



**BEST BEST & KRIEGER**  
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March 16, 2009

**VIA EMAIL AND U.S. MAIL**

Danny McClure  
Regional Water Quality Control Board  
Central Valley Region  
11020 Sun Center Drive, Suite 200  
Rancho Cordova, CA 95670  
dmccclure@waterboards.ca.gov

Re: Proposed Revisions to the 303(d) List of Impaired Water Bodies

Dear Mr. McClure:

On behalf of the Southern San Joaquin Valley Water Quality Coalition ("SSJVWQC"), we submit comments to supplement our recent testimony relative to the proposed 303d listings in our coalition area.

It had been frustrating trying to get our arms around these listings because the data supporting the listings have been elusive. We had expected such data to have been available at the oral hearing, but that was not the case. Instead, copies of an electronic disc were made available. We took such a disc and have been attempting to extract relevant data on these listings therefrom.

Follows are the proposed listing which we believe should be withheld from listing at this time.

**Lower Kings: Listing Decision 9243. Ammonia.**

The electronic data indicates that of 28 samples, only three of which were at levels deemed to be problematic. We have several comments:

1. All three data points are old data from six and seven years ago.
2. These data points indicate very limited evidence of ammonia (.9 mg/l, .71 mg/l, .59 mg/l).
3. The standard is itself elusive and is represented in the listing document as  $CMC = (0.275/(1+107.204-pH)) + 39.0/(1+10 pH - 7.204)$ . This formula is meaningless as it does not at all clarify for the coalition the actual level deemed significant.
4. The document itself indicates, "Based on the readily available data, the weight of evidence indicates that there is not sufficient justification for placing this water segment/pollution combination on the section 303d list." "3 of 28 available concentrations does not exceed the allowable concentrations of the listing policy." (emphasis added)

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We concur with the assessment that this data does not support listing, especially when coupled with the low levels, old data and the fact that the SSJWQC will continue to monitor nutrient loads. Consequently, this listing is unnecessary and not well founded.

**Lower Kings: Listing Decision 15767. Unknown Toxicity.**

The electronic data supporting this listing references 41 samples of algae growth taken by the SSJWQC which demonstrated toxicity. As stated at the hearing, and as outlined in the attached comments by the KRCD/SSJWQC, it was determined by SSJWQC and the Regional Board, Fresno Office, that these data were the result of erroneous lab practices, and these were not toxic readings. This listing is therefore entirely without support.

**Lower Kings: Listing Decision 6975. Toxaphene.**

The SSJWQC has submitted extensive water column toxicity and specific chemical (toxaphene) tests taken prior to and pursuant to the ILP ag waiver, and no evidence of any toxaphene presence has been discovered. After this data was submitted to the Regional Board, the Board staff has indicated that historical data showed that some white bass had flesh residue of toxaphene (an ag chemical not used for over 30 years), therefore the SSJWQC has consulted with Department of Fish and Game about appropriate fish to sample (there are no longer any white bass) so as to supplement the water data to remove this listing under the next 303(d) listing review.

**Lower Kern, North Fork: Listing Decisions 15949 and 15950. pH.**

The lower Kern River and the North Fork are proposed to be listed for pH based on older SWAMP data (2002-2004 data). First, we take note that the USFS, Sequoia National Forest has submitted significant additional data that must be taken into account. The USFS also points out that fire and other factors during these critical times likely skewed this data. The Regional Board should re-evaluate these listings after supplementing the database.

Moreover, the pH listing relied on data that only exceed the 8.3 pH basin plan by .1 to .3. So, even this data is virtually "at" the pH standard rather than being exceedance.

The listing on the lower Kern is not now unnecessary as, subsequent to this SWAMP data, the Regional Board ILP compels the Kern subcoalition of the SSJWQC to monitor pH and develop management plans if persistent problems are evidenced.

