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To: Tim Hemstreet, Pacificorp
From: Crystal Bowman, Karuk Tribe
Date: May 16, 2013
Re: Comments of PacifiCorp 2012 Draft Reports

INTRODUCTION

Klamath Hydroelectric Settlement Agreement (KHSA) included Interim Measure 11 (IM-11). The purpose of Measure 11 is to improve water quality in the Klamath River during the Interim Period leading up to dam removal. It is intended to emphasize nutrient reduction projects in the watershed, while also addressing water quality, algal and public health issues in Project reservoirs and dissolved oxygen in J.C. Boyle Reservoir. Until the Secretarial Determination, PacifiCorp is to spend up to $250,000 per year for studies or pilot projects developed in consultation with the Interim Measures Implementation Committee (IMIC). The IMIC is comprised of representatives from PacifiCorp and other parties to the KHSA, including various Klamath Basin Tribes. If the Secretarial Determination is Affirmative, PacifiCorp will fund up to $5.4 million for implementation of projects, and up to $560,000 per year to cover project operation and maintenance expenses. Up to 25 percent of the Measure 11 funding may be directed towards in-reservoir water quality improvement measures.

In April of 2013, PacifiCorp proposed a series of studies for 2013-2014 and circulated draft reports with the results of 2012 studies. With the help of our technical consultants we have reviewed and provide comments on the following three PacifiCorp draft 2012 reports:

- *Evaluation of Particulate Organic Matter Removal from Klamath River Source Water Using Stormwater Treatment Technology, 2012*
- *2012 Assessment of an Intake Cover for Water Quality Control at Iron Gate Reservoir*
- *2012 Localized Treatment of Copco Cove in Copco Reservoir Using Environmentally Safe Algaecide*

Last week, we provided comments on these three draft reports and on PacifiCorp's proposed 2013-2014 study plans. These new more complete comments are intended to supersede only those portions of last week's comments regarding the three draft reports (i.e., those sections titled

"Comments on draft 2012 report:"). Last week's comments on the proposed 2013-2014 study plans are not repeated here.

COMMENTS ON DRAFT 2012 REPORTS

Evaluation of Particulate Organic Matter Removal from Klamath River Source Water Using Stormwater Treatment Technology, 2012

Comments on draft 2012 report:
The draft report does not include all the information that we anticipated it would have based on previous IMIC calls (i.e., January 15, 2013) and comment responses. The draft report does not include any cost estimates or design information on a full-scale system (i.e., spatial distribution of infrastructure). In the April 25, 2013 conference call, PacifiCorp and it consultants noted that this information (cost and designs) would not be part of the 2012 report, but rather moved to the 2013 report. We understand that the consultants are busy and that it would be beneficial to finalize the 2012 report soon and therefore we do not object to this; however, we have some concerns regarding the lack of budget transparency and accountability for this study and the other projects. For example, were all the allocated 2012 funds spent despite the lack of cost and design information in the draft 2012 report? We have no way to know because the actual total expenditures for each study are not provided to the IMIC (only initial estimates are).

The draft report does not state on what dates the field experiments were conducted. Please add that information to the draft. It is our understanding that the study was conducted on August 29, 2012 (M. Deas, pers. comm.).

We are puzzled that the draft report focuses almost solely on percent reductions in particulate mass rather than on percent reductions in particulate concentration. No results for percent reductions in particulate concentration are presented in the report (though they can be inferred from the tables and figures showing measured concentrations). This emphasis overstates the potential effectiveness of the separator, or at least provides an invitation to readers to be overly optimistic in understanding/interpreting effectiveness. Percent reduction in particulate mass is useful for understanding the results of the separator experiment, but percent reductions in particulate concentration provide a better indication of the maximum in-river effect of actual deployment of separators in the real world. For example, the statement on page 15 that "The separator removed a notable fraction (i.e., 25 to 72 percent) of particulate matter" is true, but could be mis-interpreted by readers to mean that deployment of a separator could reduce particulate matter by 25 to 72 percent at Link River; however, this is not the case because the upper range of reductions relies on running a large percentage of water through the sump (which removes a lot of mass but also removes a lot of water).

Comparisons of the amount of particulate mass in the separator outflow relative to the separator inflow particulate mass is potentially mis-leading, because the separator inflow water quantity and particulate mass may be artificially inflated (i.e., relative to if there were no separator in place) due to the need to divert extra water to account for the sump effluent (i.e., so that the water quantity downstream of the separator would be the same as if there were no separator in place). If and when the separator is actually implemented/deployed, the separator <u>would not affect</u> the amount of water at the mouth of Link River or the water that passes through the A Canal. Depending on where water for the separator is diverted and returned, there could have localized effects to water quantity along Link River or at the initial diversion for the A Canal, but the final destination of the water would be the same as without the separator project. We recommend that some information on percent reductions in concentration be added to the report draft. A quick and easy way to include this information would be to add it to the appendix. For example, a percent concentration reduction column could be added to table A-1 to A-8 and a percent concentration reduction row could be added for each experiment in table A-9. In addition, these percent reductions in concentration should be summarized in the text of the report.

