
Central Valley Regional Water Quality Control Board

30 March 2017

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APPROVAL OF THE COMPLETION OF MANAGEMENT PLAN REQUIREMENTS FOR *CERIODAPHNIA DUBIA* TOXICITY IN STONY CREEK

Thank you for your 10 July 2013 request to deem the management plan requirements complete for *Ceriodaphnia dubia* (*Ceriodaphnia*) in Stony Creek in the Colusa Glenn Subwatershed of the Sacramento Valley Water Quality Coalition (Coalition). The primary basis for completion is that water quality objectives for *Ceriodaphnia* toxicity are being met, and extensive outreach efforts and management practices have been implemented in the subwatershed to effectively address the water quality impairment.

The information provided in the Coalition's request letter and the attached staff memorandum support the conclusion that growers are implementing practices to manage pesticide applications. The lack of *Ceriodaphnia* toxicity exceedances since February 2011 demonstrates the effectiveness of the management practices in resolving the water quality problem. For these reasons, I have determined that the Management Plan requirements for *Ceriodaphnia* are complete.

If you have any questions or comments regarding this approval letter, please contact Lynn Coster by phone at (530) 224-2437 or by email at Lynn.Coster@waterboards.ca.gov.

Original signed by

Pamela C. Creedon
Executive Officer

Enclosure: Review of the Sacramento Valley Water Quality Coalition's Management Plan Completion Request for *Ceriodaphnia dubia* Toxicity in Stony Creek

cc: Bruce Houdesheldt, Northern California Water Association
Michael Troughon, Larry Walker Associates

Central Valley Regional Water Quality Control Board

TO: Susan Fregien
Senior Environmental Scientist
Irrigated Lands Regulatory Program

FROM: Lynn Coster
Senior Environmental Scientist
MONITORING AND IMPLEMENTATION UNIT
IRRIGATED LANDS REGULATORY PROGRAM

DATE: 14 March 2017

SUBJECT: REVIEW OF THE SACRAMENTO VALLEY WATER QUALITY COALITION'S
MANAGEMENT PLAN COMPLETION REQUEST FOR *CERIODAPHNIA DUBIA*
TOXICITY IN STONY CREEK

On 10 July 2013, the Sacramento Valley Water Quality Coalition (Coalition) submitted a request to approve completion of the *Ceriodaphnia dubia* (*Ceriodaphnia*) toxicity management plan for Stony Creek in the Colusa Glenn Subwatershed in accordance with Waste Discharge Requirements General Order for Growers within the Sacramento River Watershed that are Members of a Third-party Group Order R5-2014-0030-R1 (Order) and Attachment B, Appendix MRP-1 to the Order. The original request for management plan completion was based upon the Coalition's contention that agricultural sources did not contribute to the observed exceedances. Subsequently, the request was updated to include the Coalition's finding that Stony Creek is meeting the water quality objective (WQO) for *Ceriodaphnia* toxicity and management practices implemented in the subwatershed have proven to be effective.

Management plans may be completed in one of two ways: irrigated agriculture is demonstrated not to be causing or contributing to the water quality problem, or the improved management practices have resolved the water quality problem and the water quality data show at least three years of compliance.

The request was reviewed to determine if the key components required for completion have been met. These requirements are:

- a) Demonstration through evaluation of monitoring data that the water quality problem is no longer occurring (i.e., three or more years with no exceedances during the times of the year when previous exceedances occurred) or demonstrated compliance with the Order's surface and groundwater receiving water limitations.
- b) Documentation of third-party education and outreach to applicable Members in the watershed where water quality impairment occurred.
- c) Documentation of Member implementation of management practices that address the water quality exceedances.
- d) Demonstration that the management practices implemented by Members are effective in addressing the water quality problem.

Monitoring data. The Stony Creek on Hwy 45 near Rd 24 (STYHY) monitoring site characterizes water from the contributing area downstream of Black Butte Reservoir just north of the town of Orland and includes approximately 20,000 acres of irrigated lands (Figure 1). The management plan in Stony Creek was based on exceedances in February 2007 at the STYHY site and in December 2007 at an upstream location near Highway 99 (STYNN)¹ where significant toxicity to *Ceriodaphnia* was observed (Figure 2). The December 2007 sample collected at the Stony Creek on County Road P (STYCP) site was free of toxicity. No monitoring for water column toxicity in Stony Creek occurred from 2008 through 2010. When monitoring resumed at the STYHY site in February 2011, toxicity to *Ceriodaphnia* was observed. The Coalition monitored Stony Creek for toxicity to *Ceriodaphnia* during the storm seasons in 2012 and 2013, and samples showed no toxicity. The site was dry during the scheduled monitoring months of January through March 2014 and March 2015. Monitoring conducted in January 2015 and January and March 2016 showed no toxicity. More than three years of monitoring have occurred during the times of the year when previous exceedances occurred with no exceedances of the WQO.

