CONSULTANT'S REPORT: STAR PANEL, NEWPORT OREGON, JULY 2001

Introduction

This report describes work undertaken by the consultant, Robin Cook, in connection with the STAR panel review of assessments of Dover sole, shortspine thornyhead and sablefish. The reviews took place at the Hatfield Marine Science Center, Newport, Oregon from 9-16th July 2001. The work to be undertaken by the Consultant is set out in Annex 1. The report is divided into three main parts which deal with work undertaken, observations on the assessments and observations on the STAR process itself.

Work Undertaken

Annex 2 outlines the itinerary and the main activities undertaken. The draft assessment documents were not received until arrival in Portland on 7th July. This meant it was not possible to adequately review the documents before the meeting began on 9th. During the meeting the Consultant participated actively in the discussion. Particular points contributed related to:

- The interpretation of survey catchability in the assessments
- Assumptions about the stock recruit relationship with particular reference to sablefish
- Stock productivity and the implications for management
- Simplification of model analysis
- Summary presentations of assessment results to indicate stock status in relation to reference points

Following return to the UK, the Consultant prepared a report to CIE.

Observations on the stock assessments

Assessment Models

All three NMFS assessments are based on Stock Synthesis as the primary analytical tool. It is a very versatile tool that can make use of a variety of different data types and can fit a wide range of different models. Synthesis is well suited to the kind of data available for these assessments and is an elegant means of exploring the available data. The primary expertise for the implementation of Synthesis still remains with the program developer and it is clear that without this expertise present both at the assessment stage and the STAR panel review it would not be possible to use this tool effectively. It was encouraging to see that a manual for synthesis is now available and that the new staff in Newport had progressed substantially since May 2000 when the consultant last participated in a STAR panel at the Hatfield Science Center.

In the case of sablefish, an additional assessment was prepared on behalf of the Pacific Groundfish Conservation Trust (PGCT) by a team of consultants. The report of this work included a number of simpler analyses of survey data as well as a more elaborate age based model AColeraine@ which is comparable to Synthesis in its approach. While the Coleraine assessment model (as configured for sablefish) did not appear to me to have been as thoroughly prepared or as well thought out as the NMFS assessment, the fact that the PGCT

team had been prepared to apply other methodology as well proved useful in both understanding the limitations of the data and, perhaps, suggesting more transparent approaches to analysis. The constructive way in which both the NMFS team and the PGCT team had co-operated meant that real value had been added to the process by having an additional assessment.

Assessment Reports

By the start of the STAR panel meeting the assessment document for Dover sole was rather incomplete and various revised and additional text, tables and figures were provided. This was confusing and made the documentation hard to follow. I would be better to have a complete revised report to avoid mis-interpretation. I appreciate the constraints on the stock assessors but the usefulness of the review is diminished if panellists cannot prepare adequately. Given the expense in mounting a STAR panel, every effort should be made to ensure adequate preparation is made for the meeting.

The situation was better with thornyhead and sablefish. The NMFS document on sablefish was particularly well prepared and presented, with very effective graphics illustrating the uncertainties in the assessment with the use of likelihood profiling.

I still feel there is room for improvement in the presentation of summary information. The present report format effectively stops at model diagnostics. It is equally important to be able to diagnose the results in terms of their biological reality and this requires useable population summary statistics. I would suggest a number of standard tables and figures which summarise the population dynamics. Since the underlying population dynamics model in Synthesis is age structured, I would include tables of estimated numbers at age and fishing mortality at age. At present, Synthesis appears only to summarise fishing mortality indirectly in terms of an utilisation rate that is more of a quasi-economic performance indicator than a biological one. Fishing mortality is absolutely fundamental since it underlies the management reference points and needs to be presented clearly. Tables and figures showing trends in catch, spawning stock biomass, fishing mortality and recruitment should be given. I would also suggest that these tables and figure follow an agreed fixed format so that the information can be readily located and interpreted. It is also important to produce standardised figures that show the present stock status in relation to biological reference points. This could be done by presenting a spawner per recruit vs. F plot with the relevant biological reference points indicated. Where an adequate stock-recruitment curve exists, this could be done on an equilibrium SSB vs. F plot.

Scope of the Assessments

The NMFS assessments are restricted almost entirely to Synthesis. There are good reasons for using this approach and maintaining it as the core method but it would be desirable to attempt other analyses if only to gain insight into model uncertainty. The reliance on Synthesis does not seem to be entirely healthy. The PGCT assessment, for example, stimulated a more critical review of the stock-recruitment assumptions in the assessment of sablefish that is of crucial importance in judging both the short and long term status of the stock. This issue may well have been missed had the alternative assessment not been available.

In the case of thornyheads, the assessment amounted to little more than a spawner per recruit

analysis and yet the data are forced through an elaborate age structured populations dynamics model. While the results may well be satisfactory, the problem is the lack of transparency about the model assumptions and the degree to which structural and statistical assumptions affect the outcome. It may be preferable to adopt a more parsimonious approach and only use those data and methods which have direct relevance to the spawner per recruit analysis, such as Jones' length based approach (Jones, 1981). At the very least, it would be informative to see that alternative approaches produced similar conclusions about the state of the stock.

It appeared that the only tool for making stock projections was within Synthesis. Again this is both useful and restricting. Having a ready made tool which can automatically project the results of Synthesis is helpful but if it is the only tool available it prevents the exploration of alternative scenarios. In this regard the PGCT analysis, which employed a Baysian projection facility, illustrated that a more open approach to assessment can provide useful additional information. This is not to suggest that one method is to be preferred over the other, but that a more broad approach has its advantages.

