PROGRESS REPORT ON THE SACRAMENTO WINTER RUN BIOLOGICAL OPINION REASONABLE AND PRUDENT ALTERNATIVE AND DEVELOPMENT OF A NEW MANAGEMENT FRAMEWORK

At the March 2011 Pacific Fisheries Management Council (PFMC) meeting, NOAA Fisheries (NMFS) submitted an overview of the NMFS ocean fishery management guidance for Sacramento River winter-run Chinook (winter-run). The overview explained that, as a result of the April 2010 jeopardy biological opinion of ocean salmon fishery impacts on winter-run, a new framework for managing impacts on winter-run must be implemented by March 2012, as stipulated by the opinion’s Reasonable and Prudent Alternative (RPA). The jeopardy determination was based on the recent substantial declines in winter-run spawning returns, and the lack of sufficient analytical information and tools to establish specific harvest impact level objectives or an explicit management process to specifically avoid or reduce impacts to winter-run when this stock is declining and/or facing increased extinction risks (NMFS 2010).

Since March, the NMFS Southwest Fisheries Science Center Salmon Assessment Team (SAT) has been engaged in efforts to develop the analytical tools required to (1) perform annual assessments of winter-run, (2) forecast the effects of fisheries on winter-run, and (3) evaluate alternative fishery exploitation scenarios to aid in the construction of a new winter-run management framework.

With regard to performing annual assessments of winter-run, the SAT has further developed and updated cohort reconstructions, analyzing the effects of ocean fisheries on brood years 1998-2007. Results of the cohort reconstructions indicate that approximately 70% of winter-run impacts come from the recreational fishery, and almost all impacts occur south of Point Arena. Additionally, the age-3 impact rate closely approximates the total ocean fishery exploitation rate owing to high age-3 maturation rates, which are typically in excess of 90% (NMFS 2010, O’Farrell et.al 2011). Given the results of this assessment, the measurable objective in the new winter-run management framework will be the age-3 ocean fishery impact rate and any winter-run management measures will apply to ocean salmon fisheries south of Point Arena. The cohort analysis used to support the 2010 Biological Opinion was reviewed by the Center for Independent Experts, and an updated cohort analysis will be reviewed the SSC-salmon subcommittee at the 2011 Methodology Review.

Implementation of winter-run annual management measures in the PFMC arena requires development of a winter-run “harvest model”. The harvest model will be used to determine the expected impact rate as a function of fishery management measures. It will allow ocean salmon fishery management measures to be designed on an annual basis such that the impact rate specified by the control rule is met. The harvest model will share many of the same characteristics of existing harvest models (e.g., the KOHM and SHM). It will allow managers the ability to modify fishing opportunity and minimum size limits in order to achieve age-3 impact rate objectives. It is important to note that the harvest model will produce a pre-season prediction of the impact rate. It is possible, and in fact will be required, that a post-season estimate of the rate will be made following the fishery, once the data are available to do so (2 years after the fishing season has ended), in order to monitor the performance of the harvest model and management framework. The harvest model will be presented to the SSC-salmon subcommittee at the 2011 Methodology Review.
The development of the management framework is ongoing, and implementation is expected to be completed before the March, 2012 PFMC meeting. The foundation of this entire process is the development of a “Management Strategy Evaluation” (MSE). At the core of the MSE is a full life-cycle winter-run population model that includes natural population dynamics, observation of the population, and fishery impacts. Without going into great detail, the model is being developed with sufficient structure to account for key aspects of population dynamics (e.g., density dependence, stochastic recruitment and survival), errors in estimates of population abundance, and variability in fishery impact rates. The purpose of the MSE approach is to simulate winter-run population dynamics under a variety of prospective management “control rules” and to assess the performance of these control rules relative to established population criteria or benchmarks. In this MSE, a control rule specifies the level of winter-run age-3 impact rate that fishery managers may allow for in a given year. For example, a control rule which allows a fixed annual fishing impact rate can be simulated and compared to other rules, such as a control rule that increases the allowable impact rate as the population increases. The goal of this simulation work is to develop a fisheries management framework (control rule) for winter-run based on the relative performance of alternative control rules.

Until results of the MSE have been analyzed and finalized, NMFS is unable to discuss details about any specific possible outcomes. However, at this time NMFS can offer some general comments in preparation for the implementation of a new management framework. As mentioned previously, the control rule will result in annual specification of an allowable age-3 impact rate. The determination of that rate will likely have dependence on recently observed winter-run spawner abundance, since these estimates are expected to be readily available on an annual basis.

After the MSE has been completed, all documents related to this process of evaluating fishing management scenarios and implementing the management framework, including development of the winter-run population model and the MSE simulation results, will be made available to the public.
