

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON REVIEW OF 2006  
FISHERIES AND SUMMARY OF 2007 STOCK ABUNDANCE ESTIMATES

Mr. Dell Simmons, Chair of the Salmon Technical Team (STT), reviewed the 2006 fisheries and the preliminary 2007 ocean salmon stock abundance estimates for the Scientific and Statistical Committee (SSC). Mr. Allen Grover presented material on the Klamath River fall Chinook (KRFC) stock which constrained Chinook fisheries south of Cape Falcon in 2006.

In 2004 and 2005, the post-season estimate for the KRFC age-4 ocean exploitation rate was far greater than the pre-season estimate, and exceeded 16 % in both years. This resulted in fewer than the escapement floor of 35,000 natural spawners, and was due in part to higher than expected contact rates in some fisheries. Beginning with the 2006 pre-season analysis, the relationship of effort to contact rate in the Klamath Ocean Harvest Model (KOHM) has been re-estimated for each fishery by using only the last 4 years of data instead of the full time series. This resulted in a better prediction of age-4 ocean impact rate for KRFC in 2006, although the natural spawner floor was missed again, triggering an Overfishing Concern. In the investigation into why contact rates were higher, a data issue related to coded wire tag (CWT) coding for the in-river tribal fisheries was discovered. This has now been corrected, and the estimates of contact rate are somewhat lower, but still considerably higher than those based upon the full time series. These higher estimated contact rates and the resulting reduced fishing opportunity appear to be the current reality. The SSC recommends that the STT investigate the causes of these changes to contact rates.

For KRFC, the abundance of age  $a$  (for ages 3-5) is estimated from age  $a-1$  in-river returns. The spawning escapement is composed of age-3, 4 and 5 Chinook, although 5 year olds tend to be a relatively minor contributor to the total escapement. The 2007 pre-season estimate of age-3 abundance is very high (515,409) while that of age-4 abundance is very low (26,085). Based upon a no-fishing prediction of over 75,000 natural spawners, the maximum age-4 ocean impact rate (16%) can be implemented while still exceeding the 35,000 natural spawner floor. However, uncertainty in the estimates of ocean abundance is not considered in this analysis. Prediction intervals or a distribution about the regression should be used to assess the risk of missing the natural spawner floor. Pre-season and post-season abundance estimates can differ by a factor of 2 or more, and thus the risk is far from negligible. Furthermore, if the relative abundances of age-3 and 4 KRFC are accurate, the spawners will be dominated by age-3 fish which are smaller and produce fewer and possibly lower quality eggs than age-4 or 5 fish. These differences in fecundity and egg quality are not considered when using the natural spawner floor as a target, but may be important to the resulting recruitment.

Ocean fisheries north of Cape Falcon may be constrained by the Endangered Species Act listing of lower Columbia River wild coho stocks and the U.S. fishery 10% exploitation cap on the Thompson River coho stock. The STT expressed concern about their ability to estimate impacts on recent listed lower Columbia River coho. Low predictions for threatened Columbia River Tules may limit fisheries South of Cape Falcon.

The pre-season forecast of the central valley index (CVI) for Chinook salmon is at its lowest level since 1992. The regression used to predict the CVI is likely highly dependent upon the

2005 data point. A sensitivity analysis should be done to see how the current estimate changes if this data point is removed. Alternatively, an errors-in-variables or functional regression approach could be taken (this approach would be useful in the KRFC contact rate to effort relationship as well). In any case, the CVI forecast of 499,900 appears high given data from years with similar age-2 returns. While this change would have little or no impact on fisheries in this year, a more accurate estimate of the relationship could improve future management.

The SSC wishes to reiterate a few recommendations it has made in the past to improve the usefulness of STT reports. Tables I-1 and I-2 in Preseason Report I present several years of preseason predictors for Chinook and coho stocks under Council management. The SSC requests the STT add post-season estimates to these tables, where available, to facilitate a reader's ability to compare the abundance predictors with the actual abundance estimates. A graphical representation of the pre- and post-season stock abundance estimates would facilitate this review.

The SSC would like to see prediction intervals for estimates of salmon abundance and exploitation rates. Given the uncertainties in abundance projection and exploitation rate estimation it is difficult to know the likelihood of meeting management objectives or to evaluate whether or not a management goal has been attained. The explicit recognition of uncertainty in salmon statistics is a necessary first step towards incorporating uncertainty and risk in salmon management.

PFMC  
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