

SCIENTIFIC AND STATISTICAL COMMITTEE COMMENTS ON
FINAL REVIEW OF METHODOLOGY CHANGES TO THE
KLAMATH OCEAN HARVEST MODEL (KOHM) AND COHO
FISHERY REGULATION ASSESSMENT MODEL (FRAM)

At the November 2001 Council meeting, the Scientific and Statistical Committee (SSC) received updates on the progress of changes to the coho salmon Fishery Regulation and Assessment Model (FRAM) and the Klamath Ocean Harvest Model (KOHM). At that time both models still had several issues that needed to be addressed before the models could be used in the 2002 management process. Joint meetings of the SSC salmon subcommittee and the Salmon Technical Team (STT) were held on January 3 and February 5, 2002 to receive progress reports on the work to address the outstanding issues for the FRAM and the KOHM, respectively.

Coho FRAM:

Mr. Jim Packer and Mr. Larrie LaVoy from the Washington Department of Fish and Wildlife (WDFW) presented the progress report on the coho FRAM. At the November meeting, it was determined the critical problem that needed resolution before FRAM could be updated was a methodology for combining or "averaging" fishery exploitation rate estimates across the six years in the new 1986-1991 base period. Since that meeting, Mr. Packer and Mr. LaVoy have investigated four possible methods of "averaging" base period exploitation rates:

1. stock-fishery-time specific exploitations rates averaged over six years,
2. stock-fishery-time specific exploitations rates averaged over open fisheries only during the six years,
3. stock-fishery-time specific catches averaged over six years (then divided by an average cohort size), and
4. stock-fishery-time specific catches averaged over open fisheries only during the six years (then divided by an average cohort size).

Detailed comparisons of the results of using each averaging method in the final 2001 preseason FRAM run were presented. The SSC recommended that method 2 be used to estimate stock-fishery-time specific exploitations rates in the model for 2002, because this method is considered to be less biased than the others, and it can most easily incorporate new information (i.e., exploitation rates outside the base period) into the model if it becomes available. The SSC also recommends further analysis of alternative methods before the 2003 management season.

At the November meeting, the following additional tasks were identified which needed to be completed prior to the March 2002 meeting: (1) those parties responsible for producing preseason forecasts for input to FRAM needed to be aware of new stock requirements and prepare forecasts in a format compatible with the updated FRAM; (2) all output reports for the Council, South of Falcon, and North of Falcon management processes needed to be developed and incorporate the new stocks and fishery units; (3) the Terminal Area Management Models (TAMMs), which have been external to the old FRAM model, are now internal to the model, and reports analogous to the TAMM output sheets needed to be developed; (4) there are a number of other management models that use output from the FRAM as input and compatibility between models needs to continue; and (5) Washington coastal terminal area fisheries are now part of the updated FRAM. In the past, analyses for these fisheries were conducted external to the model. Agreement on the methods to be used for Washington coastal terminal area fisheries in 2002 is needed. All of these issues have been satisfactorily addressed. With reference to issue 5, WDFW and the Tribes will consider both methods of analysis (external to the model and internal to the model).

Given that all identified issues of concern have been addressed, the SSC recommends the revised FRAM for use in the 2002 fishery management process. In addition, the SSC recommends that Model Evaluation Subgroups be formed for both the coho and chinook FRAM models. These groups should have participants from all interested agencies. The purpose of these subgroups would be to:

- Increase the number of people who understand the model, can run the model, and make changes to the model; so the departure of any single person does not disrupt the viability of the FRAMs.
- Validate and document the current model. Before validation can be done, it is necessary to define an appropriate approach for model validation.
- Review and verify any changes to the model and conduct postseason evaluations of model performance.
- Propose changes to the model that would improve the model for its intended management purposes.
- Conduct a sensitivity analysis of model outputs to specific model inputs.
- Implement methods to quantify the uncertainty of model predictions.

Finally, it is very difficult for the SSC to assess the scientific validity of the FRAM models because of the lack of postseason validations and model documentation. Although there has been some progress in this area, more is needed before the SSC can comprehensively evaluate the FRAM. However, using the 1986-1991 coho cohort database for the new baseline is clearly an improvement over the previous 1979-1981 base period.

Klamath Ocean Harvest Model:

Mr. Michael Mohr and Mr. Allen Grover provided an update on the revision to the Klamath Ocean Harvest Model (KOHM). At the November meeting there were three unresolved issues that needed to be addressed prior to model use: (1) the appropriate contact rate for naturally-produced fish needed to be determined; (2) a method was needed to incorporate the non-Klamath catch into the model; and (3) a comparison of the new model with the old model and, more importantly, a hindcast evaluation of the new model using abundance and harvest estimates from previous years were needed. All three of these issues have been satisfactorily addressed. With reference to issue 3, extensive test runs indicate the model code does not contain obvious errors. Hindcast catches and exploitation rates were in the range of observed values.

The KOHM revision is a vast improvement of the model, and the SSC recommends its use for this year's management cycle. The model base data are fully documented, and the input files and sub-models within the KOHM can be easily revised to incorporate new information or to assess the effects of various management regulations. Further work that needs to be done on the KOHM are (1) a report documenting the current model and its verification needs to be produced; (2) the model interface needs to be improved to facilitate its use by other groups; and (3) methods to quantify the uncertainty of model predictions need to be implemented. For example, if uncertainty were characterized the probability of the natural spawner escapement falling below the escapement floor could be estimated.