

Compilation of information to inform USFWS principals on the potential effects of the proposed Klamath Basin Restoration Agreement (Draft 11) on fish and fish habitat conditions in the Klamath Basin, with emphasis on fall Chinook salmon

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Abstract. This document is a compilation and summary of various modeling exercises, analyses, and relevant information relating to the potential effects of implementing the proposed Klamath Basin Restoration Agreement (KBRA- Draft 11) on fish and fish habitats during the interim years prior to and following the removal of PacifiCorp Hydropower Project dams (J C. Boyle, Copco 1 and 2, and Iron Gate) from the mainstem Klamath River, as proposed in the Draft Klamath Hydroelectric Settlement Agreement (KHSAs). This report focuses primarily on the effects of the proposed Agreements on anadromous species, with emphasis on fall run Chinook salmon due to the relative abundance of existing data and modeling tools developed for this stock. This report does not assess interim measures specified in the Draft KHSAs, and is not a comprehensive assessment of the potential effects of the KBRA's water allocation plan, or the proposed removal of the PacifiCorp dam complex specified in the Draft KHSAs. We anticipate that if the Agreements are implemented, more detailed evaluations will be conducted through a Secretarial Determination and NEPA process.

In this report, we evaluate one possible hydrologic modeling scenario of KBRA implementation (WRIMS Run-32 Refuge), and compare the results to alternative flow schedules based on our current understanding of fish habitat needs, derived from flow habitat relationships described previously in the Hardy et al. (2006) "Phase II" instream flow report. More recent WRIMS model runs prepared by settlement parties are not included here, as they were completed after our analyses were finalized. We also evaluated results of a fall Chinook production model (SIAM), water quality models, and reviewed literature to describe the probable effects of the KBRA water allocation plan and restoration actions on water quantity, water quality, geomorphology, and fish health. In addition, we present an example of a real-time water management application for establishing flow in the river at a daily time step. This application is one example of how the water allocation and flow regime identified in the KBRA could be practically managed.

The SIAM modeling results indicate that implementing the KBRA's water allocation plan would benefit production of fall Chinook salmon below Iron Gate Dam prior to the removal of PacifiCorp Project dams. In addition, multiple lines of evidence suggest that removal of PacifiCorp Project dams and subsequent reestablishment of Basin connectivity and variable stream flows in the Klamath River will further contribute towards restoration of the physical, chemical, and biological processes and interactions that are essential to a functional aquatic ecosystem. Dam removal would also allow the possible reestablishment of spring and fall Chinook and coho salmon, steelhead, and Pacific lamprey in the Upper Klamath Basin.

It is the professional judgment of the authors that the KBRA's water and fish programs, if fully implemented in concert with dam removal, would over time, achieve the Agreement's stated goal of restoring the "*natural sustainability of fisheries and full participation in harvest opportunities, as well as the overall ecosystem health of the Klamath River Basin*".