

Memo

To: Eric Nigg

From: Shannon Hubler

Date: 2/13/18

Subject: Review of R2 report to PGE



State of Oregon
Department of
Environmental
Quality

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Eric,

In December 2017, I received from Portland General Electric (via Bonnie Lamb) the latest assessment of macroinvertebrate conditions in the Deschutes River following implementation of the Selective Water Withdrawal. The report, titled “Addendum to Final Report: Lower Deschutes River Macroinvertebrate & Periphyton Study, Additional Analyses” (hereafter referred to as “Addendum”) was submitted to PGE by R2 Resource Consultants.

The Addendum comes in response to my review of R2’s report to PGE released in April, 2016. In my review, I stated concerns about data management, analyses, and subsequent interpretations made by R2 in assessing the macroinvertebrate assemblage of the Lower Deschutes River before and after implementation of the Selective Water Withdrawal structure at Round Butte Dam.

Below you will find my review of the efforts made by R2 to address the concerns I had with the April 2016 report. To be clear, this review is focused on how well R2 addressed my concerns in the previous report, and is not intended to be a review of the interpretations made by R2.

RECOMMENDATIONS (from 2016)

- All datasets, pre- and post-, need to be in consistent electronic format.

While I have not received copies of the pre- and post-SWW datasets, the work completed by R2 in the Addendum demonstrates that this request has been completed.

- DEQ should request an independent review of the taxonomic consistency between pre- and post- datasets.
 1. An independent taxonomy lab should examine preserved samples and verify identifications.
 2. An independent review of taxonomic consistency across all samples should be completed.

I had direct conversations with R2 and their taxonomic consultant about this issue. I agreed that River Continuum Concepts (RCC) could take on this task. While not a completely independent taxonomic lab as I initially suggested (RCC performed the post-SWW identifications), I felt that having consistent taxonomic identifications was of the

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utmost importance. We agreed upon the initial number of samples to look at, as well as targets of similarity.

Unfortunately, all evidence points to RCC not examining the same samples as the pre-SWW taxonomist. Generally, there are two stages to macroinvertebrate sample processing:

- 1) Sorting: where individual macroinvertebrates are separated from the debris found in the sample and placed into ethanol filled vials. Only macroinvertebrates and sample labels are added to the vials.
- 2) Identification: macroinvertebrates are removed from the sorted vials and examined by taxonomists for identification. Once identified, they are most often placed back into vials for long-term storage.

I cannot think of a rational explanation for sorted and identified samples to contain extensive amounts of debris. Additional lines of evidence that the actual sorted and identified pre-SWW samples were not reexamined by RCC include:

- relatively large differences in total abundances
- generally unmistakable taxa unaccounted for in the original identifications
- poor results across similarity indexes.

Further evidence that the pre-SWW samples were not reexamined by the post-SWW taxonomy lab comes from R2's summary report of pre-SWW macroinvertebrate conditions (Kvam et. al 2002). The methods state that standard sorting procedures were followed (i.e., macroinvertebrates separated from debris). In addition, it states a voucher specimen collection was maintained (at least for Fall 1999 and Spring 2000) and samples were archived for later analysis.

The efforts undertaken by RCC to rectify taxonomic discrepancies between the pre- and post-SWW datasets appear to be appropriate and the best that can be done given the circumstances. Despite uncertainty in the original samples, RCC was able to identify several taxonomic discrepancies and make updates to the taxa lists for more direct comparisons across the study period.

I agree with the decision to leave Oligochaetes in the analyses, despite initial concerns of poor preservation and/or inadequate taxonomy. There simply was not enough evidence to warrant their removal. And I appreciate RCC pointing out the error in my assumptions of Naididae worms observed in the post-SWW dataset representing (formerly) Tubificid worms. Although it is unclear to me whether the initial identifications of Tubificidae worms in the pre-SWW samples were erroneous or simply unable to be verified.

- DEQ should request further analyses:
 1. Subsample the data accordingly to make pre- and post- datasets comparable.
 2. Recalculate all metrics (including updated, published tolerances).
 3. Do a full multivariate comparison of pre- and post-SWW macro data. This is essential and was outlined as a deliverable in the Final Study Plan. NMDS ordinations should be used, with all taxa. The use of PCA, along with removing rare taxa, is inappropriate.



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R2 and RCC did an excellent job meeting my recommendations for making the pre and post datasets compatible for analyses. Using simulation to create multiple random samples, rather than relying on a single randomized 500-count sample, was a smart approach. The use of recently published tolerances in conjunction with updated and consistent taxonomy allows for more robust conclusions. Finally, the multivariate analyses included both pre and post datasets, as requested; and I appreciated the efforts to present the multivariate analyses in various ways.

- DEQ should request all the data from this study, for verification purposes.

At this time, I have not requested the data. I do not plan to make this request unless further internal DEQ discussions require me to examine the data.

FINAL COMMENTS

I approve of the efforts by R2 and RCC to address the recommendations I made in the May 16, 2016 Memo that I authored. The efforts to make the pre and post taxonomy compatible, incorporate updated tolerances, improved subsampling, and improved multivariate ordinations allow for a much improved assessment of macroinvertebrate assemblage conditions in the Lower Deschutes River following SWW implementation.

It is my hope that the improved analyses in the Addendum can be worked into a final report for the project that more adequately summarizes the macroinvertebrate assemblage in the Lower Deschutes River in relation to the Selective Water Withdrawal.



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