

SALMON TECHNICAL TEAM REPORT ON THE SALMON METHODOLOGY REVIEW

The Salmon Technical Team (STT) met October 20-22 with the Scientific and Statistical Committee (SSC) Salmon Subcommittee, and members of the Model Evaluation Workgroup (MEW) to review proposed methodology changes for 2016. The main focus of the review was an evaluation of increased stratification of the Klamath Ocean Harvest Model, the Sacramento Harvest Model, and Winter Run Harvest Model by the addition of proposed management lines at Point Reyes and Point Sur, and revisions to the base period data for Chinook Fishery Regulation Assessment Model (FRAM).

Evaluation of management lines at Point Reyes and Point Sur in KOHM, SHM, and WRHM (NMFS, CDFW).

The analysis focused on (1) whether there were sufficient coded-wire tag (CWT) recoveries to allow for splitting the current San Francisco and Monterey management areas at Point Reyes and Point Sur, respectively and (2) whether there were substantial differences in relative densities of key stocks north and south of the proposed new management lines.

The investigation concluded that for Sacramento River winter Chinook (SRWC) and Klamath River fall Chinook (KRFC) there are insufficient CWT recoveries to support increased spatial stratification by the addition of new management lines at either Point Reyes or Point Sur. For Sacramento River fall Chinook (SRFC), sufficient CWT recoveries exist to allow for further spatial stratification.

An analysis using genetic stock identification (GSI) data suggested that there may be differences in relative density of SRWC north and south of Point Reyes, though there were few SRWC stock assignments and low levels of sampling effort which complicated making strong inferences. For KRFC, GSI-based estimates suggested there is similar or higher density north of Point Reyes, with estimates varying across years. However, increasing the spatial stratification by the addition of new management lines would result in decreased precision of stratum-specific impact rates due to spreading the limited CWT recoveries over more recovery locations, and GSI-based relative density estimates were ambiguous. For SRFC, there was insufficient difference in relative density north and south of Point Reyes to warrant splitting the current San Francisco management area.

The proposed Point Sur management line was motivated by the perception that SRWC impacts are higher south of Point Sur. The limited GSI data suggested there may be a higher density of SRWC south of Point Sur, but fishing effort and Chinook catches are relatively low in this southernmost area, and there are insufficient SRWC CWT recoveries to justify any further stratification.

The recommendation from the analysis was that the current models should not be further stratified by the introduction of these proposed management lines. The STT concurs with this recommendation.

Modifications to base period data for Chinook FRAM

Members of the Chinook FRAM Base Period Work Group presented a progress report and technical presentations on developing a new base period data set for Chinook FRAM. The base

period project is a combination of compiling and documenting new data for the recent years as well as reviewing and updating old programs that were previously used to develop the base data set. Modifications to the Chinook FRAM algorithms and processing were not part of this project. The current base period data are from the late 1970s through early 1980s, and the new base period data are from brood years 2005-2008 with CWT recoveries from 2007-2013. The new base period has better stock representation and better reflects current fishery and stock distributions. The progress report covered a list of accomplishments to date that include recoding of former calibration programs and associated data files to VB.Net programming code and ACCESS database. The use of the CWT recovery database from the Pacific Salmon Commission's Chinook Technical Committee provides an annually updated foundation for the CWT cohort analysis used in the calibration. The progress report portion of the presentation also contained discussion sections on some of the challenges associated with developing a new base period data set including: 1) cohort analysis for stocks that are subject to both mark-selective and non-selective fishery regulations, 2) estimating the portion of the catch in a fishery composed of FRAM stocks (Model Stock Proportion), 3) methods for dealing with data gaps, and 4) QA-QC criteria. Two technical analyses covering specific aspects of developing the new base period were presented.

Growth functions – To model the effects of changes in size limits, the size distribution at age must be described. As part of the base period project, stock-specific growth functions were estimated from new base period CWT data. Size distributions at age were modeled with Von Bertalanffy growth functions and coefficients of variation around these functions were estimated using Bayesian methods from CWT data aggregated across brood years. Data were not sufficient to estimate growth functions for all stocks so data were combined across regional aggregates, but the number of stock-specific growth functions was increased from 11 to 13. New growth functions generally predict larger size at age (lower fraction sub-legal) than the old growth functions.

Stock-specific sublegal encounters – Estimates of total sublegal encounters in fisheries are available from a variety of sources, including on-water monitoring, dockside interviews, and voluntary log-book reports. However, assigning these encounters to stocks and age classes is problematic and a new method was proposed for the calibration program. The current method is to allocate sublegal encounters on the basis of legal encounters, which implicitly assumes that all stocks have the size at age, and all age classes from each stock have the same distribution. The new method distributes sublegal encounters on the basis of encounter rates and the presence of the age class or adjacent age classes in the fishery. This allows for differences between stocks in the proportion of sublegal fish for each age class. While we do not have data to evaluate these alternative methods empirically, the new method appears reasonable.

Work continues on the evaluation and documentation of the new base period and associated calibration method and programs. Some very preliminary FRAM model run results comparing stock compositions in Council troll fisheries between proposed and current base datasets and GSI-based estimates were presented. Further work on the base period data and comparison of FRAM run results are expected in the next several months. It remains unclear if Chinook FRAM using the new base period will be ready for implementation in 2016.

The STT acknowledges the substantial amount of work done by the Work Group and looks forward to using the new base data in Chinook FRAM when the base period data project is completed.

Other topics

Pete Lawson (SSC) described a project in California funded by Saltonstall-Kennedy to collect up to 6,000 GSI samples between Horse Mountain and Point Arena with a focus on improving understanding of the ocean distribution of Klamath River Chinook. Sampling may be non-lethal, and any impacts will need to be accounted for in the fishery planning process next year. There is also a test fishery proposal that will be coming from California (described by Brett Kormos, CDFW) focused on the evaluation of a new management line within the California Klamath Management Zone using CWT data. Both projects are intended to improve the understanding of Klamath River fall Chinook ocean distribution and perhaps there is an opportunity for some collaboration between them.

A forecast model for SRWC proposed by the California Department of Fish and Wildlife in 2015 was discussed. The current control rule for winter Chinook is based on the most recent 3-year average return. The forecast was introduced with the intent of making management more responsive and/or precautionary by using a predicted abundance rather than the most recent average abundance as input into the harvest control rule. However, a forecast abundance based on jacks would be for the current year's return, which will have escaped to the river before the current year's ocean fisheries begin. A detailed evaluation of the merits of this approach was not feasible at the Methodology Review meeting given the review materials provided.

PFMC

11/5/15