**Kaweah: Listing Decision 11963. Unknown Toxicity.**

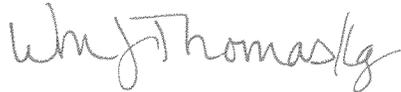
This proposed listing is from three-year old data and only represents two or three exceedances from 15 samples. Even though this minimally qualifies per the listing criteria it should be recognized that no recent data has demonstrated the toxicity problem. Because the ILP now requires continual

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monitoring, it seems prudent to wait one further listing period to see if the problem has been eliminated or not. As soon as several more samples are taken evidencing no problem, these old exceedance data will be below the listing threshold.

Thank you for considering these comments.

Sincerely,



William J. Thomas  
for BEST BEST & KRIEGER LLP

WJT:lmg

attachments

# BEST BEST & KRIEGER

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**William J. Thomas**  
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File No. 09977.00001

August 25, 2008

Central Valley Regional Water Quality Control Board  
Attn: Mr. Gene Davis  
11020 Sun Center Drive # 200  
Rancho Cordova, CA 95670-6114

Re: Removal of the Kings River from the section 303(d) List for Toxaphene

Dear Mr. Davis:

Best Best & Krieger LLP represents the Kings River Conservation District ("District"). The District requests the Central Valley Regional Water Quality Control Board ("Regional Board") to review and assess the supporting data provided with this application to remove the Kings River from the section 303(d) impaired water segment list. The original listing of Toxaphene on the lower Kings River was made with limited data. The continued listing of the Kings River for Toxaphene is totally inappropriate because extensive sampling data shows that Toxaphene has not been detected in the Kings River at any time during the sampling period between January 2004 and September 2007. Therefore, the Kings River meets the delisting criteria under section 4.1 of the *Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List* ("Listing Policy") adopted by the State Water Resources Control Board in September 2004. The compiled testing data is attached to this letter as Exhibit A.

The District requests this reassessment pursuant to Sections 4 and 4.1 of the Listing Policy. Section 4 provides that any interested party may request an existing listing be reassessed under the delisting factors of this policy. The District submits this application to the Regional Board pursuant to such section 4. Section 4 also provides that a water segment or pollutant shall be removed from the section 303(d) list if any of the conditions specified in individual sections 4.1 through 4.11 are met.

Under section 4.1, Numeric Water Quality Objectives, Criteria, or Standards for Toxicants in Water, a water segment will have met water quality objectives if water quality criteria are not exceeded as follows:

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- Using the binomial distribution, waters shall be removed from the section 303(d) list if the number of measured exceedances supports rejection of the null hypothesis as presented in Table 4.1.
- The binomial distribution cannot be used to support a delisting with sample sizes less than 28.

In this case, the listed segment at issue is the Lower Kings River (Island Weir to Stinson and Empire Weirs). This segment unquestionably meets the delisting criteria for Toxaphene. The sample size was 100, which is much greater than the minimum 28, and there were zero detections. These results far surpass the criteria established under section 4.1 which provide for a certain number of detections at certain levels referred to as "exceedances." Zero detections or exceedances overwhelmingly supports the rejection of the null hypothesis present in Table 4.1 of the Listing Policy. Therefore, the Kings River listing for Toxaphene should be expeditiously removed from the State's 303d list.

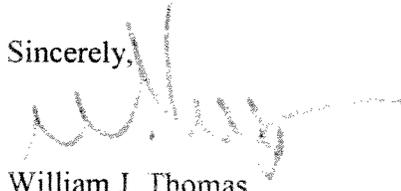
I served on the State Board's PAG Advisory Committee which developed the listing and delisting criteria adopted by the State Water Resources Control Board. This application is consistent with the intent of the policy to remove water segments from the 303(d) that have achieved the required water quality standards.

The name of the organization providing this information is the Kings River Conservation District. The name of the person certifying the completeness and accuracy of the data and information is David Cone, Deputy General Manager of the District. Contact information for the person responsible for answering questions about the information submitted is as follows:

William J. Thomas, Esq.  
Best Best Krieger LLP  
400 Capitol Mall, Suite 1650  
Sacramento, CA 95814  
(916) 325-4000 Phone  
(916) 325-4010 Fax

Thank you for your attention in this matter. If there are any questions or concerns please contact me at the above address.

