Date: January 28, 2016

To: Parker Thaler,
State Water Resources Control Board

From: Mary Ann Madej, Ph.D.
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Re: Klamath Hydroelectric Project

I am submitting this letter as part of the scoping session regarding FERC relicensing of the Klamath dams. I am commenting as a private citizen, not an agency representative, although I am submitting data collected and compiled when I worked for the U.S. Geological Survey (USGS). Attached are two types of information which highlight some of the negative impacts of the dams on salmonid habitat, and they support the views of other speakers at the scoping meeting held in Arcata, CA on January 25, 2016.

1) Stream temperature

In 2010, the USGS conducted in-situ measurements of river temperature from Iron Gate Dam to Happy Camp to supplement previous temperature monitoring efforts and to be used as input into hydraulic models. In addition, in August 2010, a thermal infrared flight was conducted in cooperation with the University of Washington to measure surface river temperature in this same reach. The attached poster highlights the results of this monitoring, which shows elevated river temperatures downstream of Iron Gate Dam, with minor cooling farther downstream as tributaries contributed cooler water. River temperatures were consistently warmer (above 20^{o} C) than the preferred range for salmonids. These results corroborate previous studies of elevated temperatures and support the temperature-impaired listing of the Klamath River.

2) Channel geomorphology

Maps of the Klamath River mainstem geomorphology were compiled to cover the reach from Iron Gate Dame to the mouth. Mesohabitat types (MHTs) such as pools, runs, riffles, and split channel units were mapped by the U.S. Fish and Wildlife Service (2010). The visual features of the river used to classify individual MHTs included channel gradient, active-channel confinement, surface disturbance, width-to-depth ratio, dominant and sub-dominant substrates, and the presence or absence of backwater effect. The survey team identified three dominant gradient types for classifying the MHT slopes including: low-slope (LS), moderate-slope (MS) and steep-slope (SS). In addition, Ayres Associates (1999) mapped additional geomorphic features along the river (gravel bars, terraces, debris fans, floodplains, eroding riverbanks, etc.). Finally, a Lidar coverage was incorporated to show the landforms of the Klamath River valley. These data are portrayed in a series of maps of the Klamath River (see attached example). The files for the full set of maps exceed my email capacity, but can be sent by mail upon request.

Through their effects on flows and sediment transport, the Klamath dams have led to decreased channel complexity downstream of Iron Gate Dam. Here, the channel is coarse and relatively featureless (Figure 1). The area of alluvial features is low downstream of the dam until around the Scott River confluence, where sediment yield from the Scott River increases gravel availability in the Klamath River. The lack of alluvial features limits potential salmonid spawning habitat and reduces hydraulic complexity (for example, reducing the range of flow velocities). Reduced channel complexity has been detected downstream of other dam projects as well (U. S. Forest Service, 2004).

Figure 1. Looking downstream from Iron Gate Dam, Klamath River.

Because of the impact of the dams on stream temperature and channel complexity as described here, as well as other impacts analyzed from scores of studies during the last two decades, I support the removal of the Klamath dams.

References

Ayres Associates. 1999. Geomorphic and sediment evaluation of the Klamath River, California, below Iron Gate Dam. Ayres Project No. 34-0449.00. Fort Collins, CO

U.S.D.A. Forest Service Pacific Northwest Research Station. 2004. The Geomorphic Response of Rivers to Dams. General Technical Report PNW-GTR-601. 2 CD set.

U.S. Fish and Wildlife Service. 2010. Classification and Inventory of Meso-habitat Types in the Klamath. In-house report compiled by Christine Medak and Thomas Shaw. Arcata, CA.

Attachments

1) Stream temperature poster.pdf
2) Klamath map example.doc