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February 26, 2013

Pamela Creedon, Executive Officer  
Central Valley Regional Water Quality Control Board  
11020 Sun Center Drive, Suite 200  
Rancho Cordova, California 95670-6114

**RE: Management Plan Completion Request – Butte Slough *Selenastrum* Toxicity**

Dear Ms Creedon:

The Sacramento Valley Water Quality Coalition (Coalition) and Butte-Yuba-Sutter subwatershed water quality coalition request Executive Officer approval for completion of the *Selenastrum* Management Plan for Butte Slough. The basis for this request is the (1) achieving compliance with the water quality objective for toxicity in Butte Slough, (2) successful completion of the California Rice Commission (CRC) Algae Management Plan (AMP) and Propanil Management Plan.

#### **BACKGROUND FOR MANAGEMENT PLAN REQUIREMENT**

The requirement for the Coalition's management plan was triggered by two (2) *Selenastrum* (algae) toxicity exceedances in 2005. These occurred in July 2005 (13% reduction in algae growth) and August 2005 (20% reduction in algae growth) at the Butte Slough at Pass Road monitoring site. Monitoring is coordinated between the Coalition and the California Rice Commission (CRC) at this site. No definitive cause of toxicity was identified for either case of observed toxicity to *Selenastrum* in Butte Slough. In both cases, TIE's were not triggered by the relatively low toxicity observed (13% and 20% reductions in algae growth).

#### **DATA AND EXCEEDANCES**

*Selenastrum* toxicity monitoring data collected by the Coalition and the California Rice Commission (CRC) are provided in Table 1. A total of 56 toxicity sample events have been conducted at the Butte Slough location, with 16 exceedances observed from April 2005 through May 2008. No exceedances were reported after May 2008. A total of 35 different herbicides have been monitored in Butte Slough by the Coalition (summarized in Table 2). Additional data for herbicides monitored by the CRC for their Algae Management Plan and Propanil Management Plan are referenced in the attached documents approving completion of these plans.

#### **EVALUATIONS SUPPORTING REQUEST**

The following evaluations were conducted to support this request:

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Assessment of Compliance with Water Quality Objectives	No <i>Selenastrum</i> toxicity exceedances have been observed in Butte Slough in the 28 sample events since the last exceedance in May 2008.
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Assessment of potential agricultural contributions to exceedances	<p>The CRC Algae Management Plan was approved as completed in 2010 because rice pesticides monitored were determined not to contribute to algae toxicity.</p> <p>The CRC Algae Propanil Management Plan was approved as completed in 2010 because propanil was determined not to contribute to algae toxicity.</p> <p>Herbicides monitored by SVWQC were not detected or were detected below concentrations that would cause or contribute to toxicity. [Synergistic effects were not directly studied, but the lack of toxicity in associated and independent toxicity tests indicate that detected herbicides were not contributing to synergistic toxicity.]</p>
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There have been a total of 59 samples analyzed over 56 sample events conducted by the CRC and the Coalition for algae toxicity. As reported both the Coalition and the CRC's Annual Monitoring Reports (AMR) for 2010 and 2011 there have been a total of 24 sample events conducted from June 2008 through December 2012 without *Selenastrum* toxicity since the last exceedance was observed in May 2008 (Figure 1, Table 1).

CRC's toxicity testing methods prior to 2009 included addition of ethylenediaminetetraacetic acid (EDTA) to *Selenastrum* toxicity tests. The use of EDTA in CRC's pre-2009 tests artificially increased growth in algal control media by approximately two-fold compared to algal control media without EDTA, and may have contributed to inappropriate findings of toxicity. Tests with EDTA included all of the toxicity exceedances with reductions below 80% of controls, and no tests without EDTA resulted in algal growth less than 80% compared to controls. Because of the change in methods, CRC's pre-2009 algae toxicity results can't be directly compared with more recent results. However, after the use of EDTA was eliminated, there were no further exceedances in CRC algae toxicity tests. EDTA was not used in any SVWQC toxicity tests, and there were no reductions in algal growth below 80% of controls in any of these tests. These results indicate that the compliance with the narrative water quality objective for toxicity is being achieved in Butte Slough when analyzed using the appropriate non-EDTA test method.

