

MODEL EVALUATION WORKGROUP REPORT ON SALMON METHODOLOGY REVIEW

Members of the Model Evaluation Workgroup (MEW) attended the Salmon Methodology Review meeting in October and offer comments on the following topics:

- 1) Factors affecting Fishery Regulation Assessment Model (FRAM) mark-selective fishery (MSF) bias when both MSF and non-selective fisheries (NSF) occur simultaneously in a model time step, along with an evaluation of potential bias-correction methods. Presented by Henry Yuen and Bob Conrad.
- 2) Evaluation of indicator stock groups for Columbia River summer Chinook. Presented by Larrie LaVoy.
- 3) Forecast models for Oregon coastal natural (OCN) coho salmon. Presented by Pete Lawson.

FRAM

Promising methods to adjust FRAM calculations of MSF related mortalities were presented and discussed. The presentations showed that the MSF induced bias in FRAM is greater than originally demonstrated. The MEW is concerned about the potential level of bias. Over the next year, MEW will continue to assess the magnitude of the bias, refine the bias-correction equations, and develop the bias-correction methodology that can be applied on an individual or aggregate stock basis. The associated program code will be incorporated into FRAM when verified.

Progress continues to be made toward understanding how MSFs introduce bias into the FRAM estimation of fishing-related mortalities. At last year's Methodology Review meeting we demonstrated a theoretical model to estimate the bias mark-selective fisheries introduce into FRAM's calculation of unmarked fish mortality within MSFs. FRAM underestimates the mortality of unmarked salmon when there is a MSF during the model time step. A method was subsequently developed to correct for this particular bias within FRAM. However, there was concern that this equation did not capture all aspects of the interactions of multiple fisheries and stocks within FRAM. Over this past year, Mr. Conrad and Mr. Yuen expanded the theoretical model to include simultaneous MSFs and non-selective fisheries (NSFs). Their findings demonstrated that the bias MSFs introduce into FRAM originates not only from potential multiple encounters of unmarked fish, but also from MSF induced changes to the mark rate of fish available to NSFs occurring during the same model time step. Corrections are needed in FRAM to account for underestimated unmarked mortalities in both MSFs and NSFs occurring during the same time step. More work is needed to confirm how to use the bias-correction equations within FRAM on the mix of marked and unmarked stocks.

However, presently the FRAM model is producing biased estimates of MSF induced mortality of unmarked salmon. This bias was shown to be greater than thought when the Council Guidance defining an "acceptable low level of MSF" was originally provided, two years ago. It may be useful to review the proposed suite of annual fisheries to evaluate whether they are consistent with the Council Guidance that was provided at the November 2008 Council Meeting.

Columbia River Summer Chinook

The methodology and results for incorporation of additional Columbia River Summer Chinook coded wire tag (CWT) recoveries into Chinook FRAM was presented by Larrie LaVoy. The past representation for this stock's distribution in FRAM fisheries and time steps was based upon relatively few CWT recoveries during the base period. Mr. LaVoy used standard FRAM "Out-of-Base" procedures to incorporate an expanded set of more recent CWT recoveries into the FRAM profile for this summer Chinook stock. The resulting stock distribution through FRAM fisheries and time steps should provide increased confidence in our ability to evaluate the impacts of pre-season fisheries upon this stock, and upon other associated Chinook stocks.

OCN Coho

The presented forecast methodology for OCN coho (river component) used a unique approach that incorporated environmental conditions from the preceding four years. The MEW appreciated the presentation of this innovative approach. Preparing pre-season abundance forecasts, for all stocks, is always challenging given the uncertainty of ocean survival rates. If shown to be successful, the incorporation of multi-year environmental indexes may be applicable to other salmon stocks.