Report to CIE

of

STAR Panel
June 20– 24, 2005
Newport, Oregon

Sablefish, Dover Sole, Longspine Thornyhead, Shortspine Thornyhead

R. K. Mohn
32 School St
Waverley, N.S.
Canada

Executive summary

The STAR Panel (June 20-24) reviewed four stocks: Dover sole, longspine and shortspine thornyheads, and sablefish. All of these stocks had been assessed before although none were updates. The Panel was relatively busy because reviewing four stocks meant having less time for discussion and the ability to probe some issues as deeply as they warranted.

All four of these stocks used the slope survey in their models. This survey series had recently been re-analyzed using a GLM analysis (Helser et al, 2005), and the drafts used the new estimates. During the Panel, it was noticed that the new data were biased upward for the Conception area. The author was contacted and revised estimates were provided on the third day of the STAR. This further compromised the time available for the STAT team and the Panel. Nonetheless, all the assessments were accepted and at least provisional decision tables reviewed by the Panel. Sablefish represented an interesting case as it incorporated an environmental term in the stock-recruit relationship.

The following technical issues are identified as special of special concern: 1) balancing input data in the model, 2) the use of informative priors, 3) tests for convergence, 4) absolute indices of abundance, 5) retrospective analysis, and 6) the stock-recruit relationship. Specific comments and recommendations where possible are provided for each of these topics.

Background

Four species known as the DTS complex (Dover sole, thornyheads, and sablefish) were scheduled for review by the June 20-24, 2005 STAR Panel. All of these stocks had been assessed before and in common, they all were dependent on the slope survey data.

The Panel and assessment team members who presented the assessments are as follows:

Dr. Tom Barnes, Scientific and Statistical Committee (SSC) Representative, STAR Panel Chair
Dr. Grant Thompson, Alaska Fisheries Science Center (AFSC)
Dr. Selina Heppell, Oregon State University (OSU)
Dr. Robert Mohn, Center for Independent Experts (CIE)
Mr. Stephen Smith, Center for Independent Experts (CIE)

Mr. Rod Moore, Groundfish Advisory Subpanel (GAP) Representative
Mr. Mark Saelens, Groundfish Management Team (GMT) Representative
Dr. John Field, Groundfish Management Team (GMT) Representative

Stock Assessment Teams
Dover sole - Dr. David Sampson, Oregon State University,
Sablefish - Dr. Michael Schirripa and J.J. Colbert, Northwest Fisheries Science Center
Shortspine thornyhead - Dr. Owen Hamel, Northwest Fisheries Science Center
Longspine thornyhead - Mr. Gavin Fay, University of Washington

The review was relatively busy because four stocks were under consideration. The revision to the slope survey data that occurred mid-week also limited time for discussion or closer examination

of issues that arose during the STAR. Nonetheless, all the assessments were accepted and at least draft decision tables reviewed by the Panel.

Description of review activities

The draft assessments and background material were written on a CD-ROM and received well in advance of the STAR Panel. Before the Panel convened, its members had been contacted by e-mail and assigned to act as Rapporteurs for stocks. I was given shortspine thornyhead. At that time we were asked, if possible, to provide the authors with any pre-meeting comments or questions. I compiled several concerns and sent them via the Chair (Appendix C) to the shortspine author.

On Monday morning (June 20), the Chair, Tom Barnes, opened the meeting with introductions and an overview of what we were expected to accomplish. The focus was to assure technical quality and have our requests to the STAT teams well documented.

The Chair asked for comments before we began with the agenda. I took the opportunity to respond about some of the things that worked well in the previous three STAR Panels I had attended. I suggested that as well as writing their requests, that the Panel append why it was requested and then include how it was responded to. I further observed that uncertainty has been handled differently at each Panel and that some time should be set aside for a discussion on how this Panel wishes to deal with uncertainty, especially with regards to the states of nature in the decision tables.

Later that morning, a video conference was held with Tom Helser during which he presented his GLM analysis of the slope survey data. All the assessments in this session used the re-estimated slope data. Later in the week, it was observed that the new analysis estimated large biomasses in Conception, especially in those years in which there were no survey stations south of 34.5. Helser was contacted by phone and re-estimated abundance for Conception north of 34.5. The new estimates arrived on Wednesday. The Panel's discussion and late arrival of the data and related re-runs required considerable time and dedication from the STAT teams.