The statement on page 15 of the draft report that "The separator removed a notable fraction (i.e., 25 to 72 percent) of particulate matter" is apparently contradicted by the following statement on page 4 of the proposed 2013-2014 study plan "Results from 2012 suggest 15-25 percent removal of particulate organic matter." What is the reason for these two different ranges? Is the higher range based on percent reductions in particulate mass from experiments that included high percentages of water flowing through the sump, and is the lower range based on percent reductions in particulate concentrations?

Page 8 states that: "The dissolved nutrient constituents showed no change between inflow and outflow samples because the particle separator has no effect on dissolved constituents." This is not entirely accurate and should be revised. The tables in the appendices show that in most of the five experiments there were very slight increases between the inflow and outflow for nitrate and nitrite (4 of 5), ammonium (3 of 5 increased), and orthophosphate (5 of 5 increased). Dissolved organic carbon was the exception, showing slight decreases in 4 of 5 experiments.

Minor formatting issue: page 12 of the report has the whole caption for Table 4 embedded inside a paragraph, rather than just the table number.

The photos on page 16 are an excellent illustration of the potential effectiveness of the separator, and a good complement to the graphs and tables.

Please add PP:TP ratio (as well as TP concentration if it fits) to Table A.2 on page A-3 of the report appendix.

Although we have not yet seen sufficient data to confirm it, we assume that the ratio of particulate organic P to total P likely exhibits a seasonal pattern, with a higher ratio in May to mid-July during the development of the initial *Aphanizomenon* bloom (because most of the TP would have been uptaken by *Aphanizomenon*) and a lower ratio in August–October (because the large amount of P released by decomposition of the decline of the initial bloom would only be partially uptaken by subsequent blooms). Samples collected during summer 2008 (Deas and Vaughn 2010) provide some support for this hypothesis, although no samples were collected prior to July 14. The particulate P data scheduled to be collected by the U.S. Bureau of Reclamation in 2013 as part of the KHSA sampling program should provide data to further evaluate this hypothesis. This seasonal pattern could have important implications for the effect of particulate organic matter removal on total phosphorus concentrations in the Klamath River downstream. We recommend that a discussion of the expected seasonal variations in effectiveness of P and BOD removal be included either in the revised report, or in next year's report.

2012 Assessment of an Intake Cover for Water Quality Control at Iron Gate Reservoir

Comments on the draft 2012 report:

The results presented in the draft 2012 report are disappointing. As described in the report, when the cover is initially deployed, the velocity of surface waters toward the intake tower is reduced (i.e., less algae-rich surface water is being drawn into the intake); however after 24 hours this effect diminishes, compromising the effectiveness of the barrier.

Figure 6 "The ADCP Measured Velocity, Along with the Direction (Angle) from True North" on page 13 is very difficult to understand, please add additional explanation. For example, please label the axes (it is unclear what is velocity and what is direction) and provide the units (in Figure 6, velocity appears to range from approximately -50 to 50 [unknown units] whereas in Figure 7 velocity appears to range from 0 to 1.25 ft/sec).

"The velocity, algae species, and phycocyanin data collected during the 2012 Cover Study suggest that cover deployment to its full depth of approximately 12 ft results in short-term changes in local in-reservoir velocities and reductions in downstream cyanobacteria concentrations. These changes occurred over a period of about 24 hours, and then appeared to diminish thereafter. However, the data also indicated that conditions in the reservoir, particularly the concentrations and distribution of algae, are variable spatially and temporally. As a result of such variability, the effects of cover deployment over longer periods during the study were not distinctive or persistent. Nonetheless, the observed short-term reductions in downstream algae concentrations as a result of cover deployment are promising and point to the possible use of a cover such as the one used in the study as a water quality management tool." (p. 19)

- Comment: it is unclear what is being suggested here regarding as being "promising". Is it promising that the short-term reductions could potentially be extended to be long-term if the cover were re-designed (e.g., to make it cover deeper depths or design a new cover that has a horizontal lip added to the vertical cover)? Or is it that the short-term reductions would be beneficial even if they remain short-term (i.e., the cover could be repeatedly raised and lowered on 12 to 24 hour cycles)?