Sincerely,



William J. Thomas  
for BEST BEST & KRIEGER LLP

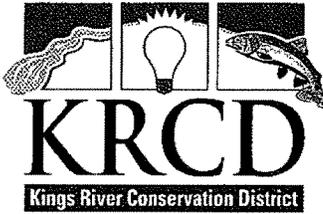
WJT: jes  
Enclosure  
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KINGS RIVER SUB-WATERSHED

TOXAPHENE RESULTS

All Values in ug/L unless noted  
 ND = Not Detected  
 NS = Not Sampled  
 J = Estimated Value  
 Below Lab Reporting Limit

Sample Date	Reporting Limit	ACOE Bridge	Mitt Creek	Manning Ave	Mousing Dup	Lemoore Weir	Lemoore Dup	Jackson Ave	James Weir
1/3/2004	0.5 ug/L	NS	NS	ND	NS	ND	NS	ND	NS
8/9/2004	0.5 ug/L	NS	NS	ND	NS	NS	NS	NS	NS
2/22/2005	0.5 ug/L	NS	NS	ND	NS	ND	NS	ND	NS
3/15/2005	0.5 ug/L	NS	NS	ND	NS	ND	NS	ND	NS
4/12/2005	0.5 ug/L	NS	NS	ND	NS	ND	NS	ND	NS
5/10/2005	0.5 ug/L	NS	NS	ND	NS	ND	NS	ND	NS
6/7/2005	0.5 ug/L	NS	NS	ND	NS	ND	NS	ND	NS
7/19/2005	0.5 ug/L	ND	NS	ND	NS	ND	NS	ND	ND
8/23/2005	0.5 ug/L	ND	NS	ND	NS	ND	NS	ND	NS
9/27/2005	0.5 ug/L	ND	NS	ND	NS	ND	NS	ND	NS
12/21/2005	0.5 ug/L	ND	NS	ND	NS	ND	NS	ND	NS
1/4/2006	0.5 ug/L	ND	ND	ND	NS	ND	NS	ND	NS
2/23/2006	0.5 ug/L	ND	ND	ND	NS	ND	NS	ND	NS
3/1/2006	0.5 ug/L	ND	ND	ND	NS	ND	NS	ND	NS
3/15/2006	0.5 ug/L	ND	ND	ND	NS	ND	NS	ND	NS
4/25/2006	0.5 ug/L	ND	ND	ND	NS	ND	NS	ND	NS
5/16/2006	0.5 ug/L	ND	ND	ND	NS	ND	NS	ND	NS
6/21/2006	0.5 ug/L	ND	ND	ND	NS	ND	NS	ND	NS
7/18/2006	0.5 ug/L	ND	NS	ND	NS	ND	NS	ND	ND
8/15/2006	0.5 ug/L	NS	NS	ND	NS	ND	NS	ND	ND
9/5/2006	0.5 ug/L	NS	NS	NS	NS	NS	NS	ND	NS
10/3/2006	0.5 ug/L	NS	NS	NS	NS	NS	NS	ND	NS
2/21/2007	0.5 ug/L	NS	NS	NS	NS	NS	NS	ND	NS
3/1/2007	0.5 ug/L	NS	NS	NS	NS	NS	NS	ND	NS
3/14/2007	0.5 ug/L	NS	NS	NS	NS	NS	NS	ND	NS
4/11/2007	0.5 ug/L	NS	NS	NS	NS	NS	NS	ND	NS
5/1/2007	0.5 ug/L	NS	NS	NS	NS	NS	NS	ND	NS
6/14/2007	0.5 ug/L	NS	NS	NS	NS	NS	NS	ND	NS
7/12/2007	0.5 ug/L	NS	NS	NS	NS	NS	NS	ND	NS
8/15/2007	0.5 ug/L	NS	NS	NS	NS	NS	NS	ND	NS
9/5/2007	0.5 ug/L	NS	NS	NS	NS	NS	NS	ND	NS



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March 10, 2009

Mr. Danny McClure  
Regional Water Quality Control Board  
Central Valley Region  
11020 Sun Center Drive, Suite 200  
Rancho Cordova, CA 95670

Re: Proposed Revisions to the 303(d) List of Impaired Water Bodies  
Proposed Listing - Kings River, Lower (Pine Flat Reservoir to Island Weir)

Dear Mr. McClure:

We have reviewed the proposed revisions to the 303(d) List of Impaired Water Bodies and must object to the listing of a portion of the Kings River as impaired due to some "unknown toxicity". We believe that this proposed listing is inappropriate and not supported by existing data.