This Panel was charged with four assessments, Dover sole, sablefish, shortspine thornyhead, and longspine thornyhead. All of these resources had been assessed before. One attribute of this Panel that distinguishes it from other was the interest from industry who video-taped the Panel, made observations and asked several questions. Industry participation enhances the quality of the review, assures relevance and should be encouraged.

The depletion or other statistics for each of the following stocks is provided as provisional value. They are not meant to be definitive and are not to be used in place of official STAR products.

Sablefish

The first stock to be reviewed was sablefish, which has been assessed several times previously. Unlike most assessments, this model had an environmental factor (sea level) in the stock-recruitment relationship. The sea level factor explained a fair bit of the residuals in the stock and recruit relationship. Its implications for stock projections and uncertainty resulted in some debate about how to include this effect. In the end the Panel suggested that it not be explicitly included

in the base case or the states of nature in the projections. Due to data limitation, M, q, and h could not be estimated within SS2, and values were assigned.

Dover sole

Subsequent to the distribution of the CD-ROM of draft assessments, the author produced and provided to the STAR Panel an addendum (dated June 13th) and a supplement (July 20th) to the draft.

Dover sole was last assessed in 2001. The current assessment had one stock which was fished by two fleets, northern and southern. The analysis was done in SS2 and had convergence problems due to data limitations and apparent conflicts, h, M, and q all had to be fixed. The current depletion is on the order of 60%

Shortspine Thornyhead

The assessment model is formulated as a single stock with two fisheries, north and south. Because of the sparseness and quality of the data, natural mortality, steepness and survey efficiency (q) were all fixed. The Panel noted that these data and the subsequent assessment were just marginally sufficient to estimate the resource status. Similarly, the biological reference points and the forecasts in the decision table should be considered with caution.

The depletion for 2005 is estimated to be 0.63 with a weakly falling recent trend. At an OY strategy, the resource is expected to fall towards the MSY biomass.

Longspine Thornyhead

The assessment was presented by the author, Gavin Fay. This resource has been assessed several times beginning in 1990. It was modeled as a single resource with two fisheries, northern and southern. Due to data limitation, h, M, and q were fixed rather than estimated. The base model estimated a healthy resource at about 80% of the virgin biomass.

Summary of findings

These resources were successfully assessed, which can be attributed to the talent and dedication of the authors (and their support teams). As well as the assessments themselves, methods and insights were brought forward which will benefit other assessments and future STAR Panels.

As expected, several technical issues arose which had also been issues in Panels earlier this year. Each Panel, its Chair, the external reviewers, and the STAT team members bring together different points of view and emphasis. Among these groups, the variation in the external reviewers seems be the main contributor to variation among Panels. However, some fundamental technical items should be resolvable and not subject to so much Panel to Panel differences. For this series of STARs, I try to standardize among the Panels to some degree, but only as a resource to relate what other Panels have approached various issues. There, of course, is a balance to be obtained. Too much proscription and homogeneity inhibits progress and too little makes it difficult for clients to interpret the differences. In general, the balance has been good, but when similar technical points come up repeatedly, it suggests a widespread and unresolved technical, as opposed to procedural, issue. In most cases, these should be resolvable with directed workshops.

These findings were more often of problems or issues. But, of course, identification is the first step to solution.

1) Balancing the input data

The first was the practice of balancing the weights on the components of the model. This was given a high priority by earlier Panels, both in terns of the effective N's (Neff's) for length frequencies and the variance of the stock-recruit relationship (SigmaR). However, this Panel did not place much emphasis of the determination of the Neff's. In one assessment, the SigmaR did not converge and this was noted and accepted. I pointed out the earlier Panel's concern about this but the comment came forward that this was a different Panel. There did seem to be consensus that the weights in the objective function (lambda's) should be 1, except perhaps for exploratory analysis. It is recommended that these issues be addressed at a technical workshop to provide a sound and accepted basis for the use Neff, SigmaR, and lambda.

