1990s". Conversion of these orchards to sustainably managed wine grapes has had the effect of significantly decreased erosion from this area.

## 3. Have growers in the area implemented any new BMPs or increased implementation of "old" BMPs?

The Lake County Winegrape Commission (LCWC) reported in 2014 that more than 70 percent of Lake County growers have participated in their Code of Sustainable Winegrape Practices Self-Assessment Workbook and expect to increase that number every year (LCWC, 2014). Management practices promoted by the California Sustainable Winegrowing Alliance (CSWA<sup>12</sup>) include soil management and cover cropping for erosion control, and irrigation management (for crop quality, energy efficiency, and runoff control), and nutrient management practices.

The current level of implementation practices relevant to erosion control and sediment and phosphorus load reduction are also documented in the Lake Subwatershed's proposal for the ILRP reduced monitoring alternative<sup>13</sup>. Included in the proposal are results of the 2015 Farm Evaluations for the entire Lake County subwatershed. Some specific results of relevance to the TMDL include these widely employed practices:

- 95% of growers get the professional assistance of PCA, CCA, agronomist, soil scientist, or NRCS when preparing crop fertility plans;
- 72.3% of growers report no potential to discharge sediment to surface waters;
- More than 90% use drip, sprinklers, or microdrip as their primary method of irrigation;

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<sup>12</sup> <http://www.sustainablewinegrowing.org/aboutswp.php>

<sup>13</sup> Lake County Farm Bureau Education Corporation. 2016. Lake County Reduced Monitoring Management Practices Alternative (DRAFT). January 29, 2016.

- 78% use cover crops or native vegetation to reduce erosion; and
- 75% use minimum tillage to minimize erosion potential.

Nearly all growers also use additional irrigation and cultural practices to minimize erosion potential and soil loss from their irrigated lands. These practices are expected to continue to have a significant positive effect on reducing sediment and phosphorus loads to Clear Lake.

**4. Are the new BMPs or increased implementation of “old” BMPs achieving the 40% sediment load reduction as specified in the TMDL/Basin Plan?**

There is evidence that the increased implementation of management practices by agriculture and other responsible non-point sources named in the TMDL is decreasing sediment and phosphorus loads to Clear Lake. Water quality monitoring conducted by the Coalition for the ILRP, and by Lake County for the TMDL from 2007-2016 continues to indicate that sediments and phosphorus concentrations have decreased in waters that flow into Clear Lake since 2000. Compared to results reported in the 2004 TMDL technical report by TetraTech<sup>14</sup>, the average concentrations of TSS and total phosphorus were much lower for the 2007-2008 TMDL monitoring and for ILRP monitoring results for 2007-2011 and for subsequent monitoring conducted from 2011-2016. These results continue to support a conclusion that significant sediment loading reductions have already been realized and that the 40% reduction targets for agriculture have been achieved before the TMDL compliance deadline.

**5. If a 40% sediment load reduction can’t be definitively demonstrated at this time, how will the Coalition intend to find out if the TMDL goals are being met?**

Consistent with the approach outlined in the TMDL and working in coordination with the other non-point source responsible parties and the Regional Water Board, the Coalition will continue to evaluate the progress toward achieving the goals of the TMDL. The specific future actions planned by the Coalition to monitor and evaluate progress are:

- Continue ILRP monitoring of related analytes in Middle Creek (ongoing) with periodic evaluations as required for ILRP Management Plan reporting.
- Periodically survey all Lake County Coalition members to document management practice implementation (as required by the Coalition’s WDR).

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<sup>14</sup> Total Maximum Daily Load for Nutrients in Clear Lake, Lake County, California. Final Technical Report. Prepared for Central Valley Regional Water Quality Control Board by TetraTech. December 2004.

## **SUMMARY: EVALUATION OF MANAGEMENT PLAN PROGRESS**

The Coalition's Management Plan approach implements the processes and elements that are outlined in the Coalition's Water Quality Management Plan (2009 Management Plan), which was reorganized into the Comprehensive Surface Water Quality Management Plan (CSQMP) in 2015. The Coalition's approved CSQMP was most recently updated in November 2016. The CSQMP complies with the requirements set forth in the Coalition's Waste Discharge Requirements (WDR), Order No. R5-2014-0030-R1, and Monitoring and Reporting Program (MRP) adopted by the Regional Water Board in March 2014.

In general terms, the processes to meet the requirements of the Management Plan can be distilled to these elements – 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 Regional Water Board for a large number of Management Plan requirements for pesticides, toxicity, pathogen indicators, 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. Specific trackable goals (Management Practice Implementation and Performance Goals MPIP-Gs) for a number of pesticide and toxicity Management Plans have been developed and submitted to the Regional Water Board beginning in 2011. Although most of these MPIP-Gs were never comprehensively reviewed by the Water Board, implementation to meet these goals was initiated in the subwatersheds in anticipation of Regional Water Board approval. Assessment of progress toward specific implementation goals will continue to be conducted regularly as documented in individual approved MPIP-G documents and as required by the current WDR and approved CSQMP until these pre-2014 Management Plans are completed.

With regard to new Management Plans developed pursuant to the WDR and CSQMP and submitted to the Regional Water Board beginning in 2016, assessment of progress toward completion of the Management Plan will be based on the tracking of actions focused on reducing the risk of exceedances of the target constituent above its water quality objective (WQO) and thus, helping to improve surface water quality in the representative drainage and represented drainages, as applicable. Actions will be implemented by responsible parties (subwatershed leads and staff, along with their designees) according to a schedule that results in compliance with a specific WQO in a time frame that is as short as practicable, but may not exceed 10 years from the date the Management Plan is submitted for approval by the Regional Water Board's Executive Officer.

The approach to managing a target constituent will include the establishment of performance goals meant to reduce the discharge of the constituent to surface waters. Performance goals are typically represented as changes in behaviors of those applying a particular constituent. A typical mechanism for achieving changes in behaviors is through general outreach and education to growers and applicators, as well as targeted outreach and education to growers and applicators who apply a pesticide in the drainage where the Management Plan exists. A quantitative measure of progress is evaluated based on achievement of outreach and education goals, along with the

tracking of changes in behaviors as measured by the frequency of implementation of specific management practices likely to reduce the discharge of a target constituent to surface waters. The frequency of management practices implementation is measured at the beginning of the Management Plan (baseline management practices assessment – using the Farm Evaluation or Focused Outreach Surveys) and over time as growers and applicators are exposed to continued outreach and education and subsequent water quality monitoring data. Management practices implementation will commonly be reassessed on an annual basis. Finally, the Coalition, subwatersheds, and Regional Water Board staff will assess the achievement of performance goals according to the schedule for their attainment included in an approved Management Plan and reported in annual Progress Reports.

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 31 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 continues to make good progress toward meeting these requirements and expects to achieve the goals of the current approved Management Plan and the approved CSQMP update that is currently in development.

### **PROPOSED CHANGES TO THE COMPREHENSIVE SURFACE WATER QUALITY MANAGEMENT PLAN**

The Coalition's currently approved Management Plan and updates have been integrated into a Comprehensive Surface Water Quality Management Plan (CSQMP) to meet the requirements of the Coalition's WDR, Order No. R5-2014-0030, and Monitoring and Reporting Program (MRP) adopted by the Regional Water Board in March 2014. The Coalition's approved CSQMP was most recently updated in November 2016.