Potential sources. There were no exceedances of monitored pesticides in the two samples with observed toxicity in 2007. In addition, no exceedances of metals have been observed in the subwatershed, and extensively monitored organophosphate pesticides show a very low rate of detections with no exceedances since 2006. However, the Coalition does not monitor for pyrethroids in the water column. Based on the staff evaluation of Pesticide Use Report (PUR) data for the period before toxicity was observed, pyrethroids are potential candidate compounds that could have caused toxicity to *Ceriodaphnia*. In the 11 April 2012 review of the Coalition's Source Evaluation Report, staff suggested that monitoring for pyrethroids in the water column should be considered in order to better understand potential sources of toxicity to *Ceriodaphnia*.

The Coalition prepared summaries of pesticides (monitored and non-monitored) used in the month prior to the observed toxicity, and assessment of relative risk based on toxicity information. The analysis and interpretation of the PUR information took into account the method of application, solubility and potential for runoff. While pyrethroids are generally characterized by low solubility and low potential for runoff, many compounds have a greater potential for transport and resuspension in water during storm events when turbulent flows and "flushing" are present. Therefore, pyrethroids should not have been ruled out as causes of the observed toxicity during the wet season storm events. Pesticide applications during the month prior to each sample event with toxicity are listed below.

- **75% survival on 2/8/2007 at STYHY².** Applied pesticides: diazinon, esfenvalerate, copper, cyprodinil.
- **0% survival on 12/19/2007 at STYNN².** Applied pesticides: esfenvalerate, copper.
- **0% survival on 2/16/2011 at STYHY².** Applied pesticides: bifenthrin, esfenvalerate, methidathion, copper, fungicides and oil dormant spray

¹ Two upstream sites, STYNN and STYCP, were monitored because the STYHY monitoring site was dry in December 2007.

²Glenn County Department of Agriculture application data.

These pesticide applications are potential causes of the exceedances, and rejecting agricultural sources is not justified. The Coalition stated that no pesticide exceedances are associated with the toxicity, but not all of the applied pesticides were analyzed.

Gravel mining, urban runoff and residential use of pesticides are suggested as potential non-agricultural sources of toxicity. One toxic sample was collected in December 2007 upstream of Orland at STYNN, excluding urban runoff as a source. In addition, a concurrent sample directly downstream from Orland, at STYCP, had 100% survival. Illegal dumping, use of old cars and asphalt in erosion control, and unknown toxicants are also mentioned but with no compelling explanation or reported follow-up. It is not clear if the speculated sources have been mitigated in the meantime, as recent samples have been free of toxicity.

Two of the three toxic samples (December 2007 and February 2011) required a toxicity identification evaluation (TIE) to be conducted as a result of the >50% reduction in survival of *Ceriodaphnia*. In both instances, the TIEs were inconclusive because toxicity did not persist.

Third-party outreach and management practice implementation. Because no specific agricultural cause was definitively identified, there was no targeted outreach to promote pesticide-specific management practices. An extensive history of outreach and education for the Colusa Glenn subwatershed has been documented by the Coalition in Annual Monitoring Reports, however. In addition to annual grower meetings, they have partnered with local RCDs, Farm Bureaus, and University of California Cooperative Extension to promote best management practices and to provide educational information through meetings, seminars, workshops, and newsletters. The Coalition suggests that grower awareness conducted in the subwatershed following the exceedances may have contributed, in part, to the lack of toxicity observed since February 2011.

Farm Evaluation Surveys from 2015 document the widespread implementation of management practices in the Colusa Glenn subwatershed. The surveys describe pesticide, irrigation, nutrient, and erosion and sediment control management practices being employed and the extent to which those practices are being implemented.

The results of the 2015 Farm Evaluation Surveys show a high rate of implementation of management practices that are protective of water quality. Results for the Willow Creek Drainage, which includes Lower Stony Creek and monitoring site Stony Creek on Hwy 45 near Rd 24 (STYHY), show that 100% of the Member parcels reported implementing at least one pesticide application practice. Approximately 83% of the parcels implemented two practices, and 81% implemented three practices. The most commonly implemented pesticide management practices include:

- Follow label restrictions.
- Follow County Permit.
- Monitor Wind Conditions.

The Farm Evaluation Surveys also show a high rate of implementation of irrigation and cultural practices to manage sediment and erosion. Results show that 100% of the parcels implemented

at least one irrigation practice, approximately 66% implemented at least two practices, and 40% implemented three practices. The most commonly implemented irrigation practices include:

- Shorter irrigation runs with checks to manage and capture flows.
- Time between pesticide applications and the next irrigation is lengthened as much as possible to mitigate runoff of sediment bound pesticide residue.
- No irrigation drainage due to field or soil conditions.

All of the Member acres reported the use of at least one cultural practice to manage sediment, approximately 78% implemented at least two practices, and 61% implemented at least three practices. The most commonly implemented cultural practices include:

- Cover crops or native vegetation to reduce erosion.
- Vegetated ditches to remove sediment as well as water soluble pesticides, phosphate fertilizers, and some forms of nitrogen.
- Minimum tillage incorporated to reduce erosion.

