

2007.007010

Patti O'Toole
Program Implementation Manager
Northwest Power & Conservation Council
851 S.W. Sixth Avenue, Suite 1100
Portland, OR. 97204

RE: Comment on ISRP Report, ISRP 2007-9

Dear Ms. O'Toole,

We are writing in response to the ISRP review of proposal # 200752600, "Lake Oxygenation Pilot Study: Improving Redband Trout Habitat Quality in Twin Lakes, WA." Our personal thanks to the reviewers for their thoughtful comments; having served on numerous review panels, we certainly appreciate their considerable efforts invested in the process.

Two comments were directed at the ability of a system to elevate dissolved oxygen in the lake, and at observation of benefits over a one-year timeframe. Most recently, significant interest has been placed on oxygenation, because it offers performance, logistic, and economic advantages over aeration. The key is engineering; properly designed systems have demonstrated ability to increase dissolved oxygen. We believe that there is special expertise available for this project, both of us having experience with Speece cone technology, having worked on some of the first North American installations for hypolimnetic oxygenation in lake restoration contexts. We also have direct and indirect experience with alternative technologies used at other lakes, including line diffusers.

As for benefits to oxygenation, there should be both immediate and long-term responses that will create more fish habitat and improve water quality. It is our understanding that the proposed work is to be a pilot project - that is, a demonstration of the technology to evaluate its applicability for long-term and for more widespread utilization. Increased oxygenation in the hypolimnion, or bottom waters, of North Twin during summer stratification will have immediate benefits by: 1) increasing the absolute volume of cold-water fish habitat, 2) improving quality of habitat for fish prey organisms, and 3) increasing fish access to prey organisms. The net for cold-water fish species, such as the native redband trout, should be less thermal stress and improved predation success that results in increased survival and summer condition factors.

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Long-term water quality benefits cannot be expected to be totally evident within one year. However, increased oxygen at the sediment/water interface should measurably lower total phosphorus, ammonia, and metal concentrations within the water column. Over time, we expect low phosphorus to reduce algae productivity in the lake, decreasing the yearly 'rain' of organic, oxygen-demanding materials to the sediments. Ultimately, in conjunction with watershed management efforts to control external nutrient loading, this should permit maintenance of adequate summer hypolimnetic DO without supplemental oxygen.

Other comments from the ISRB involved comparability of the lakes, and need for preliminary data. The Colville Confederated Tribes have worked with Washington State University, and have conducted their own research on these lakes over the past three decades. Having directed fish and water quality monitoring on North and South Twin lakes for the Tribes over the past three years, we are confident that we have and extremely strong initial data with which to evaluate lake response to oxygenation. In fact, a generalization about lake restoration projects has been that pre-treatment data is typically the weakest component, or at least covers the shortest temporal span. In our experience, the Twin Lakes offer one of the most complete pre-treatment evaluations of whole lake ecology, including chemical, physical, and biological characterization available at this point. Summaries of portions of our Twin Lakes research have already been published in the scientific literature; two other papers are currently under review. Our data indicate that North and South Twin have very similar patterns of stratification, essentially identical biological components, and track each other in overall lake ecology. Obviously, they lie within identical geologic and watershed settings. We are aware of no better candidates in a field setting for a side-by-side comparison, with South Twin as a control lake. In it our strongest scientific judgment that these lakes will provide an elegant study for oxygenation impacts, with opportunities for both before/after and paired-lake analyses.

Ultimately, we believe the proposed study has tremendous potential to benefit fish and lake resources throughout the Columbia Basin and Inland Northwest. On top of widespread alteration of habitats and cultural eutrophication processes, native fish species face increased pressure from climate change and from expanding human populations. The very threats that we observe in Twin Lakes, including warm surface waters, coupled with oxygen-depleted bottom waters, will likely become even more prevalent, producing lake environments increasingly hostile to cold-water, native fish. Oxygenation is one potentially very powerful and economical tool for lake and fisheries managers to protect and restore native fish and their critical habitats.

Finally, we thank the Northwest Power and Conservation Council for their recognition of the need for new, innovative projects to address fish and wildlife problems within the Columbia Basin. It is our hope that the Council will use the opportunity to leverage funds to enable a wide range of projects that will produce real benefits to the fish and wildlife resources of the Basin.

Again, we are most appreciative of the opportunity to submit a proposal, and for the positive feedback supplied by the reviewers.

Sincerely,



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