Page 19 of Appendix A: Proposed Changes to the 303(d) List identifies the Kings River, Lower (Pine Flat Reservoir to Island Weir) as a waterbody segment to be listed as impaired for the pollutant "unknown toxicity". Since we monitor the water quality in the Kings River on a regular basis, the only possible reason for the listing would be for "toxicity" of algae. Under our monitoring program, we have sampled the water for toxicity. One of the toxicity tests involves algae (*Selenastrum capricornutum*) growth.

During the period July 6, 2004 through April 11, 2007, we tested Kings River water at 4 monitoring sites for water quality. Of the 86 samples tested for toxicity, 43 (50%) demonstrated significantly reduced algae growth. Under water quality criteria, "significantly reduced algae growth" is considered as "toxicity". Under the Irrigated Lands Regulatory Program, there was concern that the "toxicity" was the result of discharges from irrigated agriculture into the Kings River. We did not believe that this was the "cause" so we began sampling the river immediately below Pine Flat Reservoir at the Army Corp of Engineers (ACOE) Bridge. There is no irrigated land above the Reservoir. Other than the recreational use of the Reservoir, there are no other significant sources of possible impacts to water quality in the watershed; therefore, the water released from the Reservoir is considered Kings River source water.

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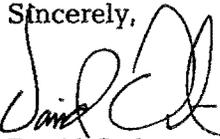
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The water samples taken at the ACOE Bridge also demonstrated "significantly reduced algae growth" or "toxicity". As a result, we worked with the local office of the Regional Board to determine if the laboratory results were correctly identifying "toxicity". From our joint analysis, it was determined that the "toxicity" results were not reflective of water quality but are related to laboratory methods. Enclosed is a copy of a letter written to the Regional Board on August 10, 2007, which summarizes this issue.

In closing, the listing of the Kings River, Lower (Pine Flat Reservoir to Island Weir) as impaired for an "unknown toxicity" is neither appropriate nor justified. It should be removed from the Proposed List.

If you have any questions, please do not hesitate to contact David Cone of my staff at (559) 237-5567, extension 126.

Sincerely,



David Orth  
General Manager

DO/DC/sjs

Enclosure: As stated

Cc: Regional Board, Fresno office (with enclosure)  
William Thomas (with enclosure)

**Kings River Sub-Watershed**  
a member of the  
**Southern San Joaquin Valley Water Quality Coalition**  
4886 East Jensen Avenue  
Fresno, CA 93725  
(559) 237-5567

August 10, 2007

Central Valley Regional Water Quality Control Board  
Attention: Irrigated Lands Program  
1685 "E" Street  
Fresno, CA 93706

Re: Amendment to Kings River Sub-Watershed MRP for Water Column  
Toxicity Testing

Ladies and Gentlemen:

Since the beginning of the Ag Waiver Program, the Kings River Sub-Watershed (through its managing agency, the Kings River Conservation District (KRCD)) has conducted sampling as prescribed by the Ag Waiver at Regional Board approved MRP sites along the Kings River. Beginning in December 2005, at KRCD's own initiative and expense, additional sampling has been conducted at 2 additional sites (U. S. Army Corps of Engineers Bridge (ACOE Bridge) ½-mile below Pine Flat Dam and Mill Creek a downstream tributary) in order to characterize Kings River source water. This was to establish a baseline for water quality on the Kings River before it enters the area where it can be impacted by irrigation agriculture.

KRCD expanded its testing of the waters at ACOE Bridge to include Phase II monitoring for pesticides, metals, and nutrients when we began Phase II sampling in July 2006. This further characterized the mineral content of the water so that ambient conditions could be better understood. Since we had acquired sufficient data to characterize the source water of the Kings River, we terminated our sampling at the ACOE Bridge as well as at Mill Creek in May 2007.

