qualities to be useful: (1) capture the biological processes of interest; (2) capture existing hypotheses about environmental or anthropogenic factors thought to affect the population dynamics; (3) identify sources of data for those factors; (4) identify the pathways for management actions; and (5) if using statistical methods, identify sources of data that can be used as indices of abundance. The conceptual model was presented to stakeholders and has resulted in a conceptual model composed of several components including: an adult migration model, an upper basin production model, an outmigrant mortality model (SALMOD), a retrospective ocean survival model, and a harvest model. Using the conceptual model as a blueprint, a life-stage model (e.g., Leslie-matrix type model) with transition among stages described by stage-specific Beverton-Holt functions is being constructed. The Beverton-Holt function is parameterized with two coefficients, the carrying capacity and the productivity. Each of these two coefficients can be further modeled as a function of environmental driver variables. For example, productivity in the rearing stage may be a function of instream temperature. The conceptual models and progress on translating the conceptual models into a quantitative model capable of meeting the objective of forecasting fall run abundances with uncertainty will be presented.

## Evaluating Economic Effects on Fisheries Associated with Klamath Dam Removal

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According to the Klamath Hydroelectric Settlement Agreement, the Secretary of the Interior will determine whether removal of four dams on the Klamath River "(1) will advance restoration of the salmonid fisheries of the Klamath Basin, and (2) is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and Tribes." Among the myriad analyses being prepared to inform the Secretarial Determination are a number of economic studies that focus on the range of human uses and values potentially affected by dam removal. This presentation focuses specifically on the economic analysis as it relates to fishery effects. Topics to be discussed include data requirements, modeling issues and the need for interdisciplinary collaboration.

## Effects of Flow Augmentation and Meteorological Conditions on Coho Salmon Production in the Klamath River Basin

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It has been hypothesized that water project operations in the Klamath River basin are a major driver of anadromous fish production. Moreover, fisheries interests have been strong advocates for mainstem flow augmentation to increase abundance of threatened coho salmon. For this reason there was a sincere desire to understand effects of flow and temperature conditions on coho salmon production. Due to the paucity of data in the Basin, a simulation approach was required. We sought to quantify the effects of flow alterations at Iron Gate Dam on coho production in the Lower Klamath River through population life-cycle modeling. For comparison, we also quantified water year-type (wet, moderate, and dry) effects on coho. The functional relationships between environmental conditions and coho survival were incorporated into a detailed population model, which was used in conjunction with a hydrodynamic model and water operations model to predict freshwater production of juvenile coho outmigrants. Results suggest that changes in IGD discharge have a limited effect on coho salmon production relative to effects of meteorological conditions. The influence of IGD discharge on mainstem

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