SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON
RESULTS OF SCIENTIFIC AND STATISTICAL COMMITTEE METHODOLOGY REVIEW

The Scientific and Statistical Committee (SSC) Salmon Subcommittee and the Salmon Technical Team (STT) jointly sponsored a meeting on October 22 and 23, 2001 in Portland, Oregon to provide a thorough overview of both the coho salmon Fishery Regulation and Assessment Model (FRAM) and the Klamath Ocean Harvest Model (KOHM). The SSC is appreciative of the effort made by the STT and specifically, Mr. Jim Packer and Mr. Larrie LaVoy of the Washington Department of Fish and Wildlife (WDFW) for their presentation of the coho FRAM and Mr. Michael Mohr of the National Marine Fisheries Service (NMFS) for his presentation of the KOHM. Their respective discussions allowed the SSC a unique opportunity to better understand both of these models.

Development of both models has progressed rapidly in the past few months, as the modelers push to be ready for 2002 season setting. Both model revisions represent substantial improvements over the models currently in use. However, at this point neither model is ready for use. The SSC is prepared to approve both models for use in 2002, provisional on completion of tasks detailed in the following discussions. The SSC Salmon Subcommittee and the STT have scheduled two joint meetings in early 2002 to review the models for final approval. The coho FRAM meeting is scheduled for early January while the KOHM meeting will be held in early February 2002 . If the models are not deemed ready for use at that time then the previous versions will be used for 2002 season setting.

Coho FRAM
The coho cohort analysis project, which has been underway since 1994, has been completed. Complete cohort data for the years 1986-1991 have been generated for all pertinent coho salmon stocks. These data include estimates of exploitation rates and contribution rates for all stocks and fisheries; the numbers of modeled stocks and fisheries have been substantially increased from the previous base period data used in the coho FRAM. The coho cohort analysis project was a major undertaking that is reflected by the amount of time required for its completion. All those that contributed to the completion of this project are to be commended.

The major proposed change to the coho FRAM model for the 2002 salmon fishery management process is to replace the old 1979-1981 base period data with the new 1986-1991 base period data from the coho cohort analysis. The new base period data are a significant improvement in stocks and fisheries covered by the model compared to the 1979-1981 base period. There are no changes proposed to coho FRAM for the overall fishery impact assessment methodologies or the algorithms used in the model. Other changes that will occur if the new 1986-1991 base period is adopted are:

·   The number of modeled stocks increases from 37 to 128.
·   The number of modeled fisheries increases from 66 (27 Council fisheries) to 206 (25 Council fisheries). For Council fisheries, the separate Eureka and Crescent City fishery areas in the old base period have been combined into a single fishery in the new base period (California-Klamath Management Zone [KMZ]).
·   The number of modeled time periods has decreased from 13 monthly periods (December to December) to four periods (January–June, July, August, September-December).

Currently, the coho FRAM has been run using each of the new base period years individually. The most critical problem that must be resolved before FRAM could use the new base period data is a methodology for combining or "averaging" fishery exploitation rate and stock contribution rate estimates across the six base period years. There was considerable discussion of how this might be done. Work efforts on the coho FRAM during the next two months will focus on resolving this issue.

If the above problem can be resolved, there are several additional issues related to coho FRAM data input and output that must be addressed before the new base period data can be used in the 2002 salmon fishery management process:

1.   Preseason forecasts will be needed for each of the 128 modeled stock units in the new base period. Those responsible for producing these forecasts need to be aware of these new

requirements and prepare forecasts in a format compatible with the updated FRAM. Many of the added stocks currently have separate forecasts that are combined for the current FRAM.

2. All output reports needed for the Council, South of Falcon, and North of Falcon management processes must be developed and need to incorporate the new stocks and fishery units.
3. The Terminal Area Management Models (TAMMs), which have been external to the FRAM model with the old base period, will now be internal to the model. Those who have supplied input for the TAMMs in the past need to know the new data requirements and formats for this information to be used in the updated FRAM. In addition, reports analogous to the TAMM output sheets will need to be developed.
4. Washington coastal coho stocks are now part of the updated FRAM where they were not in the past. Analyses for these stocks have been conducted external to the model. A decision needs to be made whether this will continue or whether the updated FRAM will now be used for these stocks.
5. There are a number of other management models that use output from the FRAM as input. Users of these models need to make sure the developers of the updated FRAM are aware of their data requirements so these data are available during the management process.

Finally, 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 groups would be to:

- Increase the number of people who: understand the model, can run the model, and can make changes to the model, so the departure of any single person does not disrupt the viability of the FRAMs.
- Propose changes to the model which would improve the model for its intended management purposes.
- Review and validate changes to the model.
- Conduct a postseason assessment of model performance.
- Develop comprehensive documentation.

Klamath Ocean Harvest Model

The KOHM revision is near completion, and the model may be ready to use for setting the 2002 fisheries. The revision included transferring all supporting data from spreadsheets into databases, error checking of all data, and converting the KOHM from a spreadsheet into a programming language. Two new databases were created: a Regulation database documenting all ocean chinook fishery regulations since 1978 and an Effort database that documents the number of chinook landed and effort in the sport and commercial fisheries. A revised cohort analysis, using the corrected data, was done on the five components (Trinity hatchery fingerling, Trinity hatchery yearling, Iron Gate Hatchery fingerling, Iron Gate Hatchery yearling, and natural fish) of the Klamath fall chinook production. Many of the parameters used in the KOHM have changed as they are derived from the cohort reconstruction. The new KOHM models contact rates (defined as number of chinook brought to the boat) as a function of effort. There is a direct and explicit link between fishing effort and the number of days the fishing season was open in each unit.

The KOHM revision is a vast improvement of the model. Major components of the model are designed as independent sub-models which can be revised as our understanding improves (e.g., size at age, contact rates vs. effort). Documentation of the models and the supporting data sets is impressively thorough and comprehensive, greatly enhancing the utility of the model.

Mr. Mohr stated there are three unresolved issues: (1) how to account for non-Klamath catch, primarily from the Rogue River and Central Valley; (2) what is the appropriate contact rate to use for naturally produced fish and; (3) a comparison of the new model with the old model and, more importantly, a hindcast of the new model using abundance and harvest estimates from previous years.

Important changes and improvements incorporated into the new model include:

1. The model uses ocean abundance estimates beginning September 1 rather than May 1 allowing earlier fisheries to be modeled.
2. Drop off mortality, shaker mortality, and straying are modeled.
3. Sport and troll fisheries are modeled in all units on a monthly basis.
4. The KMZ was split into Oregon and California units: KO (California-Oregon border to Humbug Mountain) and KC (California-Oregon border to Horse Mountain).

5. The Southern California (SOC) unit was split into two units: SF (Pt. Arena to Pigeon Pt.) and MO (Pigeon Pt. to Pt. Sur).
6. The proportion of legal size fish in a unit is now based on a size-at-age model.
7. There is monthly accounting of natural mortality.
8. The base period used for cohort reconstruction was expanded from 1986-1990 to 1986-present.
9 There is age specific accounting of river fisheries and spawners.

PFMC
10/31/01