Moreover, we question the conclusion that the short-term reductions are, in fact, due to the cover deployment. Our review clearly suggests that any downstream reduction with cover deployment may be due to vertical migration of algal cells. The way the studies were conducted does not allow for the effect of vertical migration to be separated out from any effect of cover deployment. For example, it is stated on p. 5 regarding the 2011 study that "(MSAE) cell counts were 19 percent and 44 percent lower downstream during the 6 ft and 12 ft test deployments, respectively, compared to cell counts when the cover was not present (Figure 3)". However, because the cover deployments are occurring sequentially in time, the relevant comparison would be to upstream concentrations in the reservoir, and not only to downstream concentrations (Figure 3) which include a time component. For example, Appendix B Table 1-4 shows that the downstream measurements are being made at 9:24, 10:56, and 13:14. These time ranges are well within the period where vertical migration is expected in the reservoir, and the diel algal migration pattern (e.g., cells will move upward in the water column from the morning to the afternoon) will follow that of the cover deployment.

Thus, to the extent that the penstock intake is at ~30 ft and velocities are higher at the deeper depths, one would expect a lower concentration of cells at the deeper depths as the day progresses.

In other words, even in the absence of a cover, one would expect decreasing downstream concentrations of algae as the day progresses. In fact, Appendix B Table 1-3 shows that the MSAE algal concentration in the reservoir near the cover area (Site I) at 10 ft decreased by 14% from 8:59 to 10:30 (when the 6 ft cover was deployed), and by 37% between 10:30 and 12:57 (when the 12 ft cover was deployed). Thus the higher morning concentrations downstream in the river that then decrease through the day tend to mimic the vertical migration pattern shown upstream in the reservoir. In fact, the upstream reductions at 10 ft. (14% and 37%) are similar to the 19% and 44% reductions seen downstream during those same time periods. Clearly, if algal cells are migrating upwards during the time of the deployment, there will be fewer cells at the deeper depths where algae would be subject to entrainment. Attributing the 2011 downstream MSAE decrease to increased cover depth as stated on p. 14 ("In 2011, downstream MSAE concentrations decreased with increasing cover depth (Figure 3) for short duration deployments.") is not confirmed by the existing data and study design.

Similarly, the same effect of time-of-day is noted for the 2012 cover deployment. Although it is noted that a rebound occurs in MSAE after deployment (p. 14) the initial decrease in MSAE is attributed to the cover deployment (p. 14 "In 2012, MSAE concentrations were reduced [as denoted by arrows in Figure 9) in samples taken shortly after the deployment of the intake cover on both August 22 and August 27 (see Table 2)"]. First, there is no appreciable decrease in downstream algal concentration corresponding to the arrow drawn over the bars for the 8/27 deployment (Figure 9b). Furthermore, Figure 9 again shows that the downstream decrease corresponding to the arrows generally occurs from the morning to the afternoon (Figure 9a, b). Figure 11 also indicates that downstream phycocyanin frequently followed a diel cycle during both the cover deployments and at other times when the cover was not deployed, (e.g., 8/24), tending to be highest in the earlier part of the day. As noted above, even in the absence of a cover there can be decreasing downstream concentrations of algae as the day progresses. It is apparent that the 2012 cover deployments were also influenced by vertical migration in the reservoir, and the decrease in MSAE measured over time (i.e., morning to afternoon) downstream would be highly influenced by this.

In addition, a comparison to MSAE upstream in the reservoirs indicates that concentrations downstream were in the range of what would be expected from between the 10 ft and 30 ft depths in the reservoir (Appendix A; Figure 1-8), but that no real reduction occurred. This was also true for chlorophyll (see Appendix A; Figures 1-5 and 1-6) Moreover, reservoir data from 8/21, 8/22, 8/23, and 8/28 also show a distinct mid-day vertical partitioning, with MSAE trending downward from the surface to the deeper depths. These data confirm vertical migration away from the intake as the day progresses. During 8/28 to 8/30 MSAE overwhelms the intake area, and MSAE concentrations are generally higher downstream than upstream (Appendix A; Figures 1-7 and 1-8).

Based on the above discussion we disagree that either the 2011 or 2012 studies provide evidence of downstream MSAE reduction with the current intake cover design. Any hope of effectiveness would require prevention of entrainment at night and early morning when MSAE cells are deeper in the water column, but the cover actually increases velocities at these depths. It is possible that day-time cover deployment could reduce entrainment of surface or upper water column cells, but so far the data do not demonstrate that (downstream comparisons are confounded by time of day, and comparisons to upstream do not show a decrease).

"A bathymetric survey in the vicinity of the intake tower is recommended to improve the interpretation of data collected to date and to inform potential future work to better understand local velocities and hydraulics near the intake that would be useful in the design of an intake cover or barrier system. In both 2011 and 2012 it was hypothesized that local bed geometry at the intake tower limits the spatial range of ADCP sampling. A bathymetric survey would determine the bed configuration in the vicinity of the intake tower and other local features in the area of the intake to test this hypothesis." (p. 19)
- Comment: We are assuming that the authors have looked at the available bathymetry (Eilers and Gubala 2003) and determined that it is not adequate? Also, we are unclear on what "local bed geometry at the intake tower limits the spatial range of ADCP sampling" means, please explain.