Management reference points

All three stocks appear to show long term declines and these trends appear to be very robust to many model and data assumptions. Unfortunately because there are large uncertainties in the assessments, the proximity of current stock biomass to over-fished biomass thresholds is far from clear. This is a very difficult problem and much of the Panel discussion was concerned with the sensitivity of the assessments to this issue. However, no amount of discussion will eliminate the uncertainty in the assessments and this highlights the problem with current over-fishing definitions and the approach to assessment. It is quite easy to produce equally plausible assessments that estimate the stock to be either side of the over-fished threshold. It is important to try to define over-fished thresholds that take into account uncertainty in the assessments. Failing to do this will at best result in advice that is unstable because successive assessments will be affected by noise. At worst it will simply mean the stock continues to be over-fished because the perception of current stock size is wrong.

The sablefish assessment suggests that the current stock productivity is insufficient to sustain a fishery in the long term. If this conclusion is correct it has major implications for the choice and operation of management reference points. There seems to be a belief that the low prevailing productivity is temporary and that productivity must improve. Given that the change in regime is unpredictable and stock rebuilding times are very long, there does seem to be a need to consider very carefully whether the current reference values are appropriate.

Observations on the STAR panel process

I have commented before that I find the STAR process a very effective means of reviewing assessments but that I find the time allocation overly generous. This remains my view. I also feel that it is unclear the extent to which the STAR panel is part of the assessment and the extent to which it is an independent peer review.

Clearly the effectiveness of the review could be improved if documentation was more complete well before the meeting. One of the factors which appears to contribute to this problem is a fear among assessment report authors that the Panel will expect them to make significant changes to assessments and they therefore are reluctant to commit themselves to

completing the report. This highlights the ambiguity in the responsibilities of the STAT teams and the STAR panel. It might help of the STAR process was more transparently restricted to a review with an acknowledgement that the STAT teams were the primary experts in the field. One way of approaching the STAR panel would be to insist on comprehensive and complete assessment reports that are circulated to Panellists 3 weeks before the meeting. The Panellists should produce a written review one week before the meeting with a list of any additional analyses required. The STAT teams could then table a final report responding to the Panel's concerns which could be discussed at the meeting. The STAR panel could then write a report on their view of the assessments, but it would be up to the STAT teams to decide the extent to which they took on board the Panel's views.

Somewhat paradoxically, these assessments are characterised by a paucity of data yet much of the Panel discussion revolves around the inclusion/exclusion of data. Up to a point I find these discussions philosophical rather than practical. It is important to be sure that the reasons for excluding data are well founded in order to avoid manipulating assessments to give the desired result. However, in many examples at this meeting sensitivity analyses had already shown that the results were not dependent on certain data sets and lengthy discussion on them only satisfies intellectual curiosity rather than being of practical value. I believe a colleague from DFO Canada who also participated in the sablefish Panel shared this view. A shorter time for discussion might help focus minds on the more important aspects of the assessment. As I have suggested before, I would think that typically only one day per assessment is necessary, provided preparatory work can be done properly.

Reference

Jones, R. 1981. The use of length composition data in fish stock assessments (with notes on VPA and cohort analysis). U.N. FAO Fisheries Circ. 734, Rome

Annex 1:STATEMENT OF WORK

Consulting Agreement Between The University of Miami and Dr. Robin Cook

October 8, 2001

General

The consultant will participate in two Stock Assessment and Review (STAR) Panels of the Pacific Fishery Management Council (PFMC) in Newport, Oregon from July 9-16, 2001. The first STAR panel will review Dover sole and shortspine thornyhead from July 9-12, and the second STAR panel will review 2 assessments of sablefish will from July 13-16.

The consultant is expected to participate actively in the panels, offering advice and constructive criticism of the assessments, and to assist in the preparation of any panel reports, documenting the technical quality and completeness of these assessments. The consultant is also expected to provide an additional written report describing the consultant's review activities and an assessment of the review. Areas of importance include on how the procedures of the review activities may be improved, panel composition, roles and operation, duration, quality and comprehensiveness of reviews and panel reports, and other panel-related criticisms that the consultant may offer.

The consultant's duties shall not exceed a maximum total of 20 days: Several days prior to the meeting for document review; the 8-day meeting; and several days following the meeting to complete the written report.

Specific

1) Read and become familiar with the 2001 STAR terms of reference, assessment reports, and any reviews of the previous assessment, provided in advance to the consultant. These documents will be provided directly to the consultant by NWFSC.

2) Participate actively in the discussions during the STAR panel meeting.

3) Offer constructive criticisms on the procedural and technical aspects of all the assessments, in accordance with the terms of reference.

4) Under the leadership of the STAR panel chair, assist in the drafting of the STAR panel reports.

5) No later than August 17, 2001, the consultant will submit a written report of his review activities and assessment of the STAR process. The consultant will send the report to David Die, UM/RSMAS, 4600 Rickenbacker Causeway, Miami, FL 33149 (email: ddie@rsmas.miami.edu).

Annex 2: Outline of Visit

7 July. Travel from Aberdeen, UK to Portland Oregon. Received draft assessment documents on arrival in Portland.

8 July. Travel to Newport Oregon. Review of draft assessment documents.

9-12 July. STAR Panel meeting on Dover sole and short spine thornyhead.

13-16 July. STAR Panel meeting on sablefish.

16 July. Travel from Newport to Portland.

17 July. Travel from Portland to New York.

18 July onwards. Follow up to STAR Panel meetings and preparation of consultants report.