

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON PACIFIC WHITING
HARVEST SPECIFICATIONS AND MANAGEMENT MEASURES FOR 2008

The Scientific and Statistical Committee (SSC) discussed three separate stock assessments of Pacific whiting (hake) in U.S. and Canadian waters; one that was based upon the stock synthesis 2 (SS2) modeling platform, a second that utilized a Virtual Population Analysis (VPA), and a third based on a single fleet age-structured population dynamics model (TINSS). Each of the assessments was conducted by different members of the combined U.S.-Canada assessment team but all were based on essentially the same data. There were, however, some fundamental differences in assumptions among the three assessments, specifically regarding selectivity, how the data were aggregated and entered into the models, the weighting of the data, and productivity.

Dr. Thomas Helser presented the SSC with an overview of the SS2-based assessment, and responded to questions during the SSC discussions. Dr. David Sampson summarized the report of the joint Canadian and U.S. Pacific Whiting Stock Assessment and Review (STAR) Panel and discussed the minority report submitted by the Canadian members of the assessment team and the STAR Panel's response to this report. The STAR Panel considered all three assessments. It did not reject any of these as being flawed. However, the Panel did identify a preferred base model based on SS2 because it was considered to provide a more flexible platform for evaluating assumptions and because it made better use of the available data. In particular, unlike TINSS, the SS2 model allowed for either dome-shaped or asymptotic fishery and survey selectivities.

The 2008 SS2-based assessment was similar to the 2007 assessment, except that natural mortality was estimated for older ages, stock-recruitment steepness was estimated although constrained by a prior, ageing error was accounted for, and acoustic survey catchability (Q) and selectivity were estimated. In addition, the pre-recruit survey was removed. The assessment exhibited a marked retrospective pattern in that recruitment and spawning stock biomass changed as the terminal year of the assessment was reduced from 2007 to 2001. The SSC notes that Q has been fixed in previous assessments because of concerns regarding the ability of the data to estimate the value of this parameter.

The SS2-based assessment led to higher acceptable biological catch and optimum yield catch levels than the other two assessments. However, the decision table (which included high, medium and low catch scenarios and constant catch levels of 250,000 mt, 300,000 mt and 400,000 mt) presented in the Executive Summary of the SS2-based assessment encompasses the range of point estimates for coastwide fishery yields that were provided in the other two assessments. The SSC endorses the use of the SS2-based 2008 Pacific whiting assessment and the associated decision table for management purposes and recommends that the results from it form the basis for management advice. Notwithstanding this endorsement, the SSC has concerns about estimating natural mortality and selectivity for the oldest ages as was done with the SS2 assessment. Furthermore, this is the first time that the value of Q has been estimated for whiting, and it is questionable whether the data are informative enough to rely only on the point estimate from the base model for management decisions. The SSC noted the comments in the minority report, in particular the retrospective pattern, but concludes that none of the information provided is sufficient to warrant changing the recommendations of the STAR Panel.

The decision table included in the SS2 assessment is different from those presented for most other groundfish assessments because it reflects uncertainty within one model rather than the implications of different models. For example, the column “25th” in the spawning depletion part of the decision table reflects that there is a 25% probability that the depletion will be equal to the value presented or be lower. The wide range of spawning depletions highlights that the data for whiting are not very informative about absolute population size nor depletion. The SS2 base model indicates that the stock is near the upper bound of the precautionary range (0.25-0.40 SSB_0), and has been declining since 2003. The spawning biomass is expected to increase in the near future for a harvest level of about 500,000 mt and lower because a moderate 2005 year class. However, in using these results, the Council should be cognizant of the considerable uncertainty associated with stock size estimates, that the 2005 recruitment has not been sampled adequately to confirm its strength, and that the three assessments presented to the STAR Panel differ in their predictions. Furthermore, the SS2 decision table does not capture the full range of uncertainty from the other models.

The SSC further notes that the population dynamics of whiting may not match the default harvest policy for groundfish. If the fishery were to be conducted under the $F_{40\%}$ harvest policy over an extended period, the biomass would be expected to fluctuate at a level well below $B_{40\%}$. Given that whiting recruitment is very variable, application of the 40-10 harvest policy will lead to frequent excursions into the overfished zone. The SSC recommends that an appropriate harvest policy for whiting be further investigated. The SSC also recommends that the next assessment consider whether natural mortality for the older age classes should be estimated by the model, examine the implications of sexually dimorphic growth, and assess whether the shored-based and at-sea sectors should be modeled as separate fleets.

Finally, the SSC notes that review of this assessment was complicated because three “competing” assessments were presented to the STAR Panel and the STAR Terms of Reference (TOR) does not explicitly address this situation. Since it is likely that multiple models could be brought forward for other future assessments, the SSC recommends that the TOR be revised to provide guidance on dealing with a possible recurrence of this scenario. In addition, it would have been desirable for there to have been a decision table that included the TINSS and VPA assessments as alternative states of nature so that the impacts of model uncertainty could have highlighted. However, the relevant calculations are not available and the STAR Panel did not in any case assign probabilities to each model.

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