Review of the chemical analyses for the exceedances in 2005 that triggered the Coalition's management plan determined that no herbicides (or other pesticides) monitored for the ILRP were detected. Review of pesticide application data before the period these two Coalition events identified oxyfluorfen, propanil, and thiobencarb as agriculturally applied herbicides with substantial potential to contribute to the observed *Selenastrum* toxicity. None of these three herbicides were monitored for these specific events in 2005. However, in subsequent years each of these herbicides has been monitored by the CRC or the Coalition for the ILRP, and has not been detected at concentrations expected to cause toxicity to *Selenastrum* (Table 2).

The Coalition submitted a Source Evaluation Report (SER) to the Central Valley Regional Water Quality Control Board (Regional Water Board) in March 2010. The SER references the results of the CRC Algae Management Plan, which was approved as completed by the Regional Water Board in April 2010. As the Coalition SER states on Page 5,

*“Monitoring conducted from 2004-2009 for the ILRP by the California Rice Commission (CRC) found significant toxicity in approximately 39% of the samples (n=36) collected from Butte Slough. The CRC also monitored many herbicides and fungicides commonly used on rice. Sixteen different pesticides were analyzed in multiple samples (Table 6; 2006-2009 ILRP data). Of these, only five were detected (azoxystrobin, clomazone, molinate, propanil, and thiobencarb) and none approached concentrations toxic to Selenastrum (Table 7). **Based on these results, none of the pesticides monitored by CRC were likely to be the cause of the observed toxicity in SVWQC or CRC samples.** (emphasis added).”*

In the Coalition’s 2010 SER, the next steps proposed for the management plan were to continue coordination with CRC sampling in Butte Slough to analyze for the pesticides with the highest potential to contribute to the observed toxicity (propanil, oxyfluorfen, and thiobencarb). These steps were completed and there has been no evidence indicating these pesticides were contributing to algae toxicity in Butte Slough. Additionally, under the Rice Pesticide Program (RPP), ongoing weekly sampling for thiobencarb was also initiated in mid-May and continued through mid-July in both 2010 and 2011. There were no exceedances of the thiobencarb performance goal of 1.5 µg/L in either year, and detected thiobencarb did not approach concentrations expected to be toxic to Selenastrum (~17 µg/L).

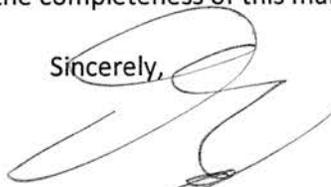
Additionally, the CRC voluntarily submitted a Propanil Management Plan that was approved by the Executive Officer on April 30, 2010. As required under the approved MP, propanil sampling occurred weekly at the Butte Slough monitoring site during the peak application period starting in early-June and lasting until late July. The results of the propanil monitoring effort indicated that propanil was not an ongoing cause of toxicity in Butte Slough, and on March 9, 2012 the CRC request to terminate the Propanil Management Plan received Executive Officer approval.

There was no outreach conducted targeting specific pesticides because no pesticides were identified as likely causes of the observed toxicity, and SVWQC only conducted general outreach informing growers in the drainage of the observed toxicity and the Management Plan. No implementation of additional practices was recommended or warranted based on the findings of source evaluations and management plan monitoring by SVWQC or CRC. Consequently, the outreach conducted by SVWQC is not considered as part of the basis for this request for completion of the management plan. For the same reasons, there was no significant additional targeted outreach conducted by the CRC to address potential causes of algae toxicity.

## CONCLUSIONS

Based on the monitoring results above, Butte Slough is meeting the water quality objective for toxicity, agriculture is not contributing to Selenastrum toxicity exceedances, and the Coalition respectfully requests that you make a determination of the completeness of this management plan.