As a result of the significantly reduced algae (*Selenastrum capricornutum*) growth problems identified in Phase I, we continued to sample for Water Column Toxicity beyond the required under Phase I. This was identified in our MRP.

The purpose of this communication is to outline the reasons why the Kings River Sub-Watershed is amending its MRP to discontinue Water Column Toxicity testing at our 4 MRP monitoring sites with our last samples in August 2007. We will have conducted Water Column Toxicity from July 2004 through August 2007 (3 years).

### The Problem

As I explained to the Regional Board on August 2, 2007, and as your staff is well aware, significantly reduced algae growth in the Kings River has been a continuing issue since the inception of our monitoring program (July 2004). It is not uncommon for samples to be returned from the laboratory (Sierra Foothill Laboratory, SFL, Jackson, CA) showing statistically significant differences in growth between the lab control and the samples submitted. Currently 43 (50%) of our 86 samples from our 4 MRP monitoring sites have demonstrated significantly reduced algae growth.

The purpose of doing the algae testing is to determine the effects of any potential contamination on the bottom rung of the food chain, knowing that impacts here may eventually occur further up. *Selenastrum capricornutum* is a standard test organism for many types of aquatic contamination studies, because of its relative ease of culture and reliability in detecting problems. The other two toxicity tests look at the potential impacts on higher organisms for the same reasons. With very few exceptions, the Kings River has not had any significant mortality to the higher organisms tested, and when those exceptions occurred, no specific cause or causes could be identified from the chemical analyses performed. KRCD considers these events the result of random statistical chance, not the result of any contamination within the watershed.

There is no pattern as to when or where the reduced algae growth takes place. It occurs year round, during both irrigation and storm events. Very few samples actually showed increases in growth over the control.

In order to determine the cause for this pattern, it is necessary to eliminate certain factors from consideration. These include:

1. **Temperature.** It cannot be temperature dependent, because the shipping procedures for the sample require that they be transported at or below 4°C. Samples at ACOE Bridge typically run 8-9°C when collected, so chilling to below 4°C is not a great shock to the sample. Field samples are collected, packed in a cooler with "blue-ice" to maintain temperatures close to or lower than sampling temperature for transport, and packed/repacked with cubed ice prior to transport the

next morning. Samples arrive at the lab approximately 30 to 36 hours after sampling, giving the lab a minimum twelve hour window to begin testing. All hold times have been observed, so it not a problem with the lab not getting to the samples quickly enough.

2. **Dissolved Oxygen.** Dissolved oxygen (DO) is not an issue, as the field measurements of DO are all above the Basin Plan Objectives (BPO) for the Tulare Basin. Samples are also collected and subjected to a Winkler titration, which confirms the results from the field instrumentation. In addition, releases are made through the Pine Flat Power Plant Bypass as required to maintain the DO for the Fisheries Management Program and maintain compliance with the plant's FERC license.

**The Physical Characteristics**

This leaves the physical characteristics of the water itself. A chemical analysis of the water used for the control sample and the submitted river sample show practically no difference in chemical content *except* in a few parameters. These are electrical conductivity (EC), pH, and hardness.

Table One shows the comparison between the elements/compounds tested for by the laboratory when it conducts its annual audit of its control water and the list of constituents tested for in the Phase II tests by the Kings Sub-Watershed, (APPL Inc., Fresno, CA). Those tests in common are in **bold**.

**Table One:** Comparison of SFL Tests to APPL Tests for Kings River Sub-Watershed Samples.

<b>EC</b>	<b>Color</b>	<b>Cadmium</b>
<b>pH</b>	Bicarbonate	<b>Copper</b>
<b>TDS</b>	Carbonate	<b>Lead</b>
<b>Turbidity</b>	Phosphorus	<b>Nickel</b>
<b>Nitrate-N</b>	Sulfate	<b>Selenium</b>
<b>Nitrite-N</b>	Chloride	<b>Zinc</b>
Orthophosphate-P	<b>Arsenic</b>	<b>Hardness</b>
Ammonia-N	Barium	TKN
Boron		

SFL also tests for a number of other materials that the Kings River Sub-Watershed does not contract APPL to test for, and these material are listed in Table Two.

