

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON PACIFIC WHITING
MANAGEMENT FOR 2006

Mr. Tom Jagielo from the Scientific and Statistical Committee (SSC), and Chair of the Joint Canadian and U.S. Stock Assessment and Review (STAR) Panel for Pacific whiting, presented the SSC with an overview of the STAR Panel report. Members of the Stock Assessment (STAT) Team responded to questions arising during the SSC discussions. The Panel was conducted using Terms of Reference for Groundfish Stock Assessments.

Unlike the 2005 assessment, the 2006 assessment is based on the stock assessment package Stock Synthesis 2 (SS2). The assessment authors compared the results from SS2 with those from a variant of the model applied for the 2005 assessment. The time-series of biomass estimates from the two models are very similar.

The assessment considered two alternative and equally plausible models based on the value for the catchability coefficient (q) for the hydroacoustic survey. One of these values ($q=1$) is the same as that included in the 2005 assessment. The alternative model involved estimating q taking into account a prior distribution on q selected by the STAR Panel. The value of q from this alternative model is 0.69, which is higher than the value used in the last assessment (0.6). The SSC endorses the use of the 2006 Pacific whiting assessment for management purposes. The SSC notes that the results from both models could be combined to form the basis for management advice giving each model equal weight.

The 2006 assessment was based on setting the steepness of the stock-recruitment relationship to 0.75 whereas the 2005 assessment was based on a value of 1. Assuming a steepness of 1 in a stock assessment implies that recruitment is expected to be the same at high as well as low stock size. As a result, assuming that steepness is 1 can lead to over-optimistic projections. The SSC agrees with the STAT Team that assuming a steepness value less than 1 is appropriate. However, little justification is provided in the assessment report for the value for steepness actually used in the assessment (0.75). The SSC recommends that the basis for the value of steepness be explored further in the next assessment.

The projections based on the models are driven by the 1999 year-class, which has been sustaining the stock in recent years. The spawning biomass is predicted to decline in the future for almost any level of harvest. If the 40-10 control rule is used to determine Optimum Yields (OYs), the stock is predicted to drop to below the overfished threshold of 25% of the unfished biomass (25% B_0) even though the OYs are predicted to decline from over 500,000t to, for the base model, 184,000t. As such, the whiting stock should be considered to be "Approaching an Overfished State" if catches are to be based on the 40-10 control rule. The catch for 2005 was 360,306t. The results of the assessment can be used to determine the ability to remain above the overfished threshold. For example, a constant catch of 200,000t would maintain the spawning biomass above the overfished threshold until 2009 with 50% probability while a constant catch of 400,000t would result in the stock being below the overfished threshold in 2008 with at least 50% probability.

$F_{40\%}$ was selected as an F_{MSY} proxy for Pacific whiting based on the results of a meta-analysis that used stock and recruitment data for other whiting species. However, the Pacific whiting stock is predicted to fall below 25% B_0 if management is based on $F_{40\%}$ owing to the impact of variable recruitment. There is therefore a lack of consistency for Pacific whiting between aiming to maximize yield on average and preventing depletion to below 25% of B_0 . The SSC can examine the issue of how to develop a control rule which maximizes yield subject to keeping the spawning biomass above the overfishing threshold with a pre-specified probability at its B_0 workshop.

PFMC
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SSC-related notes [Not for the Council]

1. *There is a discrepancy between the indices of recruitment for 2003 and 2004 from the SWFSC and the PWCC/NWFSC surveys with the SWFSC surveys suggesting that the 2003 year-class was below average and the 2004 year-class was average above and the PWCC/NWFSC surveys suggesting that the 2003 year-class was average and the 2004 year-class was strong.*
2. *B_0 was based on the weight-at-age in the first year of the modeled period whereas other biological parameters (such as MSY) as based on weight-at-age for the most recent year. The issue of how to define B_0 (and MSY) when biological parameters (and recruitment) change over time should be discussed at the B_0 workshop.*
3. *For the 2007 assessment, the assessment authors should consider: a) using a sex-structured model, b) incorporating ageing error, c) allowing for Canadian fish to be larger at age than US fish, and d) examine the sensitivity to allowing the initial biomass to be treated as an estimable fraction of B_0 .*
4. *The selectivity pattern for the acoustic survey and the fisheries are notably different. The selectivity pattern for the acoustic survey suggests that selectivity is much lower than 1 for animals aged 2-4 whereas it is expected from the survey design that acoustic selectivity should be close to 1 for animals aged 2 and older. Previous Pacific whiting assessments imposed a prior on the ascending limb of the selectivity pattern for the acoustic survey. It might be possible examine this issue by collecting age data from different parts of large aggregations.*