

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON SCIENCE IMPROVEMENTS FOR THE NEXT GROUND FISH MANAGEMENT CYCLE

The Scientific and Statistical Committee (SSC) reviewed possible topics for off-year science workshops related to improving groundfish stock assessments for the 2017-18 management cycle based on recommendations from recent Stock Assessment Review (STAR) panels (Agenda Item G.4a, Attachment 1). Dr. Owen Hamel gave a presentation on assessment-related “off-year” research priorities for the FRAM division at the NWFSC. The NWFSC priorities are grouped into a) inputs to assessment models, b) model improvements and c) management and agency priorities. Many of these activities are best regarded as research projects for individual scientists or small teams, and would not necessarily be appropriate for Council-sponsored workshops. There may be a need for the SSC to review refinements to existing methods or data inputs prior to their use for stock assessment, and this should be possible during regular SSC meetings, or during 1-day meetings of the SSC Groundfish Subcommittee scheduled before or after meetings of the full SSC.

The SSC identified four priority topics for off-year science workshops. Two of these workshops were also recommended in 2011, but could not be completed for various reasons. The SSC continues to regard them as priority topics.

Workshops related to stock assessments (in priority order):

- 1. Workshop to review historical landings time series (recommended in 2011).** A major effort to reconstruct historical landings was initiated in 2008 in response to the Council’s call to compile the best estimates of catch history early in the development of Pacific Coast groundfish fisheries. Currently, this effort has produced published estimates for California fisheries, and more recently, estimates for Oregon fisheries. Data bases have been developed for raw landings and historical species composition data for Washington, but the analysis has not yet been done. An off-year science workshop would review reconstructions of all landings comprehensively, ideally when the Washington estimates are available. This review would need to be structured differently than the other proposed workshops, since the most expertise is to be found among current and former employees of state agencies and experienced fishermen and processors. Estimation of the extent of uncertainty of the historical catch estimates due, for example, to uncertainty in estimates of landings species compositions, would also be a priority for this workshop.
- 2. Workshop on methods of data reweighting.** Most West Coast assessments use effective sample size to weight the composition data by fleet. During the aurora and roughey rockfish STAR panel, CIE reviewer Dr. Chris Francis provided compelling evidence that this standard approach resulted in implausible residual patterns. An alternative approach proposed by Dr. Francis for the most part eliminated these “bad” residual patterns. However, it remains to be determined whether this approach is the “best” general approach for deriving reweighting factors. The issue, while technical in nature, has important consequences, since it is not unusual for assessment results to be

fairly sensitive to the weights given to composition data. The SSC recommends that a scientific workshop be sponsored to review the state of the art for reweighting stock assessment data, with the aim of preparing a guide to good practices for future assessments. This workshop would also benefit CPS stock assessments.

- 3. Workshop on the shape of the stock productivity curve.** Recent data-moderate assessment approaches such as Extended Depletion-Based Stock Reduction Analysis (XDB-SRA) are designed to have greater flexibility in how productivity changes with stock size. In contrast, nearly all full assessments of West Coast groundfish use the two-parameter Beverton-Holt stock recruit relationship, which imposes strong constraints on the shape of the stock productivity curve. While the approach used in XDB-SRA has conceptual appeal, it is not clear whether such flexibility is appropriate given what is known about the growth and mortality of West Coast groundfish. The two approaches represent a fundamental difference in how stock productivity is modeled, and there are important implications to biomass and fishing mortality reference points used in Council's harvest control rules. The SSC recommends that a scientific workshop be sponsored that would evaluate the suitability of these alternative ways of modelling stock productivity in data-moderate and full assessments.
- 4. Workshop on estimation of B_{MSY} proxies (recommended in 2011).** The Council's harvest control rules depend on estimates of stock size relative to a B_{MSY} proxy, with a default B_{MSY} proxy defined as some fraction of unfished stock size, B_0 . Changes in stock assessment methods or data inputs can lead to large changes in estimated B_0 and in some cases to marked changes in depletion levels, overfishing limits, acceptable biological catches, or rebuilding times. This workshop would review alternative control rules (e.g., control rules based on "Dynamic B_0 " or on direct estimates of B_{MSY}) and compare their performance with current approaches using management strategy evaluation (MSE). The workshop would build on the last B_0 workshop, but would be more focused on the performance of control rules. It would also include review of stock status for a range of stocks when stock status determinations are based on "Dynamic B_0 ." The evaluation of control rules could be based on the MSE currently being developed to evaluate rebuilding revision rules.

Successful workshops require dedicated research, careful organization before the workshop, and post-meeting development of scientific reports, all of which come at a cost of time and resources. The Council should be cognizant of the trade-off between the number of workshops that are held and amount of progress that can be made on other projects with the potential to improve data inputs and stock assessments.

With the adoption of the Council's Fishery Ecosystem Plan, the SSC anticipates a greater workload next year reviewing ecosystem-related documents, including annual reports of ecosystem status and technical documents to support the Council's ecosystem initiatives. Depending on the nature of the document and its intended use by the Council, these reviews could range from short, focused reviews (1 or 2-day) by SSC Ecosystem Subcommittee, to more extensive reviews similar to the methodology review process used for CPS and Groundfish. For example, the Ecosystem Workgroup is proposing a science workshop to evaluate information on the food habits of Council-managed species with the goal of refining criteria for identifying forage fish species. This workshop would benefit from SSC Ecosystem Subcommittee participation as reviewers of the scientific information developed for the workshop.