2) Use of informative priors

This Panel placed more emphasis of informative priors than the previous ones. These were often introduced when the data failed to converge to a "reasonable" value (of usually h, M or q) or when profiles showed the data had little influence. These priors (note: Steve Smith commented that they were not true priors but rather penalties) act as soft restrictions on the parameters and seemed to be rather arbitrary than "informative". For example, if the Panel felt that the q should not get above 1.5, this could be accomplished by either setting it at this value or setting the prior at 1 with a cv of 0.3 which resulted in an constrained estimation of 1.5 again. The degree to which the data could pull the final solution off the prior would reflect its influence. The Hessian would be more informative with the prior, but still there is an arbitrary component. The use of priors also needs to be investigated and potentially standardized or recommendations made.

3) Testing for convergence

The Dover Sole assessment had convergence problems to a greater degree than other stocks this year. It appeared to oscillate between fitting the NWFSC and AFSC length-at-age data. The author demonstrated this with a "jitter" analysis in which the initial parameter estimates were perturbed a small amount and then the model re-run repeatedly. The results showed that the model converged to different final states, usually in clusters, with the same model and data. I suggested that he try a fine scale profile of the likelihood and say the depletion, as had worked nicely in the cabezon assessment, and it too showed the lack of convergence. Both these tests are informative and should become a routine practice. When I advocated the practice during the Panel, it was pointed out that the terms of reference for assessors also advise testing convergence. A further comment from a STAT team member was to compile only those likelihood components that were affected by data when examining convergence.

4) Absolute indices of abundance and their q's

It was felt that the extension of the abundance estimates to include Baja would give better estimates of depletion. Therefore, the recent extension of the slope survey to south of 34.5 highlights three interrelated technical questions: 1) what to do when a survey changes the area of coverage, 2) how to handle q's for surveys of absolute abundance, and 3) how to treat a known, or at least estimable, refugium.

The extension of the slope survey was first dealt with by Helser using a GLM model to extend the northern portion of Conception to the south. For some stocks, this extrapolation caused over-estimates of abundance. The Panel contacted Tom Helser and new estimates were made only for north of 34.5 for the recent years, and these new estimates were used in 3 of the 4 assessments.

When the slope (absolute) abundance estimates were for the entire coast, q could be expected to be 1. However, the longspine thornyhead estimate was 6 when the q was estimated and not constrained. Q's less than one 1 are not so troubling, as this suggests a gear which is inefficient for a given species or a lack of availability. When it covered only a portion of the stock, it could be expected that q would be the proportion in the new smaller area. This proportion of the stock could be estimated from the years in which the entire southern stratum was sampled. This expectation was not well met, especially for the thornyheads where a strongly domed selectivity was used based ion the work of Lauth et al. (2004). Q's up to 6 were estimated suggesting that the survey saw 6 times as many fish as were in the path of the gear. An earlier Panel (Shortspine thornyhead 2001) suggested that a q greater than 1 was not a problem, but this Panel did not accept that argument.

Another aspect is the situation when the resource extends beyond the used in tuning area, and the abundance in that area is known. What is the potential for adjusting the depletion to account for this? Could this tonnage simply be added in to the virgin biomass?

All of these issues related q's for absolute abundance should be fairly easily resolved (and probably have occurred many other stocks) and should be dealt with at a future workshop.

5) Retrospective analysis

Although not acted upon, the Panel had a brief discussion of retrospective analysis. Retrospective analysis is a commonly used diagnostic which focuses on the estimation phase of an assessment (Mohn, 1999). As all these assessments include projections, the concept could be expanded to include the projection phase. Such an analysis would be of particular interest for those stocks in a rebuilding phase. It could be done in two ways, one of which would be technical and the other historical. The technical approach would partition the entire data/projection period into successive windows of data and projection using a single analytical model. The historical approach would take old assessments/projections and compare them to successive ones, with corrections to the account for the actual catch stream as opposed to what had been assumed. Both of these approaches would focus on how well the models can predict the near future instead of focusing only on the assessment phase.

Although retrospective analysis is usually about changes in data, the transition from SS1 to SS2 should be considered as a potential contributing factor in changes of perception from old to new assessments. In a couple of instances, STAT team members have observed that the two versions behave differently. Dover sole provided an example of this. When the same data were used for Dover sole (the data and structure of the 2001 assessment), and if the parameters were fixed similar trajectories were seen. However, if the program estimated the parameters, very different trajectories resulted (See Dover sole supplemental figure S3), and these resulted in a very different conception of depletion. The data may not have been identical among these runs, and the Panel did not have time to pursue this issue in detail. But in summary, when the change in perception from a new assessment is significant, the relative contributions from change in the analytical framework, model, and the new data should be evaluated.