"Variable diel cover deployment durations (e.g., daytime only, nighttime only) should be considered for future test deployments. Because the position of algae in the water column often changes from day to night, the examination of varying diel deployments may identify specific benefits for reducing entrainment of algae into the intake and subsequent reduction in algae concentrations below Iron Gate Dam." (p. 20)
- Comments: We are somewhat skeptical of this idea (variable cover deployment durations) for several reasons. First, the diel dynamics of the reservoir circulation and phytoplankton are very complex and it is uncertain that they could be understood well enough to know when to raise and lower the intake cover. Second, frequent raising and lowering of the cover would likely add substantially to the operating (i.e., labor) costs of the gate, as well as potentially to capital costs. A cover that is frequently raised and lowered would require more sturdy and reliable components than a cover that was only raised and lowered a few times a year. The costs of full-scale implementation for the medium/long-term (i.e., in the years until dam removal) should be kept in mind in regards to pilot testing. As we have stated many times in previous comments, if a management technique would be prohibitively expensive to deploy at full-scale, it is not worth wasting money evaluating its potential efficacy. The initial attraction of the intake cover was that its relative simplicity and low cost made it an excellent candidate for being an interim measure to improve water quality in the river downstream. The more complex and costly it becomes, the less likely it is to actually be implemented.

"The vertical migration study should be extended over a longer duration. As described above, meteorological and thermal conditions (e.g., stratification) are important factors that affect the vertical distribution of algae in the water column. An extended period of study would give a more comprehensive picture of shorter- and longer-term variations in reservoir algal dynamics, particularly in the vicinity of the intake. Prior to such a study, review of location and vertical sampling depths should be considered." (p. 20).
The cost and scope of the study required to really understand the 3D circulation patterns of water and algae are likely prohibitively expensive for an interim measure. However, if Pacificorp is interested in pursuing interim measure projects such as this and others that are obviously impacted by factors such as circulation and vertical migration, then they should fund this work separate from the IMIC. It would likely require months of intensive data collection with a spatially distributed network of sensors (i.e., ADCPs and automated water quality profilers) and automated sample collectors. The available data (i.e., from the PacifiCorp 2011 and 2012 studies as well as the automated vertical profiler that was operated in 2011 by U.S. EPA) indicate that the patterns are very complex. There is some evidence a diel algal migration pattern (e.g., cells will move upward in the water column from the morning to the afternoon, accumulating the surface), but the pattern is variable and inconsistent. The data are sufficient to show that phycocyanin

concentrations generally decreases with depth (highest at 0-3m, then declines until approximately 7m, then is similar from 7-11m) (see Figure 1 below).

The 2011 and 2012 studies also clearly show that diel vertical migration of MSAE is occurring at times, and that night-time/early-morning levels are higher at deeper depths. It is very expensive and labor-intensive to collect and analyze the number of water samples required for an additional vertical migration study; therefore, it would be better to deploy sensors (i.e., phycocyanin and perhaps a weather station to measure wind speed/direction) rather than collecting samples. The intake cover concept still has some promise, but evaluations should be focused on developing new cover designs and evaluating hydrodynamics, not the day/night vertical migrations of algae (not worth the huge effort required). Any future testing must include an accounting for time of day and vertical migration as well as direct comparison of in-reservoir algal concentrations to downstream algal concentrations.