Sincerely,



David J. Guy  
President  
Northern California Water Association

Cc: Joe Karkoski  
Susan Fregien  
Mark Cady  
Larry Lloyd  
Juleah Cordi  
Bruce Houdesheldt  
Claus Suverkropp

Figure 1. *Selenastrum* toxicity test results for Butte Slough, 2004 – 2012 (SVWQC and CRC Data)

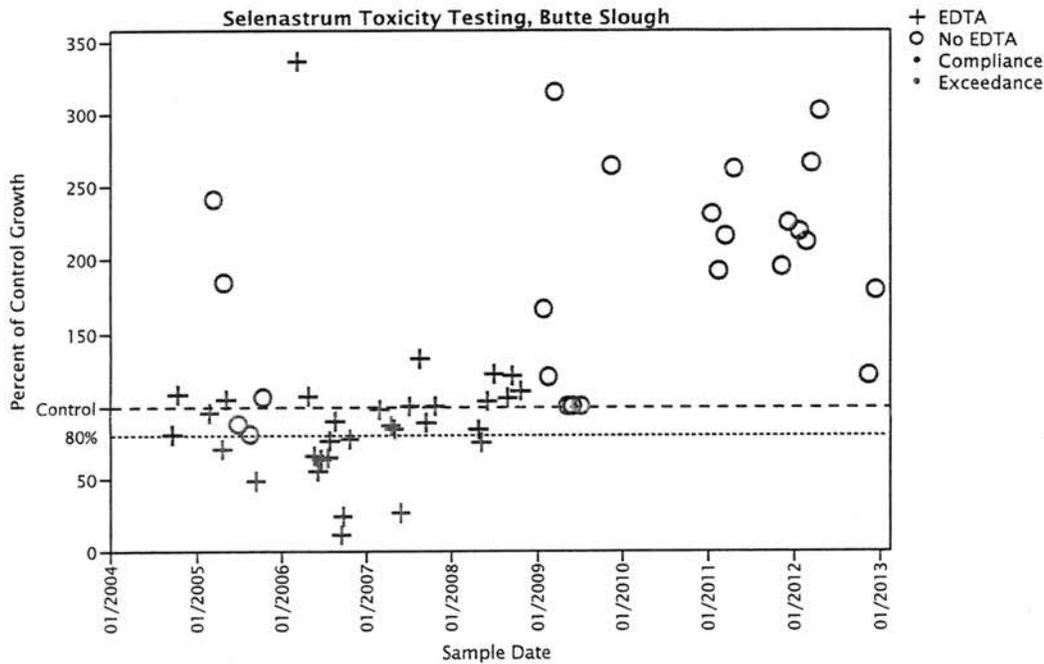


Table 1. *Selenastrum* toxicity test results for Butte Slough, 2004 – 2012 (SVWQC and CRC Data)

Sample Date	EDTA ?	Result	Exceedance?	Sample Date	EDTA ?	Result	Exceedance?
9/28/04	Yes	80	No	4/29/08	Yes	84	No
10/19/04	Yes	108	No	5/13/08	Yes	74	Exceedance
3/2/05	Yes	95	No	6/3/08	Yes	103	No
3/19/05	No	241	No	7/1/08	Yes	122	No
4/26/05	Yes	70	Exceedance	8/26/08	Yes	105	No
5/3/05	No	184	No	9/16/08	Yes	120	No
5/10/05	Yes	104	No	10/21/08	Yes	110	No
7/5/05	No	87	Exceedance	1/28/09	No	166	No
8/24/05	No	80	Exceedance	<i>replicate</i>	No	166	No
9/20/05	Yes	47	Exceedance	2/18/09	No	120	No
10/18/05	No	106	No	3/17/09	No	315	No
3/7/06	Yes	336	No	<i>replicate</i>	No	306	No
4/25/06	Yes	107	No	5/13/09	No	100	No
5/30/06	Yes	65	Exceedance	6/2/09	No	100	No
6/13/06	Yes	54	Exceedance	7/7/09	No	100	No
6/22/06	Yes	63	Exceedance	11/17/09	No	264	No
7/25/06	Yes	64	Exceedance	1/18/11	No	231	No
8/1/06	Yes	75	Exceedance	2/16/11	No	192	No
8/22/06	Yes	89	No	3/16/11	No	216	No
9/20/06	Yes	10	Exceedance	4/21/11	No	262	No
9/27/06	Yes	23	Exceedance	11/9/11	No	195	No
10/25/06	Yes	77	Exceedance	12/8/11	No	225	No
2/27/07	Yes	97	No	<i>replicate</i>	No	223	No
4/24/07	Yes	86	Exceedance	1/24/12	No	219	No
5/8/07	Yes	84	Exceedance	2/23/12	No	212	No
6/5/07	Yes	25	Exceedance	3/15/12	No	266	No
7/10/07	Yes	100	No	4/19/12	No	302	No
8/21/07	Yes	132	No	11/14/12	No	121	No
9/18/07	Yes	88	No	12/12/12	No	179	No
10/23/07	Yes	100	No				