6) Stock-recruit relationship

I mentioned in my last report (May 16-20, 2005 STAR Panel report) that the cabezon assessment had an innovative way of determining the period to have recruitment deviations operant. After I described it, two of the STAT team members used it during the week successfully. However, one of the authors, Gavin Fay, brought to the Panel an enhancement to this method. In the longspine thornyhead assessment, the standard deviations were shown in the same way but over a range of SigmaR's (Figure 8 of Draft assessment). This represents a useful contribution and should be used routinely.

It was interesting to note in the sablefish assessment the nature of the sensitivity on h from the old to new slope data; h bounced from one wall to the other (h = 0.27 to h = 1.0). The h's in turn affect the estimated virgin biomass and hence depletion. A standard Hessian analysis of either data set would not show the bi-phasic nature of the model. It would be interesting to see if MCMC runs would reveal it, although some sort of bootstrapping would probably be a better candidate. The related question of how to include the rather extreme sensitivity to minor changes in input data into uncertainty and projections is worth consideration.

Following below in bold italics are the specific questions from the CIE Terms of Reference:

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

In the opening session, I explained how previous Panels addressed uncertainty. They all used different approaches and emphases. The evolving general principal seemed to be to have the model as free as possible to get a reasonable estimate of measurement error. The data precluded estimation of most basic parameters for this complex (DTS) of species so uncertainty was modeled as deviations to the base model. A STAT team member commented that this is still a learning year on decision tables and capturing uncertainty, so it is okay to learn as we go along.

I had not seen any risk analysis in previous Panels and thought that it would be appropriate for cases like sablefish wherein the base model had a depletion near 0.25. At my request, this was done using a Hessian approximation and found that the risk was of being beneath the 25% level was of the order of a couple percent. Although this may well be an underestimate of the risk, analysis of this sort should be routine when the resource is near a biological limit, especially if posteriors are available.

Sablefish also represented an interesting case for trying to capture the uncertainty in the states of nature for projections. As well as the possibility of varying a combination M, h and/or q, there was the environmental term in reproduction and its uncertainty as well. Time did not permit an analysis of the co-variance among the potential axes of uncertainty. However, being constrained to a single dominant dimension would probably represent a great simplification. Although the analysis of the interplay among the parameters is not difficult, it would be time consuming and the criteria for selection are not, to my knowledge, worker out. Such criteria would have to consider the interplay of uncertainty in the current stock status and uncertainty in production.

For one stock, when m, h, and q fixed to get convergence, the resulting current depletion estimate had a cv of 3%. Data were so poor that we can not get an estimate of how poor is the stock is. Some feeling for the missing measurement uncertainty can be seen in the following figure. Future work, perhaps using analyses across several stocks, may develop some rules of thumb to give a range or proxy when the measurement error is not directly estimable.