Iron Gate Reservoir, USEPA Automated Profiler, 2011 Phycocyanin

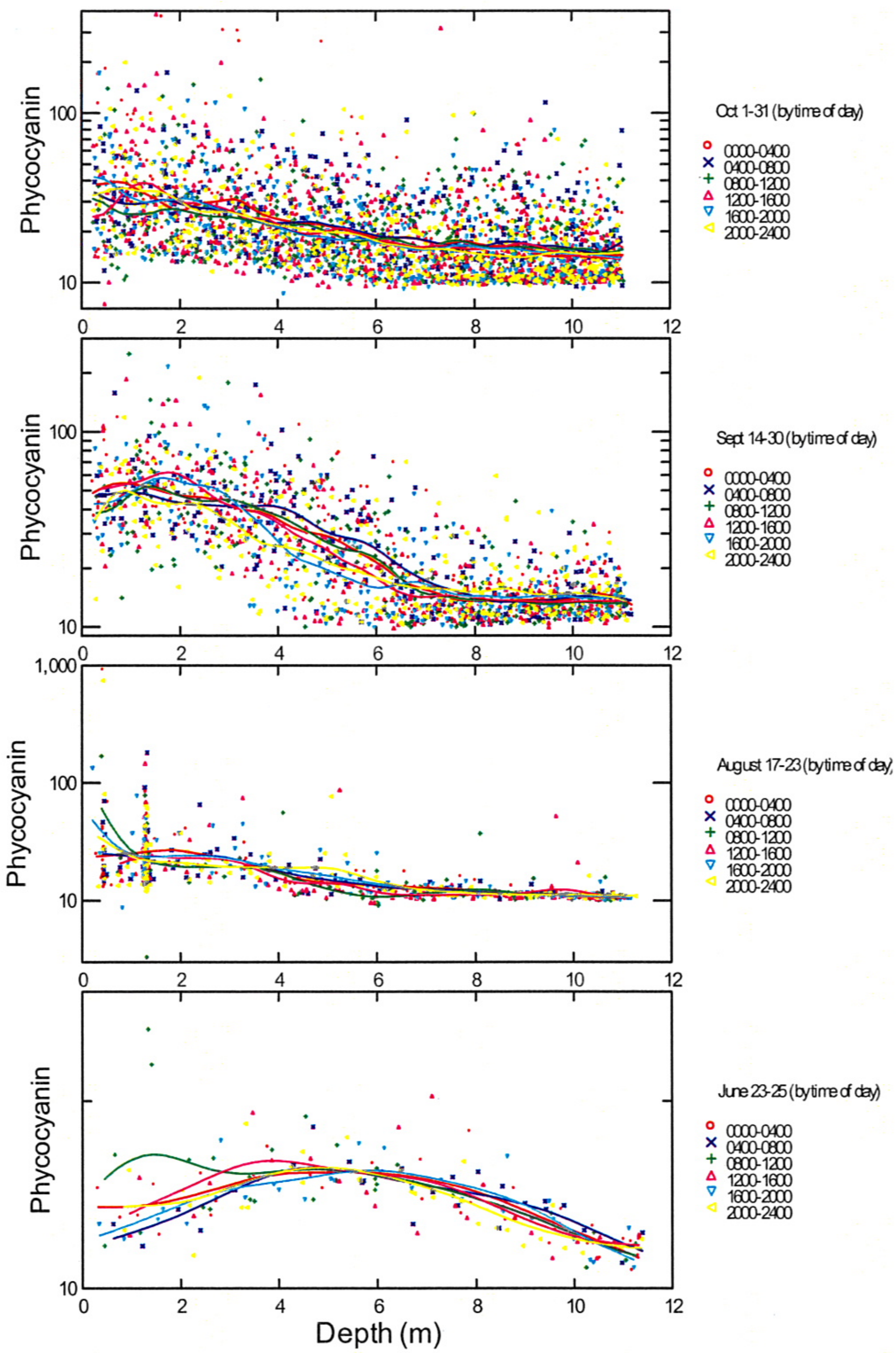


Figure 1. Phycocyanin concentrations measured by the U.S. EPA's "BOB" automated profiler deployed in Iron Gate Reservoir in 2011. Data from U.S. EPA's Andy Lincoff, graphs by Eli Asarian.

Minor notes:

- Captions on graphs on page B-7 and B-8 should have 2011 for the year, not 2012.
- Any explanation for the very low TP concentrations (~0.1 mg/L compared with ~0.25-0.30 mg/L on the other days) for Iron Gate Reservoir on 8/22/2012 in the graphs on page A-2? Those TP concentrations are actually less than the PO4 values on the same day, perhaps suggests a laboratory issue or data processing error?

2012 Localized Treatment of Copco Cove in Copco Reservoir Using Environmentally Safe Algaecide

<u>Comments on draft 2012 report:</u>

Methods on p. 9 show that algae and nutrient samples were only collected at 0.1 and 1.0 m. As noted above in the Iron Gate intake cover section, vertical migration of buoyant MSAE algal cells is common in the reservoirs. For example, former UC Santa Cruz researcher Pia Moisander has shown that maximum morning concentrations can occur deeper than 5 m, and that even when concentration maxima occur near the surface in the afternoon, cell density can still be substantial between the surface and ~6 m. This is especially critical given that the algaecide was applied only to the top 4 ft of the water column in the 2012 application. In addition, the full effect of the application on nutrient recycling post-treatment cannot be evaluated because as dying cells sink they are likely to recycle bioavailable nutrients at deeper depths than were sampled.

Furthermore, in addition to no nutrient samples taken at depths deeper than 1 m, post-event sampling only occurred the morning of the day directly following treatment, which would not allow sufficient time for decaying algae to show the full effect of nutrient release.