Table 2. Herbicides Monitored by SVWQC in Butte Slough

Pesticide	Period Monitored		Total Samples	Number Detected	Max Concentration, µg/L	Algae EC50 from ECOTOX, µg/L
Ametryn	3/2/06	9/19/06	7			
Atraton	3/2/06	9/19/06	7			
Atrazine	3/2/06	9/19/06	7			
Azoxystrobin	4/24/07	9/16/08	8	1	0.87	106
Barban	6/8/05	9/20/06	10			
Bensulfuron-methyl	9/20/06	9/16/08	3			
Bis Pyribac Sodium	4/25/06	9/16/08	8			
Bromacil	6/8/05	9/20/06	10			
Carfentrazone	4/25/06	9/16/09	16			
Chlorothalonil	1/18/11	1/18/11	1			
Chloroxuron	6/8/05	9/20/06	10			
Chlorpropham	6/8/05	9/20/06	10			
Clomazone	9/20/06	9/16/09	10	3	2.5	3500
Cyanazine	3/2/06	9/19/06	7			
Cyanazine	9/18/07	9/18/07	2			
Cyhalofop Butyl	9/20/06	9/16/08	9			
Dacthal	5/24/06	9/19/06	3			
Diuron	6/8/05	9/20/06	10			
Diuron	9/20/06	9/16/08	4			
Fenuron	6/8/05	9/20/06	10			
Fluometuron	6/8/05	9/20/06	10			
Glyphosate	3/18/06	9/16/09	16			
Halosulfuron Methyl	9/18/07	9/16/08	3			
Linuron	6/8/05	9/20/06	10			
Merphos	1/27/05	9/19/06	14			
Metribuzin	9/18/07	9/18/07	2			
Molinate	4/25/06	9/16/08	54	20	6.34	220
Monuron	6/8/05	9/20/06	10			
Myclobutanil	9/18/07	9/18/07	2			
Neburon	6/8/05	9/20/06	10			
Oryzalin	6/8/05	9/20/06	10			
Oxamyl	6/8/05	9/20/06	10			
Oxyfluorfen	1/18/11	11/14/12	11	1	0.012	0.08
Paraquat	3/18/06	9/20/06	6			
Pendimethalin	9/20/06	9/16/09	10			
Penoxsulam	9/18/07	9/16/09	10			
Prometon	3/2/06	9/19/06	7			
Prometryn	3/2/06	9/19/06	7			
Propachlor	6/8/05	9/20/06	10			
Propanil	6/8/06	7/26/11	50	26	4.4	29
Propazine	3/2/06	9/19/06	7			
Propham	6/8/05	9/20/06	10			
Propoxur	6/8/05	9/20/06	10			
Secbumeton	3/2/06	9/19/06	7			
Siduron	6/8/05	9/20/06	10			
Simazine	3/2/06	9/16/08	17	2	0.02	100
Simetryn	3/2/06	9/19/06	7			
Tebuthiuron	6/8/05	9/20/06	10			
Terbutylazine	3/2/06	9/19/06	7			
Terbutryn	3/2/06	9/19/06	7			
Thiobencarb	3/18/06	9/16/08	42	19	1.99	17
Triclopyr	9/18/07	6/2/09	5			
Trifloxystrobin	9/20/06	9/16/08	8			
Trifluralin	7/18/06	7/18/06	1			