**Table Two:** SFL Tests for Elements/Compounds not Contracted for with APPL by Kings River Sub-Watershed

Aluminum	Sodium	Magnesium, Calculated
----------	--------	-----------------------

Beryllium	Thallium	Chromium
Fluoride	Antimony	Alkalinity, Hydroxide
Calcium	Alkalinity, as CaCO <sub>3</sub>	Iron
Foaming Agents	Manganese	VOC's
Mercury	Odor	Silver
Corrosivity		

**Discussion**

Table Three shows a comparison between the SFL tests and the APPL tests for those items in common. As can be seen, for a majority of the items tested, very little difference in chemical makeup is seen.

**Table Three: Comparison of SFL and APPL Results for Tests in Common**

Constituent	Units	SFL	APPL by Test Date			
			2-21-07	3-1-07	3-13-07	4-11-07
EC	umhos/cm	184	31.2	31.5	33.3	35
pH		7.7	6.93	6.94	6.88	6.86
TDS	mg/l	110	22	26	24	26
Turbidity	NTU	<0.1	0.3	0.35	0.43	0.025
Nitrate-N	mg/l	0.25	0.74	0.85	0.88	0.98
Nitrite-N	mg/l	<0.05	ND	ND	ND	ND
Color		<3	1	5	5	8
Arsenic	ug/l	<2	0.64	0.46	0.68	0.65
Cadmium	ug/l	<1	0.058 J	0.16 J	0.047 J	0.049 J
Copper	ug/l	<50	0.59	ND	ND	0.55
Lead	ug/l	<3	ND	0.16 J	ND	0.13 J
Nickel	ug/l	<5	0.75	0.35 J	0.65 B	0.42 J
Selenium	ug/l	<2	0.39 J	ND	ND	0.34 J
Zinc	ug/l	<5	13.3 J	14.4 J	2.4 J	3.3 J
Hardness	mg/l	88	10.1	10	12.1	13

"J" indicates reading below PQL limit at lab. "B" indicates that tested material was found in blank.

While only the 2007 tests are shown here, the results are typical of what has been found in the Kings River samples dating back to July 2006.

Several characteristics of the Kings River samples are at variance with the SFL control water. These include EC, pH, TDS, Nitrate-N, and Hardness. Of these characteristics, only Nitrate-N is reported higher in the Kings River samples, but only marginally so.

The magnitude of the differences between the control and the samples for each of the above characteristics is considerable. The most prominent

difference is the EC level. The control solution is nearly 6 times higher than that of the sample, yet the concentration of the materials within the solution are nearly the same as the sample. The TDS measurement is also about 6 times higher in the control solution, and the pH has shifted from slightly acidic (sample) to a stronger alkaline condition for the control. Finally, Hardness is running about 7 times higher in the control than the sample. It is the purity of the Kings River samples that could be an underlying cause of the significantly reduced algae growth.

Electrical Conductivity has been consistently low for the Kings River, regardless of the sampling point. With the exception of storm water runoff from the Mill Creek watershed (an ephemeral creek that empties into the Kings below Pine Flat), the EC values of the Kings rarely exceeds 60 umhos/cm. Even during the flood event of 2006 when samples were available at James Weir (the last diversion point on the north fork of the Kings River), the EC values of the water were only in the 40-50 umhos/cm range. This is after the river had run its complete course through the agricultural lands covered by the Kings River Sub-watershed, a distance of some 79 miles.

#### **Other Sampling and Laboratory Results**

Over the course of the last year (May 2006 through April 2007, 10 events), samples at ACOE Bridge demonstrated significantly reduced growth for algae at all events, regardless of flow levels (345 cfs, April 2007 to 12,878 cfs, May 2006). Since no irrigated agriculture occurs upstream of the sampling site (approximately ½ mile downstream of Pine Flat Dam) or in the upper Kings watershed, the water is considered source water for the system and is not impacted by irrigated agricultural activities.