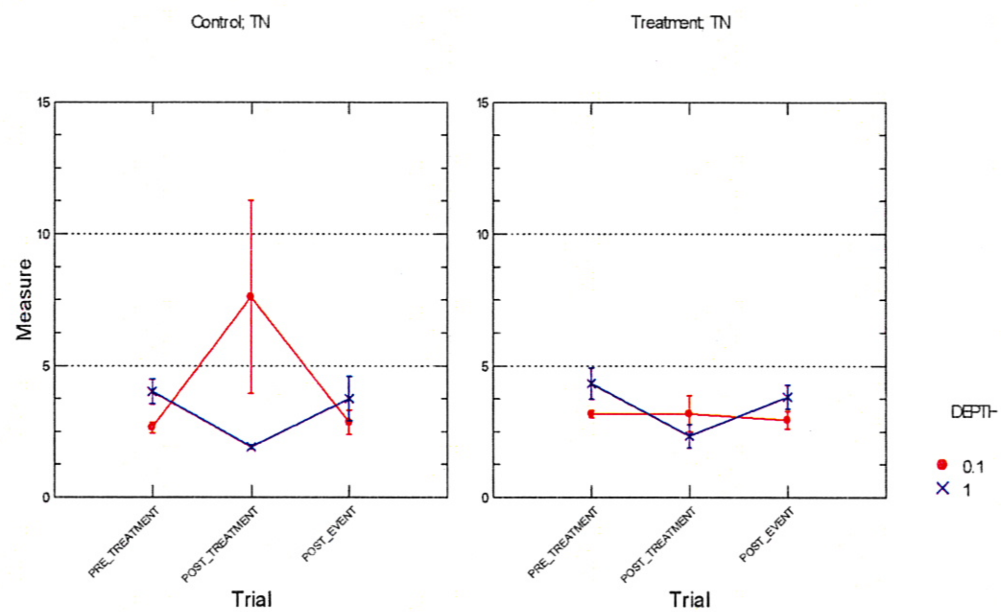
Figure 9 (p. 13) clearly shows what look to be high, and healthy concentrations of algae after algaecide treatment. This indicates that, at best, only partial treatment effectiveness was achieved.

On p. 14, Table 2 shows no variability from the replicates (e.g., 95% CI's or standard errors) so one cannot determine if the percent reductions are significantly different from the controls.

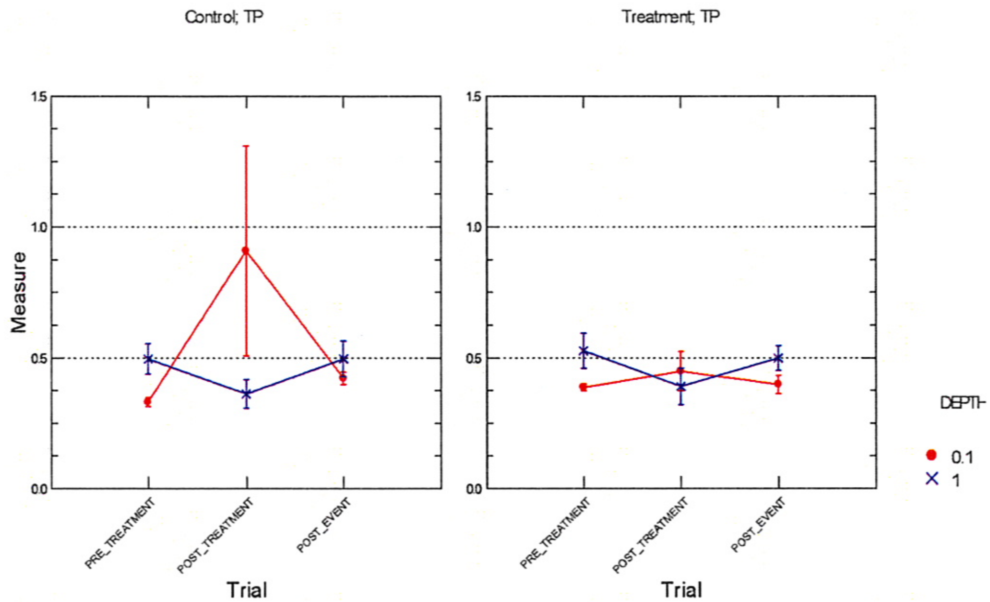
The logic in the discussion on p. 14 is not clear: it is stated on p. 14 that "If increased algae production near the surface at control sites was indicative of Copco Cove overall during post-treatment sampling, the results from post-treatment samples obtained at the near-surface test locations (at T1-T5) may be conservative; that is, the effect of treatment may be greater than indicated by direct comparison of post-treatment to pre-treatment levels (Table 2)". In fact, the "increased algal production" near the surface in the control during post-treatment sampling does not reflect new algal production from the existing water column or advective transport from outside the area, but rather normal vertical migration of buoyant algal cells.

This is supported by the fact that in post-event sampling, TN levels for the 0.1m controls, despite having increased the previous afternoon, decline to levels similar to the pre-treatment levels the previous morning. Similarly, the 1.0 m control first declines (presumably as cell migrate upward to the 0.1m level), and then by the following morning rebound to levels similar to the previous morning (presumably as cells then sink downward during the night).

