

SALMON TECHNICAL TEAM COMMENTS ON THE METHODOLOGICAL REVIEW OF
REVISIONS TO THE KLAMATH OCEAN HARVEST MODEL AND THE
COHO FISHERY REGULATION ASSESSMENT MODEL

KOHM

The Salmon Technical Team (STT) recommends that the revised KOHM be applied beginning in 2002. Based on several reviews of the revised model, the STT believes that the new KOHM represents a thoughtful, well-reasoned modeling approach that can be expected to substantially improve the capacity of the Council to evaluate the impacts of fishery regulations on Klamath fall chinook. The revised model represents a significant improvement from the previous version in several important ways, including:

- Available data and information regarding Klamath fall chinook from a variety of sources are integrated into a cohesive form with a sound theoretical basis.
- A new historical database has been created which contains CWT data, catches, effort, and escapements necessary to parameterize the KOHM. This database is to be updated to incorporate new information as it becomes available over time.
- The fishery-time strata used in the new KOHM provide for separate assessment of troll and sport fisheries and significant refinement of management areas. These stratifications and changes in parameterization improve the visibility of the assumptions employed in the estimation of fishery impacts.
- Cohort analysis procedures have been modified to be consistent with algorithms used in model projections, including incorporation of drop-off mortalities and current release mortality rate estimates.
- Cohort analyses have been performed on five components of Klamath fall chinook production (Iron Gate Hatchery fingerling and yearling releases, Trinity River Hatchery fingerling and yearling releases, and Klamath Naturals).
- The structure of the KOHM and the data employed are now more transparent:
 - ❖ Methods, assumptions, and algorithms are well documented, improving understanding the components that affect impact predictions and the significance of key model parameters.
 - ❖ The KOHM has been coded in R, a statistical programming language, improving the ability to understand and modify algorithms and identify interrelationships between model parameters.
 - ❖ Visibility of underlying data has been improved.
 - ❖ The new structure uses all historical data and has provisions for future data and parameters that may improve the prediction of fishery impacts.
 - ❖ The new time/area strata makes integration of the KOHM with other ocean harvest models more transparent.

The STT and the SSC recommended in November of 2001 that additional evaluation of the KOHM be conducted. Since then, the model code has been error checked, and model algorithms have been validated by hindcasting the 1991 through 2000 seasons. This hindcasting exercise revealed no bias in estimated mortality rates or escapements and increased the STT's confidence in the KOHM.

The determination of whether or not the new KOHM be used should not be based on a comparison of results with the previous version.. It is likely that results of the revised KOHM will differ from those of the previous version in several ways due to differences in structure, databases, and parameterization. A comparison of the previous and new versions of the KOHM may provide users with some insight into model behavior, but would not provide useful information regarding the performance of the revised KOHM in accurately estimating fishery impacts.

Coho FRAM

The STT recommends that the Council approve the use of the new base period dataset for Coho FRAM. No changes in algorithms or functional structure from the Coho FRAM used last year are involved. Changes are confined to the model input data, specifically to the development of a new base period data set. Estimation methods for the generation of base period data rely upon the Mixed Stock Model (MSM) supplemented by other data (e.g., escapements), estimation methods, and models. These methods have been previously reviewed so the development of the new base period data primarily involves the application of approved methods to a specific set of data.

There are trade-offs involved in changing base period data sets. The current base period for Coho FRAM reflects exploitation patterns observed from 1979-1981. Fisheries during this period were consistent, occurred over an extensive geographic area, and were intensive so that CWT recovery data were of high quality. However, tagging of stocks contributing to fisheries during this period was incomplete so that data were not available to directly estimate base period impacts for some populations of concern.

The new base period covers the years from 1986-1991. CWT releases for many more groups of fish contributed to fisheries during this time period, but fishing patterns were inconsistent. As management attention focused on the protection of individual stocks, uncertainty over estimates of fishery impacts increased as harvest rates were reduced and fishery regimes became more variable.

Agencies were consulted extensively during development of the new base period database to ensure that representative CWT groups were selected and that the correct data were employed. The methods employed to generate the new base period data attribute all catch to modeled stock groups, and eliminate many ad-hoc data manipulations and terminal fishery calculations that had to be done outside the model in the past.

Considering these trade-offs, the STT believes that the new 1986-1991 base period database represents a substantial improvement over the 1979-1981 base period data currently used by Coho FRAM.

Changes in fishery and stock stratifications resulting from the use of a new base period are summarized in the following table:

	Current Data Set	Proposed New Data Set
Base Period Catch Years	1979-1981	1986-1991
Stocks		
Fisheries		
Time Periods	(Dec-Dec)	Jan-June, July, Aug, Sep-Dec)
CWT Groups in Base	10 (10.8 million tags)	40 (44.2 million tags)
Stocks without CWT data during base	Skagit, Grays Harbor, Willapa)	the