

**Report to CIE**

**of**

**STAR Panel**

**April 18 – 22, 2005**

**Seattle, WA**

**Starry flounder, Petrale sole, English sole**

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## **Executive summary**

The STAR Panel (April 18-22) reviewed three stocks: English Sole, Petrale Sole and Starry Flounder. All three stocks were assessed using the recently developed Stock Synthesis 2 (SS2) package. The input data and the new assessment package were reviewed in two workshops late in 2004, the West Coast Groundfish Data Workshop held from July 26-30, 2004 and the Stock Assessment Modeling Workshop held from October 25-29, 2004. Both meetings were held in Seattle Washington. All three stocks were assessed from the Mexican to the Canadian borders, although Petrale and Starry sole stocks were treated as two stocks with northern and southern components. Although the decision tables are produced in terms of the entire stock, there may be some significance to the separate components as a precautionary or conservation issue.

The review process suffered from a lack of finished draft assessment documents. A number of circumstances contributed to this situation. First, the SS2 software was still in the final stages of development (results from two versions were presented during the STAR, and presumably there had been changes since the package was introduced at the Modeling Workshop in October 2004) There is a cascading effect resulting from the newness of the package. The users were to various degrees still learning to use the package and several of the reviewers were even less familiar with the package and its outputs. Considerable time was spent deciphering and interpreting what SS2 was doing and saying.

All the assessments were accepted except for the northern portion of the Petrale sole, which was recommended to be reviewed at a future STAR. None of the three assessments had completed decision tables when presented, and some correspondence was required via e-mail after the STAR to develop a couple of the tables.

## **Background**

Three flatfish species were scheduled for review by this STAR Panel; English sole, Petrale sole and starry flounder. For these assessments, all three of these stocks were assumed to range from the Mexican to the Canadian border. English sole was last assessed in 1993 (Sampson, 1993) and Petrale sole more recently by Sampson and Lee (1999). It was fortunate that Dr. David Sampson chaired the meeting given his experience with these two stocks. This STAR provided the first assessment of starry flounder.

All assessments were performed using the recently produced Stock Synthesis 2 (SS2) software. A base run was chosen to best represent the resource and a number of sensitivity runs accompanied it to explore the various formulations of model structure. The choice of the best model to define the base run combined statistical (goodness-of-fit) and subjective criteria.

The STAR Panel consisted of David Sampson (Chair, SSC representative), Bob Mohn (CIE), Jon Volstad (CIE), and James Ianelli (AFSC). The stock assessment authors (STAT) were Ian Stewart (English sole), Han-Lin Lai and Melissa Haltuch (Petrale sole) and Steve Ralston (starry flounder). Before the meeting, the Chair had assigned a Panelist as lead reviewer for each of the three stocks.

## **Description of review activities**

The draft assessments and background material were received well in advance of the STAR. Because one of the drafts was still being developed, an FTP site was established to provide the Panelists access to the latest versions.

The STAR Panel opened with a review from Dr. Methot of his SS2 (version 1.18) package, which was quite helpful for those of us unfamiliar with this new software as it was used in all three assessments.

English sole was the first assessment to be presented, and it had defined a base run model and included several sensitivity runs but did not include a decision table. At the Chair's suggestion, the Panel made requests for reruns or additional analysis or outputs in written point form for the author. This assessment was well prepared, and considerable effort had been expended to prepare the requisite data.

The second stock to be presented was Petrale sole, and the stock was divided into two assessment units (north and south) which were assessed separately. Only the southern Petrale sole assessment was accepted by the Panel. It was revealed during the STAR that there were some data that had not been included in the northern component; also, the model had some details that required more investigation. It was recommended that this portion of Petrale sole be reviewed at a future STAR.

Starry flounder was being assessed for the first time, which placed additional responsibility on the author in terms of data preparation; of note were the investigations into natural mortality and the development of a catch-per-unit-effort (CPUE) series. No survey data were available for this stock. Due to time constraints, the author was given instructions for completing the decision table after the meeting.

