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Karuk Tribe

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July 16, 2014

Victoria Whitney
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Division of Water Quality
State Water Resources Control Board
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Charles Andrews
Associate Director
California Department of Pesticide Regulation
PO Box 4015
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candrews@cdpr.ca.gov

RE: Withdraw Permit for Algaecide Application

Dear Ms. Whitney and Mr. Andrews,

The Karuk Tribe would like to formally request that the State Water Resources Control Board (SWRCB) withdraw Pacificorp's permit to use an algaecide in Copco and Iron Gate Reservoirs. On April 11, 2014 the SWRCB's Division of Water Quality granted Pacificorp the permit with an enrollee number of 1A12159NSIS. The permit violates Cultural Beneficial Uses in the mid and lower Klamath River and may impact water quality standards.

Impacts to Cultural Beneficial Uses

The Karuk Tribe strongly feels that the application of algaecides upstream of Karuk Ancestral Territory is a violation of our Cultural Beneficial Uses. The Karuk Tribe opposes the use of any algaecides or other chemicals in Copco or Iron Gate Reservoir as the chemicals may be transported through Karuk Ancestral Territory. The Karuk Tribe is actively involved in World Renewal Ceremonies throughout the summer months. Our

ceremonies require direct contact with the Klamath River, including the medicine man ritualistically bathing in the River. In August and September, Karuk Tribal members are subsistence fishing in the Klamath River to provide food for their families and elders. The only way for the SWRCB to correct the violation to our Cultural Beneficial Use is to withdraw Pacificorp's permit for algaecide application immediately.

Applying Chemicals without Public Notification of Application Dates

Pacificorp has applied chemicals to Iron Gate Reservoir three times this year: 6/24/14, 7/1/14, and 7/15/14. The Karuk Tribe and state and federal Agencies were not notified of the application of chemicals until July 15, 2014 during a meeting. The application of algaecides during the Karuk Tribe's World Renewal Ceremonies is a violation of our Cultural Beneficial Uses. The application of the chemicals without informing any downriver Tribes, downriver communities, and state and federal agencies should be a violation of Pacificorp's algaecide permit. The SWRCB should immediately withdraw Pacificorp's algaecide permit.

Data Suggests that Algaecides Exacerbate Water Quality Issues

The report "2013 Localized Treatment of Long Gulch Cove in Iron Gate Using Environmentally Safe Algaecide" (Watercourse Engineering 2014) documents that the permitted algaecide was ineffective in controlling toxins from the nuisance blue-green algae bloom. Two out of three Post-Event[1] samples in the integrated[2] September sample from the area treated with algaecide increased and showed substantially higher microcystin than all samples from the non-treated area. Moreover, subsequent to algaecide treatment, all September samples in the treated area remained well above public health guidelines (1 station >8; ppb the remaining stations >100ppb).

The permitted algaecide may also be applying selective pressure that favors more toxigenic strains of microcystin. On April 30, 2014, Tim Otten and Theo Dreher of Oregon State University presented "DNA fingerprinting and source-tracking of *Microcystis* populations throughout the Klamath River system" at the Klamath Basin Monitoring Program (KBMP) meeting in Yreka, CA (Otten and Dreher 2014; see link to presentation). Otten and Dreher's work indicates that oxidative stress may exert strong selection pressure favoring toxigenic strains of microcystin. Thus applying an algaecide such as the one allowed in Pacificorp's permit (GreenClean acts as a strong oxidizer) has the potential to select for toxigenic strains of *Microcystis aeruginosa*. If such strains are enhanced in the reservoirs, there is a higher likelihood of microcystin toxin to be transported downriver. Otten and Dreher's work also indicated that Iron Gate Reservoir was a direct conduit for downstream *Microcystis aeruginosa* populations. Therefore, detrimental impacts from algaecide applications in the reservoir directly impact the downriver area important to the Karuk Tribe.

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[1] Post-Event refers to samples collected ~24 hours after treatment with algaecide.
[2] Taken over the top 6 m (or less if the water column was less than 6.5 m) of the water column.