Samples of the source water (Kings River at the ACOE Bridge and Mill Creek) have demonstrated significantly reduced algae growth in 20 of the 27 samples. The Kings River at ACOE Bridge had 15 out of 17 and Mill Creek had 5 out of 10 demonstrate algae growth problems.

The results of the algae testing were so unusual (no clear cut reason for the problem had been detected) that the Regional Board staff of the Fresno office accompanied KRCD staff members to collect independent samples during an irrigation event in 2006. The Regional Board's samples were sent to the California Fish and Game lab for analysis, with no significant reduction in algae growth reported (Lab # P-2442, September 25, 2006) for either of the two sample sites. Yet the samples sent to the lab contracted by KRCD reported that both samples from the same sites demonstrated significant reductions in growth.

With this inconsistency in mind, KRCD submitted two additional samples (collected in February 2007: one irrigation event sample and one storm event sample) to another lab (one used by other Sub-Watersheds of the Southern San Joaquin Valley Water Quality Coalition) for evaluation. The results from the tests conducted by the other lab did not show algae growth problems for the 2 samples. Our lab reported growth problems for both of our samples.

In July 2006, we began Phase II of the monitoring program. To our knowledge, we have not had an exceedance for pesticides, metals, and/or nutrients at any of our monitoring sites. Therefore, since the Kings River source water is not impacted by irrigated agriculture and demonstrates algae growth problems, it is unlikely that these other constituents would be causing the problem.

### **Further Investigation**

In attempting to determine the cause of this paradox, we contacted a scientist with extensive experience in using algae as an indicator for herbicide toxicity within water samples. His opinion is that a time lag exists between the growth rate curves for the control sample and the river sample, and that at the end of the prescribed 96-hour run of the test, the river sample, while showing positive growth that parallels the control growth curve, has not had enough time to match the total cell population of the control group. His opinion, based on the literature he provided and sample data we submitted, is that if the tests were carried out to an end-point of approximately 10 days, the two samples would have similar cell concentrations, or even the sample might exceed the control. The charts in the literature he submitted suggests that if the test were run for another 48 hours, the control growth would have leveled out and the sample growth would then match up at that point. The reference is as follows:

Hughes, Jane S., Alexander, Meryl M., and Balu, K. **An Evaluation of Appropriate Expressions of Toxicity in Aquatic Plant Bioassays as Demonstrated by the Effects of Atrazine on Algae and Duckweed.** *Aquatic Toxicology and Hazard Assessment: 10<sup>th</sup> Volume, ASTM STP 971*, W.J. Adams, G. A. Chapman, and W. G. Landis, Eds., American Society for Testing and Materials, Philadelphia, PA 1988, pp. 531-547.

His opinion is that the cause of the time lag is due to acclimatization of the sample culture to the river samples. Some of this can be due to the changes in water characteristics between the control sample (which is the medium the algae cells are used to) and the river sample, with its much lower values of EC, pH, TDS, and Hardness, as well as the changes in the specific ion concentrations within the control and river samples. This creates a "shock" effect that delays the onset of cell reproduction once the test is initiated.

The sudden change in EC and other values may also be causing an osmotic effect on the algae cells. The low EC water, with its very high osmotic potential, migrates into the cells where the osmotic potential is lower, potentially causing some cellular lysis to occur. This in effect reduces the available cellular population available to reproduce, thus also negatively impacting the observed growth rates.

Since the Coalition is not in the laboratory business nor does it conduct actual research, this is only included as one of the explanations for the reduced algae growth.

### **Conclusion**

Since the quality of the source water is beyond the control of the Kings River Sub-Watershed, beyond the scope of the Irrigated Lands Program, there is very little variation from the previous sampling, and we have been unable to identify a potential source of the problem from irrigated agriculture, it is our intention to discontinue Water Column Toxicity testing at our 4 MRP monitoring sites after our last irrigation event sampling this year (August 2007). Phase II testing will continue as listed in Table 1 under Regional Board Order No. R5-2005-0833 at all 4 MRP sites for irrigation and storm events.

Please contact me if your have any questions or wish to discuss this further.

Sincerely,



David Cone  
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Kings River Sub-Watershed  
(A Member of the SSJWQC)

DC/dr

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