Considerable e-mails were exchanged after the meeting, and the Panel was informed that the draft STAR Panel Report would not be available until the week of May 9th.

## **Summary of findings**

That these resources were successfully assessed can be attributed to the talent and dedication of the authors (and their support teams). Their tasks were made more difficult by a couple of factors. The first was the ongoing development of the principle assessment tool, SS2. The second seemed to be a lack of understanding of what was required in terms of document completeness and preparation. This lack of understanding was evidenced in the large number of requests for additional analysis and sensitivity runs. Although there had been an internal assessment review, it seems to have been more administrative and editorial than technical. No results' documentation from this review were made available. Finally, and the most difficult to define, was the perception of a vague, but pervasive, disillusionment with the assessment process. These observations will be expanded below in the Conclusions/recommendations section.

The relative contributions of data and model to the assessment results needed more attention. For example, in the starry sole, the CPUE data were first passed through a GLM model, and then these results were used in SS2 to give abundance estimates. It would be useful to have all three of these plotted in a single figure to present the relationship among them. The vehicle for linkage

back to the data was mostly residual plots. Those experienced with such plots can interpret them quite easily, but they may be unintuitive to those who are less well acquainted with them. For this reason plots of state variables, such as biomass and recruitment and their underlying data, are more generally informative.

Following below are the specific questions from the CIE Terms of Reference (see Appendix A):

3) *Comment on the primary sources of uncertainty in the assessment.*

In general, the sources of uncertainties for these three stocks were similar to those of other flatfish resources; stock definition, discarding and misreporting issues, natural mortality, etc. As starry flounder did not have survey abundance indices, its assessment had to depend on CPUE data as an abundance index. CPUE data are generally inferior, especially when used alone, to surveys because of the lack of a survey design distortion from fishing practices. That is to say, it is not just noisy but subject to considerable biases that may change over time as well.

Aging seemed to be a factor of concern and the Panel recommended that more investigations be made to aging and comparing ages from different techniques, age readers, and labs.

4) *Comment on the strengths and weaknesses of current approaches.*

The current approach, based almost exclusively on SS2, poses several advantages. Once fully developed and documented, it will be a tested and widely used (certainly on the West Coast) analytical package. Techniques developed in one lab can be easily shared with other assessment teams. A community of active users assures quality and relevant outputs. It would be strengthened if it provided 'standard' assessment products such as numbers, biomass, and F at age and year.

I do have several reservations however. At least as evidenced in this STAR, SS2 seems to inhibit other approaches to assessing fishery data. Simpler approaches should be presented to complement SS2. Insights gained by having several modeling initiatives to compare give an understanding of the resource and of the uncertainty that cannot be obtained any other way. In a similar vein, the multiple sensitivity runs within SS2 are useful in investigating some of the model attributes.

Limited uncertainty estimates were presented which were based on Hessian in the estimation optimization of the model to the data. Estimates from (conditioned) bootstrapping or from MCMC posteriors would be preferred. For apparently technical reasons related to convergence within SS2 resulting in several day run times, MCMC runs were not available for any of the three stocks. The expression of uncertainty as risk plots (typically with removal rate along the x-axis and the probability of something bad on the y-axis) was also not available.

These comments must be tempered by my lack of hands-on experience with SS2. I hope to rectify this soon.

5) *Recommend alternative model configurations or formulations as appropriate during the STAR panel.*

This was done throughout the meeting. Under the Chair's recommendation, such requests were made in written point form and given to the authors. The authors' responses to the requests were also recorded. This format evolved during the STAR and was useful to both assessment authors

and Panelists. **It is recommended** that this, or a similar, practice be carried forward to other STAR Panels.

One specific request that I made was for summary output plots of biomass and fishing intensity in the terminal year, showing the estimation uncertainty as a confidence range and the scatter of a chosen subset of sensitivity runs. This allows at least a subjective comparison of model uncertainty and estimation uncertainty.