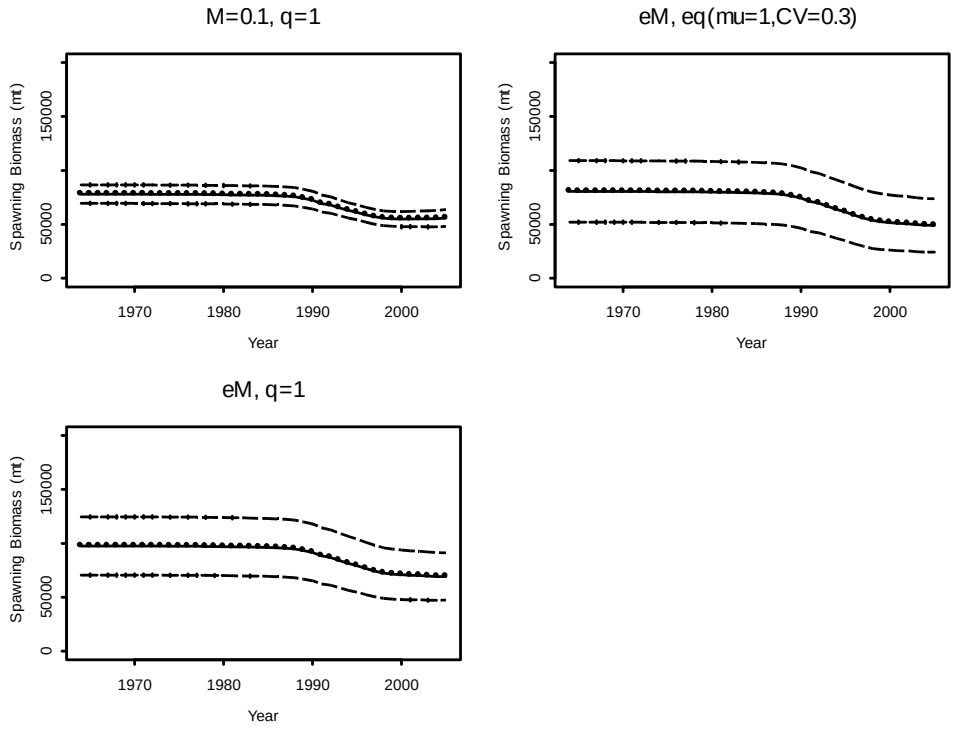

Figure 1. Gavin Fay, personal communication. Error bars for longspine thornyhead when both M and q are fixed (upper left), M is estimated and q is fixed, (lower left) and both q and M are estimated but q with a prior (upper right)

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

As in the other STARs in this year, the data and their relationship to the model results do not get enough attention. The congested agenda also inhibited some discussions or potential additional analysis.

The nearly universal adoption of SS2 has provided a tested platform with sufficient versatility for most assessments. But of course, there are always details unique to given resources. The price of a common platform is that many users are constrained by its current format. One example, that of sablefish, that came up was the way in which SS2 incorporates an environmental signal into the stock-recruit function. STAT team members said that it could be changed in one could write the code, but then the advantage of a tested platform is considerable. A second example came up in Dover sole concerning the manner in which SS2 handles male/female selectivity (at length); the parametric relationship was too restrictive. And thirdly, the retention function describing discarding allows only for the discarding of smaller fish. The author felt that a function which allowed for the discarding larger fish would also have improved the description of the fishery.

Because the revised abundance estimates for the Helser slope data came in at noon Wednesday, June 20th, most stocks had to be re-run. At that time, the re-weighted length frequencies were not available. The STAT team and Panel made the conscious decision of living with mismatch of using new abundance indices for slope but not matching length comps (which were weighted by

old abundances). The slow (for example, on the order of half an hour for Dover sole) run times for SS2 meant that authors could not perform machine intensive analysis, such as fine scale profiles and jitter analysis. Batch files or mainframe or borrow-able desktops for parallel running would be a benefit. Selected batch files could be passed out to participants to run unattended overnight. Another possibility that could be examined when time is precious is stripped SS2 model versions with most parameters fixed just to explore specific questions. The phase attribute of ADM should be a convenient way to implement a stripped version.

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

This was done throughout the meeting and several points are described above in the Description of Review Activities. Most of the recommendations are relatively minor technical points and are captured in the Panel Reports. The recommendations are both from my own scientific experience and from previous STARs attended this year. In general, my comments are for simple analysis showing the data before they are incorporated into the base model and requests for more diagnostics.

Conclusions/Recommendations.

When the stock extended into Canadian waters, or even to Alaskan waters, and there was a Canadian assessment available, why are these assessments not consulted to check for complementary trends in abundance, yearclass synchrony or biological parameters? This would seem offer better understanding of the resource and to be a good potential source for informative priors.

Again the bulk of my technical recommendations are in the Description of Review Activities above. As well as these, I made several recommendations regarding the form of the Panel Reports and Decision Tables derived from earlier STARs.

References

Lauth, R.R., J. Ianelli and W.W. Wakefield. 2004. Estimating the size selectivity and catching efficiency of a survey bottom trawl for thornyheads, *Sebastolobus* spp. using a towed video camera sled. Fish. Res. 70:27-37.

Mohn, R. K. 1999. The retrospective problem in sequential population analysis: an investigation using cod fishery and simulated data. ICES J. Mar. Sci. 56:473-488.

Appendix A: Terms of reference for STAR sole Review:

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 Dover sole, sablefish, shortspine thornyhead and longspine thornyhead stock assessments.