Staff recommendation:

Staff concluded there is sufficient evidence to justify management plan completion. Monitoring data shows three years with no exceedances during the time period of previous exceedances and demonstrates that the water quality problem is no longer occurring. Management practices and third-party education and outreach to growers have been documented. Sufficient measures have been taken to manage pesticide applications and to prevent agricultural contributions to sediment and erosion discharges in the drainage. Based on the lack of toxicity, management practices are demonstrated to be effective in meeting the water quality objective. As a requirement in the Order, the Coalition will continue to report on the subwatershed's implementation of management practices through Farm Evaluation Surveys reported annually in high vulnerability areas and every five years for all farming operations in low vulnerability areas. The requirements for completion have been met, and staff recommends the approval of the request to complete the management plan for *Ceriodaphnia* toxicity in Stony Creek.

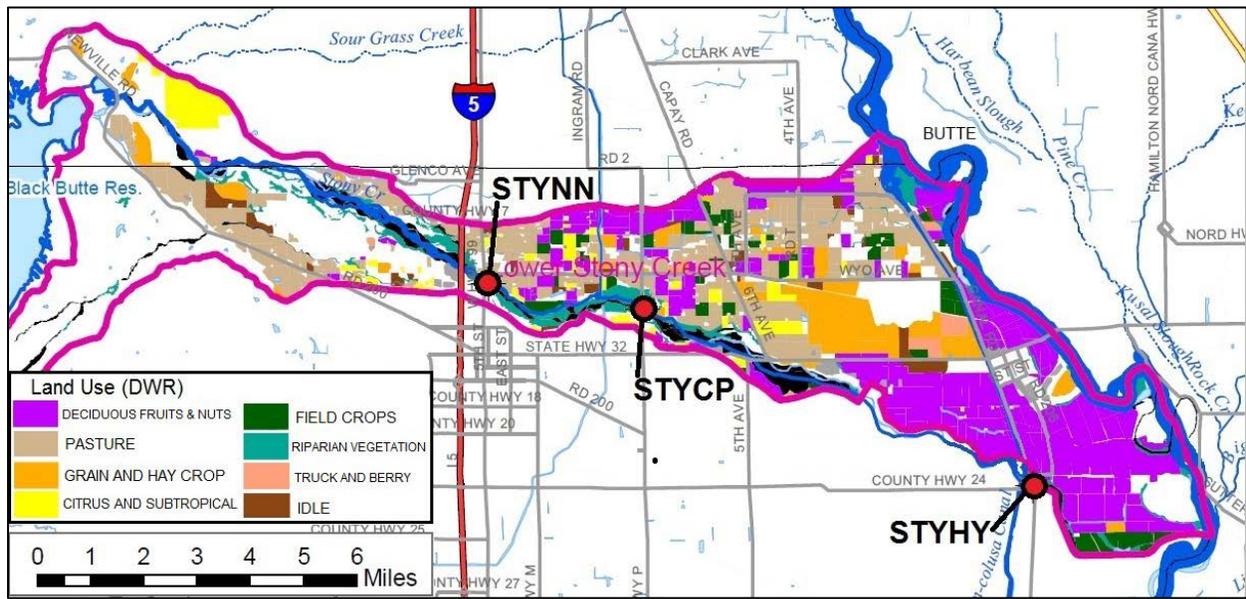
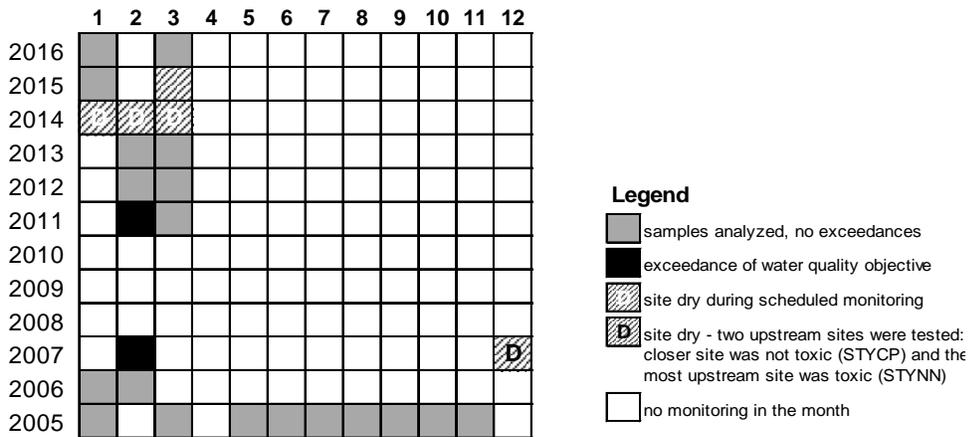


Figure 1. Land use in the Lower Stony Creek subwatershed (modified from the Coalition's 2014 AMR).

Ceriodaphnia toxicity in Stony Creek

Monitoring Results



Legend

- samples analyzed, no exceedances
- exceedance of water quality objective
- site dry during scheduled monitoring
- site dry - two upstream sites were tested: closer site was not toxic (STYCP) and the most upstream site was toxic (STYNN)
- no monitoring in the month

Figure 2. Monitoring results for toxicity to *Ceriodaphnia* in Stony Creek. Results of monitoring are shown by year (rows) and month (columns). Each cell represents one month, and the cell fill indicates if monitoring took place and if results were in compliance with the water quality objectives.