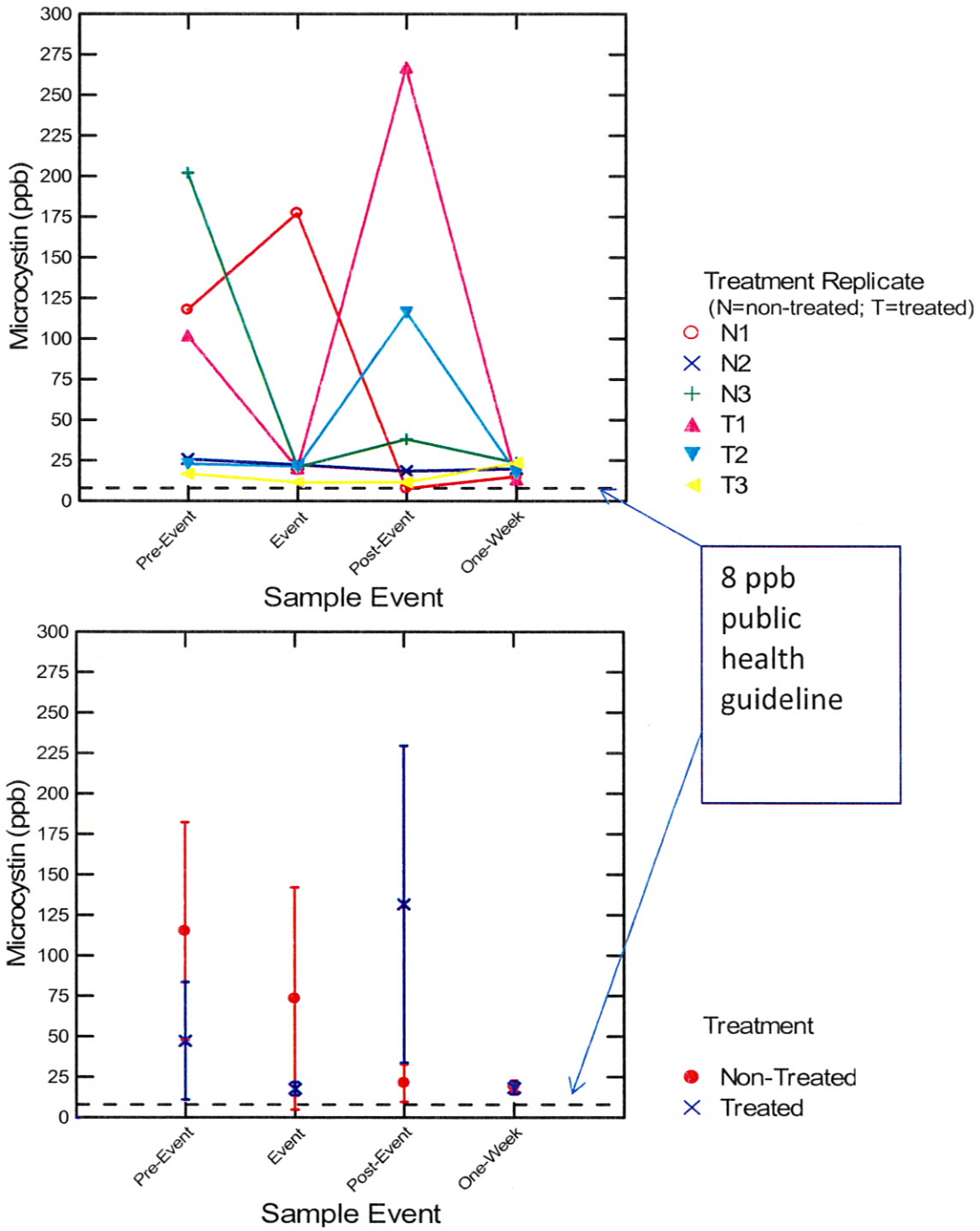

Figure 1. Microcystin concentration during the September algaecide application in Irongate Reservoir. Data source :Table A-22 (Watercourse Engineering 2014). (pre-event = background conditions prior to treatment; event = immediately after treatment; post-event = next day; one-week = one-week after treatment)

In summary, 1) the permitted algaecide been shown to be ineffective at controlling levels of algal toxin in Iron Gate Reservoir, 2) increased levels of microcystin toxin were observed post-treatment, 3) research indicates that oxidative stress (the utilized algaecide acts as a strong oxidizer) may apply selective pressure that enhances toxigenic strains of *Microcystis,* and 4) recent genetic work clearly shows that Iron Gate Reservoir serves as a direct conduit for downstream transport of *Microcystis* populations. The application of an algaecide upriver of Karuk Ancestral Territory has a direct impact on Karuk Cultural Benefical Uses. The only clear solution for these issues is to immediately withdraw Pacificorp's algaecide permit.

Please contact Susan Corum, Mainstem Water Quality Coordinator, scorum@karuk.us, (530) 469-3456, with any questions regarding these comments.

Sincerely,

Leaf Hillman
Director
Department of Natural Resources
Karuk Tribe

cc: Matthias St. John, Executive Office, North Coast RWQCB, 5550 Skylane Boulevard, Suite A, Santa Rosa, CA 95403, Matt.St.John@waterboards.ca.gov

Jane Diamond, Director, Water Division, USEPA Region 9, 75 Hawthorne Street, Mail Code: WTR-1, San Francisco, CA 94105, Diamond.jane@Epa.gov

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Caren Trgovcich, Chief Deputy Director, SWRCB, PO Box 100, Sacramento, CA 95812-0100, caren.trgovcich@waterboards.ca.gov

Felicia Marcus, Board Chair, SWRCB, PO Box 100, Sacramento, CA 95812-0100, felicia.marcus@waterboards.ca.gov

References:

Otten T. and T. Dreher. 2014. DNA fingerprinting and source-tracking of *Microcystis* populations throughout the Klamath River system. Powerpoint Presentation to Klamath Basin Monitoring Program (KBMP. April 2014. Yreka CA. www.kbmp.net/images/stories/pdf/KBMP_minutes/meeting_14/3.%20DNA%20fingerprinting%20and%20source-tracking%20of%20Microcystis%20populations%20throughout%20the%20Klamath%20River%20system_OSU.pdf

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