303(d) Listing for Unknown Toxicity on the Kings River: Evidence in Support of Not Listing

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Lines of Evidence: Water Flea

*Ceriodaphnia dubia*

- One Incidence of Statistical Mortality in 50 samples
  - 75 percent survival reported Sept. 5, 2006 at Manning Ave ILRP site
- Does Not meet Listing Requirements under Table 3.1 (requires 5 of 50 samples to list)
Lines of Evidence: Fathead Minnow

*Pimephales promelas*

- Two Incidences of Statistical Mortality in 50 Samples
  - One at Manning Ave ILRP site on Feb. 23, 2006 showed 88 percent survival
  - One at Lemoore Weir ILRP site on Feb. 23, 2006 showed 55 percent survival
- Does Not meet Listing Requirements under Table 3.1 (requires 5 of 50 samples to list)
Lines of Evidence: Algae

*Selenastrum capricornutum*

- Issues with REDUCED GROWTH since inception of ILRP
- All Algae tests referenced for listing run through same laboratory
- No chemical constituents identified in Phase II testing as cause of "toxicity"
- All samples showed Positive growth, but not at same growth rate as control
Lines of Evidence: Algae

*Selenastrum capricornutum*

- Investigation

Regional Board Staff in Fresno Office collected a water sample on same date and location (September 2006) as KRCD and sent it to Fish and Game lab

  - No Significant Differences detected by Fish and Game, but Significant Differences by KRCD contracted lab

- Second Split-Sample study sent samples to KRCD contracted lab and identical samples to Fruit Growers Laboratory (one storm sample, one irrigation sample)

  - Both FGL samples came back as NO SIGNIFICANT DIFFERENCE

  - KRCD samples showed Significant Differences
Lines of Evidence: Algae

*Selenastrum capricornutum*

**Investigation**

1. Considerable freedom exists within method leading to inconsistent results from one lab to another (not comparable data).

2. Client (KRCD) not told initially that control water in test could be reformulated to match hardness levels of sample water.

   - Control water at primary lab was \textbf{6 times higher} in both Electrical Conductivity and Hardness than Kings samples.
# Control vs Sample Water

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Units</th>
<th>SFL</th>
<th>APPL 02-21-07</th>
<th>APPL 03-01-07</th>
<th>APPL 03-13-07</th>
<th>APPL 04-11-07</th>
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</thead>
<tbody>
<tr>
<td>EC</td>
<td>umhos/cm</td>
<td>184</td>
<td>31.2</td>
<td>31.5</td>
<td>33.3</td>
<td>35</td>
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<tr>
<td>TDS</td>
<td>mg/L</td>
<td>110</td>
<td>22</td>
<td>26</td>
<td>24</td>
<td>26</td>
</tr>
<tr>
<td>Hardness</td>
<td>mg/L</td>
<td>88</td>
<td>10.1</td>
<td>10</td>
<td>12.1</td>
<td>13</td>
</tr>
</tbody>
</table>
Lines of Evidence: Algae
Selenastrum capricornutum

- Investigation
  - This fact, according to a USGS researcher familiar with this test, contributes to a “shock effect” on the algae, which delays its growth curve (osmotic shock effects?)
  - A special test run to 8 days (method time is 4 days) confirmed that the sample will statistically match the control sample after the shock effect subsides.
Lines of Evidence: Algae

*Selenastrum capricornutum*

- **Investigation**
  - Tests run May 2009 using hardness matching water as a control sample showed that the river sample actually matched or exceeded the control in algae growth
    - Water sample was collected from a site with no agricultural activity upstream
  - All future algae tests under the new MRP to be run in a similar manner (toxicity will be because of a chemical constituent, not because of the control water)
Lines of Evidence: Algae

*Selenastrum capricornutum*

**Conclusion**

- All previous tests available to Regional Board Staff (via ILRP reports and SWAMP) were run with Control waters running 6 times (minimum) higher in EC and Hardness than sample water.
- Shock effect of placing test organism in “softer, less saline” water temporarily inhibited growth.
- Reformulating Control Water to match sample water EC and Hardness shows no toxicity effects.
Conclusions

- Water Flea and Fathead Minnow data insufficient to list under Table 3.1 of the Listing Policy

- Lab issues with regards to Control Water makeup lead to the statistical differences in sample vs. control tests, primarily due to freedom within prescribed method
  - Said freedom does not allow for comparison between labs for the algae testing (inconsistent application of method)

- This resulted in the “toxicity” seen in the algae tests, not because of an agriculturally related constituent
Conclusions

- Request that 303(d) listing for Unknown Toxicity on the Kings River be **Rejected** or **Delayed** 1-year to reevaluate the impact of the method on the results obtained.

- This issue is currently before the ILRP TIC, and has been discussed by the labs and staff for the last 2 years.