Exhibit C.4.b
Supplemental SSC Report
November 2002

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

Mr. Jim Packer and Mr. Larrie LaVoy of the Washington Department of Fish and Wildlife (WDFW) presented a progress report to a joint meeting of the Scientific and Statistical Committee (SSC) Salmon Subcommittee and the Salmon Technical Team (STT) on modifications to the chinook Fisheries Regulation Assessment Model (FRAM). This meeting was held on October 15, 2002 in Portland. Their report described two important changes to the model for the 2003 management season:

1. Chinook FRAM has been recalibrated and the period for model validation runs has been expanded.
2. Chinook FRAM has been changed to accommodate the modeling of mark-selective fisheries.

Model Recalibration and Validation

The chinook FRAM recalibration changes include:

• Extending the database used for model calibration to include 1997-2000 return year data.
• Moving some out-of-base period stocks back into the base year period.
• Adding a White River Hatchery yearling stock to the coded-wire tag data used by the FRAM model.

In addition, catches for the period 1983-2000 were updated and new "validation" model runs were produced for this period. All these changes should improve the model.

Changes to Accommodate Mark-Selective Fisheries

As was done previously for coho FRAM, the capability for each stock in the model to have both marked (adipose fin clipped) and unmarked components was added. The same selective fisheries algorithms used in the coho FRAM were implemented in chinook FRAM. These algorithms calculate impacts in mark-selective fisheries following the recommendations of the Selective Fishery Evaluation Committee of the Pacific Salmon Commission. They are based on four user-defined parameters: release mortality rate, marked fish recognition error, unmarked fish recognition error, and drop-off mortality rate. The program estimates encounters in the selective fishery as the number of fish that would have been landed without mark-selective regulations. Mortalities of unmarked fish are estimated based upon the user-defined parameters applied to the estimated encounters. A special selective fishery report has been developed to summarize all stock impacts for each fishery.

The chinook FRAM is considerably more complex than the coho FRAM, because:

• Chinook FRAM is a multiple-age model while coho FRAM is a single-age model.
• Chinook FRAM incorporates a growth algorithm that is applied to sub-legal fish.
• Chinook FRAM calculates "shaker" mortality for sub-legal sized fish.

The most important task yet to be completed before chinook FRAM potentially could be used to evaluate salmon fishery proposals which include mark-selective fisheries for 2003 is modification to the terminal area management modules (TAMMs). The TAMMs need to be changed to accept marked and unmarked estimates of abundance by stock and separately estimate impacts for these marked and unmarked components. This work is on-going and should be completed in January 2003.

A continuing problem with both the coho and chinook FRAMs is the lack of documentation and validation for these models. There is a need to document how each model works (model algorithms, data inputs, model assumptions, etc.) and how the models are used (model recalibration, model validation, etc.). With the continued lack of documentation, the viability of both models could be threatened by the departure of one or two key people with the most complete understanding of all model aspects.

Conclusions and Recommendations

The SSC has the following conclusions and recommendations concerning the modified chinook FRAM and its use in the 2003 management process:

1. The material presented to the review group indicated that the modified chinook FRAM is capable of duplicating the results of the previous version of the model in the absence of mark- selective fisheries. Therefore, the modified FRAM can be used to assess impacts if mark-selective fisheries are not under consideration and the changes to the TAMMs described above are made.
2. The SSC cannot evaluate the model as a tool for assessing mark-selective fisheries, because of the lack of written documentation and appropriate model validation. Therefore, the SSC cannot support the use of the modified chinook FRAM to evaluate mark-selective fishery proposals in 2003.
3. If the Council chooses to use the modified chinook FRAM to evaluate mark-selective fishery proposals in 2003, the SSC supports the STT recommendation to establish buffers for management targets to compensate for the increased bias and uncertainty of model estimates (Exhibit C.4.c Supplemental STT Report).
4. As has been recommended in previous SSC statements on the FRAM models, Model Evaluation Subgroups should be formed for both the coho and chinook FRAMs. 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 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.
    •   Validate the current model.
    •   Review and validate any changes to the model.
    •   Conduct postseason evaluations of model performance.
    •   Conduct a sensitivity analysis of model outputs to specific model inputs.

Model documentation is required for the SSC to identify the specific issues related to the model that need detailed review. Review is necessary to identify the strengths and weaknesses of the chinook FRAM in relation to Council-managed fisheries. A detailed review should occur in 2003, prior to the use of the model in 2004.

PFMC
10/29/02