

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON 2010 SALMON METHODOLOGY REVIEW

The Scientific and Statistical Committee (SSC) reviewed the SSC Salmon Subcommittee report on the Salmon Methodology Review. The methodology review occurred during a joint session with members of the SSC Salmon Subcommittee, the Salmon Technical Team (STT) and the Model Evaluation Workgroup (MEW) on October 19-20, 2010 in Portland. The review focused on: (1) new investigations into Fishery Regulation Assessment Model (FRAM) bias when there are both mark-selective fisheries and non-selective fisheries in a modeled time step and possible bias-correction methods; (2) new forecast methods for Oregon Coastal natural (OCN) coho salmon abundance (river component only); and (3) evaluation of new indicator coded-wire-tag (CWT) groups for Columbia River summer Chinook salmon to update the Chinook FRAM base period.

FRAM Bias and Bias-correction Methods

Previously, to minimize the impacts of bias in FRAM modeling, the SSC suggested a “30-10” rule which recommended that the FRAM is “suitable for modeling mark-selective fisheries of low intensity, with 'low intensity' provisionally defined as those fisheries with fishery-specific exploitation rates on marked stocks of less than 10 percent and overall selective fishery exploitation rates of less than 30 percent.” Subsequently, Bob Conrad and Henry Yuen have produced two reports to further define the problem and recommend solutions (Agenda Items F.5.a, Attachments 1 and 2).

The most striking result of these analyses was that operating mark-selective fisheries simultaneously with a non-selective fishery introduces bias in the non-selective fishery impact estimate, which was unbiased in the single fishery case. This is because the mark-selective fishery selectively removes marked fish, so the pool of fish the non-selective fishery is operating on has a higher proportion of unmarked fish than assumed by any of the current management models. As mark-selective fisheries get more intense the differences and biases increase exponentially. Operating fisheries simultaneously also increases the bias in the mark-selective fisheries, because the stock proportions are changing more rapidly than they would with only a single fishery.

The SSC concludes that while progress was made in defining the potential impacts of bias, several issues still need to be addressed before bias correction can be implemented in FRAM:

1. The fundamental problem is that the best bias-correction methods need, as input, the total number of fish of all stocks available to the fishery. FRAM models each stock as a single pool, and does not distribute stocks by area.
2. Non-retention fisheries, drop-off mortalities, and mark-recognition errors are not included in the proposed bias-correction methods. It is not clear that these factors have enough influence on final estimates to warrant the extra complexity they would introduce into the modeling.

3. The “30-10” rule needs further clarification and interpretation in order to be implemented. The SSC will consult with the MEW and STT to help develop a way to evaluate fishery options for compliance with this rule during pre-season planning.

These issues should remain a high priority in the next year so that bias-correction methods can be implemented.

OCN Coho Abundance Forecast Models

Dr. Pete Lawson summarized the work done on developing a new forecast model for Oregon Coastal Natural (OCN) coho (river component) (Agenda Item F.5.a, Attachment 3). After evaluating numerous possible models, the authors decided upon nine models with the Pacific Decadal Oscillation (PDO) and one other variable, and nine models with the PDO and two other variables, as well as ensemble means of six of the predictors from both the two-variable and three-variable models as the most promising.

The SSC recommends that the three-variable ensemble mean form the basis for predictions for 2011 management.

Columbia River Summer Chinook Stock Representation in Chinook FRAM Base Period

Mr. Larrie LaVoy presented an evaluation of the effect of adding new out-of-base period CWT codes to the present tag codes used to represent Columbia River summer Chinook in the FRAM (Agenda Item F.5.a, Attachment 3).

The SSC agrees that incorporation of the proposed additional Columbia River summer Chinook CWT groups into the base period improves FRAM’s exploitation rate analysis for Council fisheries. The proposed revisions provide for an increased sample size of CWT recoveries from more recent brood years, and would better represent the life history strategies of the stock’s current hatchery and natural production.

The SSC supports the recommendation to incorporate the proposed additional CWT groups into the FRAM base period for 2011 management.

PFMC
11/05/2010