The below figure (that includes standard errors) shows that pre-treatment levels of TN at both 0.1 m and 1.0 m in the control area and treated area were similar. Both had higher concentrations at 1 m during the morning pre-treatment sampling, with a switch to the 0.1 m samples showing higher concentrations in the afternoon during the post-treatment sampling period. However, the 0.1 m afternoon samples in the treated area (right panel), although higher than the 1 m, are lower than the control during the same time period. By the next morning both are again reversed with respect to depth, but the 0.1 m treatment does not further decline as would be expected if dying cells were to continue to settle out of the water column. These plots likely reflect the effect of continuing buoyancy form healthy cells not affected by the algaecide treatment.



A similar trend was shown for TP:



The treatment of Copco Cove appears to reflect a very temporary reduction of buoyancy post-treatment. A comparison of the treatment TN and TP levels at 0.1 m compared to the control levels at 0.1 m indicate that buoyancy and migration of cells to the upper water column between the morning and afternoon sampling were temporarily dampened (there is only a slight increase in the 0.1 m treatment between morning and afternoon, and at the 1.0 m treatment there is a decrease between morning and afternoon and then a rebound [but still lower] by the next morning). The critical observation, though, is that post-event control area levels were the same as they were 24 hrs earlier (indicating no new algal production), as were the post-event treatment area levels. Rather than being conservative as stated in the text, it appears that, at best, the algaecide treatment caused a temporary dampening of buoyancy.

These data (and the microcystin and chlorophyll data) indicate a typically expected buoyancy trend, but do not indicate that the results are conservative with respect to treatment effectiveness as indicated by the authors in this section and sections following. In fact, the data support partial or incomplete treatment effectiveness which is rapidly overcome within a day of treatment. This is illustrated by re-plotting the data in Figures 10 and 13, as shown above (data from Appendix A)

Most importantly, re-plotting the chlorophyll-a and microcystin data (see figures below) shows that although levels of both were higher in the treated area (relative to the control area) in the morning prior to treatment, despite a depression post-treatment in the afternoon, by the next morning levels returned to where they were the previous morning. The same trend was shown in the control where levels post-event were the same as they were the previous morning, despite afternoon changes due to buoyancy. Language needs to be added to conclusions in the report that accurately describes this notable trend.

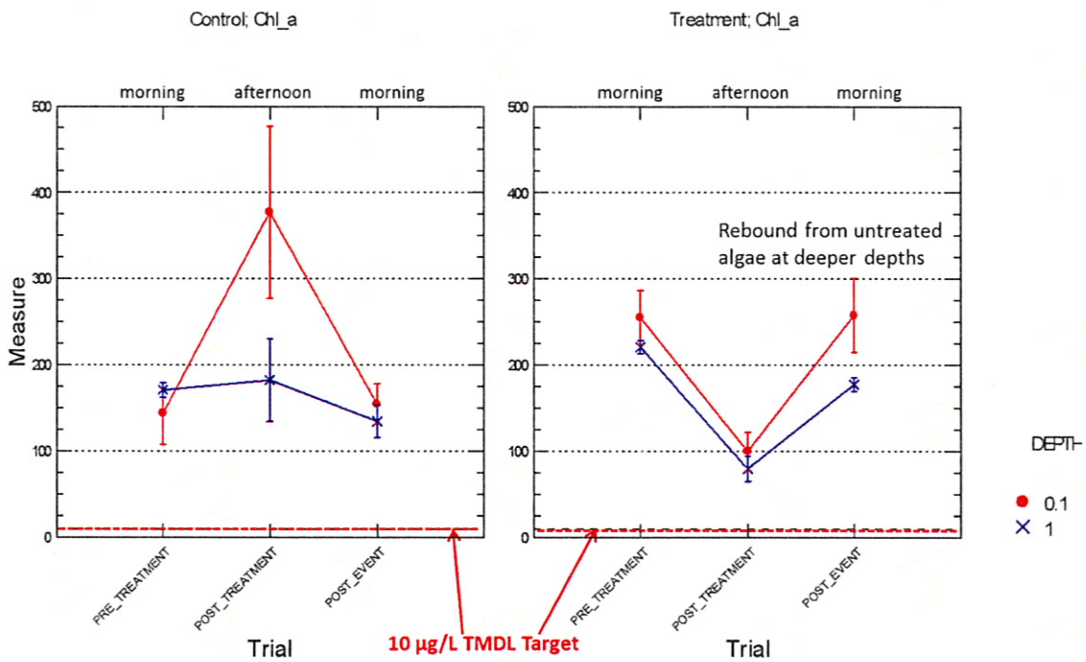
The fact that the controls for these variables show similar levels the following morning (post-event) to what they were the prior morning (pre-treatment) indicates that new algae from outside the area were not the cause of the rebound in the treated area, otherwise the control should have also shown an increase when in fact they were very similar to the previous day.