It may be a minor point, or perhaps my own limitation, but the expression of fishing pressure as a SPR (spawning potential ratio) is unintuitive, and at least to me, unsatisfactory. It is unintuitive in the sense that a bigger value denotes less fishing pressure. It is unsatisfactory in that it also includes growth, and a change in growth over time would therefore change the SPR even if fishing did not change. Even in the situation of multiple fisheries a summary F, or exploitation rate, could be defined. If the impact of individual fisheries is an issue, partial Fs can be estimated for each from the F matrix and the catch at age.

### **Conclusions/recommendations**

The STAR Panel successfully reviewed and made improvement to the three assessments. Hopefully, some of the ‘value added’ will radiate to the upcoming STAR panels.

More difficult to assess than technical issues are those related to the assessment environment, which may be expressed as a failure, or at least a weakness, in the “corporate culture”. For example and surprising to me, even though the STAR was held at a NMFS lab, only those scientists presenting drafts attended. These Panels can have beneficial communication and technical dissemination roles. Presumably some of the staff there will be involved with assessments in the near future and would have benefited from observing the process. **It is recommended** that such attendance be encouraged. This environmental failure was also reflected in the preparedness of the assessments. It seemed that the authors were reluctant to develop their analysis completely (including decision tables of a base case) because of the anticipated vagaries of the STAR. Nor did there seem to have been any internal assessment workshops, with an emphasis on data preparation and technical issues specific to a given stock. Although such workshops do require some resources (realized mostly as the time of scientific staff not doing the specific stocks under review), the workshops pay off in two ways: 1.) a better reviewed product for the STAR, and; 2.) a dissemination of expertise. There was an uncertainty among the authors about what was required and in what format it should be; by contrast, this was not the case in the SAW/SARC reviews I have attended. This is somewhat unexpected considering the length of time that STARs have been carried out. More could be written on this but it would be better to attend a couple more STARs to ascertain how widespread and persistent this situation may be. I have frequently observed a pervasive (and not just west coast US) feeling that assessments are not worth the effort compared to other products, such as primary publications.

The above comments are not to be taken as a criticism of the Chair, who effectively performed three meaningful functions: moving the meeting towards its goals; exercising technical expertise; and providing knowledge of the stocks under review. Although the draft Panel report was not available by the end of the meeting, the real delay was that resulting from reruns and related investigations that held up final versions of decision tables. All those involved in the STAR performed well, but special thanks are extended to Dr. James Ianelli who contributed above and beyond the call both in scientific terms and in his work on the draft Panel report.

The details of the fishery and the implications of the assessments would have benefited from wider participation, especially from industry and resource managers. Wider participation would have meant that the data and models, their assumptions and results, could be put in the context of broader experience as a sort of a “groundtruthing”. This would address the question “Do these results make sense?” from a number of points of view. It would also have meant that a wider variety of relevant questions may be brought forward to direct future research and analyses.

## **Appendix A.**

### **Terms of reference for STAR Flatfish Review: Tilefish and Snowy Grouper**

#### Statement of Work

#### **Consulting Agreement Between the University of Miami and Dr. Robert Mohn.**

**February 17, 2005**

#### **General**

External, independent review of West Coast groundfish stock assessments is an essential part of the STAR panel process. The stock assessments will provide the basis for the management of the English sole, Petrale sole, and Starry flounder resources off the U.S. Pacific coast.

The consultants will participate in the Stock Assessment and Review (STAR) Panel of the Pacific Fishery Management Council (PFMC) for the review of the English sole, Petrale sole, and Starry flounder stock assessments. The consultant should have expertise in fish population dynamics with experience in the integrated analysis type of modeling approach, using age-and size-structured models, use of MCMC to develop confidence intervals, and use of Generalized Linear Models to process survey and logbook data for use in assessment models.

