SCIENTIFIC AND STATISTICAL COMMITTEE KLAMATH RIVER FALL CHINOOK CONSERVATION OBJECTIVE

Mr. Michael Mohr presented the "Klamath River Fall Chinook Stock-Recruitment Analysis" report by the Salmon Technical Team (STT) to a joint meeting of the Scientific and Statistical Committee (SSC) Salmon Subcommittee and the STT on October 12, 2005 in Portland. The report presents information on:

- Two Ricker-type stock-recruit analyses for Klamath River fall chinook salmon,
- A meta-analysis based on Ricker stock-recruit analyses and watershed area, and
- Correlation analyses of survival and flow during two time periods.

The analyses were technically sound and thoroughly documented.

The first Ricker-type stock-recruitment model was a standard analysis of recruits as a function of spawners. The second Ricker-type model included a measure of out-migration and early ocean survival. Including this survival measure adjusts for variability that is ostensibly not due to the density-dependent relationship between spawners and recruits and, in this case, substantially improved the fit of the model. Compared to model 1, the estimated spawners at maximum sustainable yield (S_{MSY}), for model 2 increased from 32,700 to 40,700 spawners. This latter is calculated using the mean of the logarithm of the survival measure, which results in a point estimate with an unrealistically small confidence interval. A simulation model could produce a more realistic point estimate of and confidence interval around the optimal escapement level for long term average harvest or other management goal. This would likely be larger than 40,700 spawners for model 2.

The meta-analysis was based on a study developed for the Pacific Salmon Commission that relates S_{MSY} (based on Ricker stock recruit functions) to watershed area. The Klamath Basin is south of and much larger than any of the systems in the original analysis and the results are based on extrapolations beyond the range of data used to develop the model.

The flow analyses correlated flow data from stations on the Trinity and Klamath Rivers with aggregate hatchery survival. Flows during juvenile out-migration and adult spawning migration were tested. Weakly significant correlations were found suggesting that higher flows related to higher survivals. Natural production is expected to be more sensitive to flows than hatchery production, but no natural survival data are available. Temperature in the Klamath Basin is known to be a problem for chinook salmon, but no appropriate time series of temperature data were available. In conclusion, the flow analysis is incomplete and necessary data are lacking. It does not provide an adequate basis for management decisions.

The stock-recruitment models estimated S_{MSY} as 32,700 spawners without an early life-history survival index and 40,700 spawners with an early life-history survival index. The habitat based model S_{MSY} was 70,900, however this was derived from a regression well outside the range of data used to develop the model. The analysis is thorough and informative, given the limitations of the data available. The SSC endorses the Ricker model analyses as the best available science that could be used to assess whether the 35,000 fish escapement floor is consistent with management goals.

PFMC-11/1/05