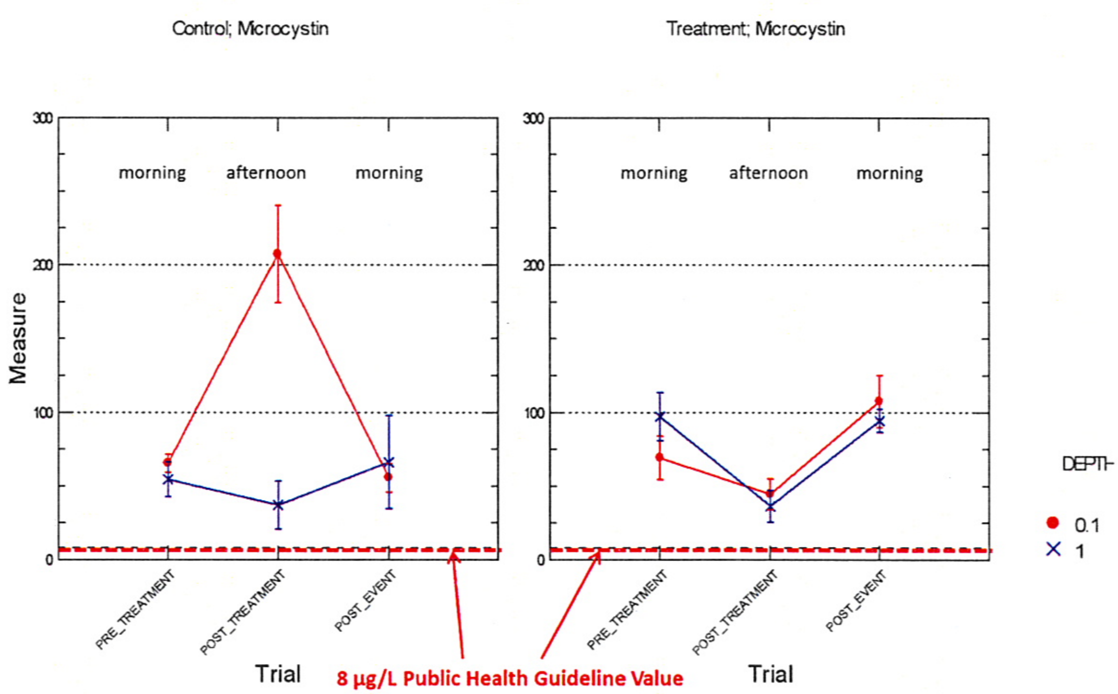
In addition, the level of microcystin at the 0.1 m depth post-event was greater than it was pre-treatment, indicating that more of the microcystin was in the dissolved form and not subject to the usual buoyancy factors that would cause it to decline in the surface water during the morning (dissolved microcystin would be expected to increase as cells die and lyse releasing toxin—but this fraction was not measured in the study). Thus the algaecide application appeared to increase microcystin in the surface waters post-event.

Finally, the algaecide treatment did not reduce levels of microcystin below public health guideline levels, even when it was most depressed during the post-treatment time-period. In fact it remained more than ~6x higher that the 8 µg/L public health guideline level.

When consideration is given to the control dynamics and when actual concentrations are compared through the course if the experiment, it is apparent that the algaecide treatment was ineffective at controlling the toxic blooms in Copco Cove in 2012.

Results from the 2012 pilot study clearly show that although the algaecide application was made during a time period when MSAE is expected to be maximized in the upper water column layers, the partial kill of algae was insufficient to prevent rapid recovery from healthy cells at deeper depths, and presumably from other areas of the cove not fully treated. Moreover, given that pre- and post-event data were only collected from the surface layer, and the only post-event samples were collected one day after treatment, the true effect of the treatment on either algae or nutrient concentrations cannot be evaluated. Both of these study design attributes would preclude an understanding of both algae and nutrients at depths deeper than 1 m (e.g., as dying cells sink they are likely to release nutrients at deeper depths, and vertical migration of algae shows that cell densities can be relatively high at depths deeper than 1m), and any effect of recycled nutrients occurring subsequent to the following day. Although PacifiCorp has indicated that the recovery of the MSAE bloom was due to transport of MSAE from areas outside of the cove, comparison to the control stations does not support that contention (see above).


Control; Chl_a
Treatment; Chl_a
morning
afternoon
morning
Measure
Rebound from untreated algae at deeper depths
PRE_TREATMENT
POST_TREATMENT
POST_EVENT
Trial
10 µg/L TMDL Target
DEPTH
0.1
1


Control; Microcystin
Treatment; Microcystin
morning
afternoon
morning
Measure
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POST_TREATMENT
POST_EVENT
Trial
8 µg/L Public Health Guideline Value
DEPTH
0.1
1

We hope these comments are useful in the development of the 2013 study plans and decisions regarding project selection. The information gained from these experiments is a mixed bag of data, useful though often not sufficient or presented accurately. We hope to help correct those issues, or at least document these occurrences and educate members of the IMIC technical committee.

Sincerely,

Crystal Bowman

Crystal Bowman
Water Resources Coordinator
Karuk Tribe

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