Documents to be provided to the consultants prior to the STAR Panel meeting include:

- Current drafts of the English sole, Petrale sole, and Starry flounder stock assessment reports;
- Most recent previous stock assessments for English sole and Petrale sole (Starry flounder has not been assessed previously);
- An electronic copy of the data, the parameters, and the model used for the assessments (if requested by reviewer);
- The Terms of Reference for the Groundfish Stock Assessment and STAR Panel Process for 2005-2006;
- Summary reports from the West Coast Groundfish data and modeling workshops held in 2004;
- Stock Synthesis 2 (SS2) documentation; and
- Any additional supporting documents as available.

## Specific

Consultant's duties should not exceed a maximum total of 14 days: several days prior to the meeting for document review; the 5-day meeting; and several days following the meeting to complete the written report. The report is to be based on the consultant's findings, and no consensus report shall be accepted.

The consultant's tasks consist of the following:

- 1) Become familiar with the draft stock assessments and background materials.
- 2) Actively participate in the STAR Panel to be held in Seattle, Washington, from April 18-22, 2005.
- 3) Comment on the primary sources of uncertainty in the assessment.
- 4) Comment on the strengths and weaknesses of current approaches.
- 5) Recommend alternative model configurations or formulations as appropriate during the STAR panel.
- 6) Complete a final report after the completion of the STAR Panel meeting.
- 7) No later than May 6, 2005, submit a written report consisting of the findings, analysis, and conclusions (see Annex I for further details), addressed to the "University of Miami Independent System for Peer Review," and sent to Dr. David Die, via e-mail to [ddie@rsmas.miami.edu](mailto:ddie@rsmas.miami.edu), and to Mr. Manoj Shivilani, via e-mail to [mshivilani@rsmas.miami.edu](mailto:mshivilani@rsmas.miami.edu).

## **ANNEX 1: Contents of Panelist Report**

1. The report shall be prefaced with an executive summary of findings and/or recommendations.
2. The main body of the report shall consist of a background, description of review activities, summary of findings (including answers to the questions in this statement of work), and conclusions/recommendations.
3. The report shall also include as separate appendices the bibliography of all materials provided by the Center for Independent Experts and a copy of the statement of work.

## **Appendix B**

### **Bibliography of Materials Provided.**

A CD\_ROM of draft assessments and background material was supplied before the Panel convened. Also, an FTP site was provided to access any changes that occurred to the draft assessments. Paper copies were available at the meeting of the CD\_ROM contests were provided as well. As well as the two Methot manuscripts concerning Stock Synthesis, examples and a PowerPoint presentation were provided in this package.

#### Draft Assessments:

Lai, Han-Lin, Melissa A. Haltuch and Andre E.Punt. 2004. DRAFT. Stock Assessment of Petrale Sole:2004. 172pp.

Ralston, Stephen. 2005. DRAFT. An assessment of Starry Flounder off California, Oregon and Washington. 43pp.

Stewart, Ian J. 2005 DRAFT. Status of the U.S. English sole resource in 2005. 208pp.

#### Supporting Documents:

Anon. 1999. STAR Panel Meeting Report Petrale sole. MS 8pp.

Anon. 2004. A Summary Report from the West Coast Groundfish Data Workshop held July 26-30, 2004 in Seattle Washington. MS 24pp.

Anon. 2005. A Summary Report from the Stock Assessment Modeling Workshop held October 25-29, 2004 in Seattle Washington. MS 19pp.

GAO (United States General Accounting Office). 2004. Pacific Groundfish: Continued Efforts Needed to Improve Reliability of Stock Assessments. MS. 53pp.

Method, Richard D. 2005, Technical Description of the Stock Synthesis II Assessment Program. Version 1.17. MS 54pp.

Method, Richard D. 2005, User Manual for the Assessment Program Stock Synthesis 2 (SS2). Version 1.17. MS 47pp.

Sampson, David B. 1993. An assessment of English sole stock off Oregon and Washington in 1992. MS. 43pp.

Sampson, David B. and Yong Woo Lee. 1999. An assessment of the Stocks of Petrale Sole off Washington, Oregon and Northern California in 1998. MS 100pp.