The consultants will participate in the Stock Assessment and Review (STAR) Panel of the Pacific Fishery Management Council (PFMC) for the review of the Dover sole, sablefish, shortspine thornyhead and longspine thornyhead 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 Dover sole, sablefish, shortspine and longspine thornyhead stock assessments;
- Most recent previous stock assessments for Dover sole, sablefish, shortspine and longspine thornyhead;
- 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 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
- Additional supporting documents as available.

Specifics

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 Newport, Oregon from June 20-24, 2005. . *Participants are strongly encouraged to voice all comments during the STAR Panel so the assessment teams can address the comments during the Panel meeting.*
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 July 8, 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, and to Mr. Manoj Shivlani, via e-mail to mshivlani@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.

I. Current Draft Stock Assessments

A. Dover sole

1. The Status of Dover Sole off the U.S. West Coast in 2005, David B. Sampson, *DRAFT*
2. Control and data files for the preliminary base-run model, 2005 Dover sole assessment

B. Sablefish

1. Status of the Sablefish Resource off the Continental U.S. Pacific Coasts in 2005, Michael Schirripa and J.J. Colbert, *DRAFT*
2. Schirripa, M.J, and J.J. Colbert. 2005. Interannual changes in sablefish (Anoplopoma fimbria) recruitment in relation to oceanographic conditions within the California Current System. Fish. Oceanogr. 14:4, 1–12.

C. Longspine thornyhead

1. Stock Assessment and Status of Longspine Thornyhead (*Sebastolobus altivelis*) off California, Oregon and Washington in 2005,Gavin Fay, *DRAFT*

D. Shortpsine thornyhead

1. Status and future prospects for the shortspine thornyhead resource in waters off Washington, Oregon and California as assessed in 2005, Owen Hamel, *DRAFT*

II. Background Materials

A. 2004 Workshop Reports

1. A Summary Report from The West Coast Groundfish Data Workshop held July 26-30, 2004 in Seattle, Washington. Northwest Fisheries Science Center. February 16, 2005.
2. A Summary Report from the Stock Assessment Modeling Workshop held October 25-29, 2004 at the Northwest Fisheries Science Center, Seattle, Washington. Northwest Fisheries Science Center, FRAM Division. March 16, 2005

B. Data Reports

1. Model-based estimates of abundance for 11 species from the NMFS Slope Surveys. Thomas E. Helser, Ian J. Stewart, Curt Whitmire, and Beth Horness. 2005.
2. Length and Age Composition Calculations for the NWFSC West Coast Survey of Groundfish Resources for the 2005 Assessment Season. Owen S. Hamel. April 29, 2005.
3. Standardized Catch Rates for the Deep-Water Complex. Jon Brodziak. 1997. (Note: Figures are currently not available in an electronic format but hard copies will be provided at the STAR Panel).

C. SS2 Documentation

1. Technical Description of the Stock Synthesis II Assessment Program. Version 1.17. Richard D. Methot. March 2005.
2. User Manual for the Assessment Program Stock Synthesis 2 (SS2), Model Version 1.17. Richard Methot. April 4, 2005.
3. PowerPoint Presentation: SYNTHESIS 2: Integrated Analysis of Fishery and Survey Size, Age, and Abundance Information for Stock Assessment. Richard Methot.
4. SS2 Model and Examples

D. STAR Panel Terms of Reference

1. Groundfish Stock Assessment and Review Process for 2005-2006. The Scientific and Statistical Committee (SSC) of the Pacific Fishery Management Council. 2005.

E. GAO Report

1. Pacific Groundfish: Continued Efforts Needed to Improve Reliability of Stock Assessments. United States General Accounting Office, Report to Congressional Requesters. June 2004.

III. Previous Stock Assessments and STAR Panel Reports

A. Dover Sole

1. Stock status of dover sole off the U.S. West Coast in 2000. D. Sampson and C. Wood. 2001.
2. Dover sole STAR Panel Report, 2001.

B. Sablefish

1. Status of the Sablefish resources off the continental U.S. Pacific Coast in 2002. Michael Schirripa. 2002. (Updated Assessment).
2. Review of the updated 2002 sablefish stock assessment (STAR Panel Report).
3. Status of the Sablefish Resource off the U.S. Pacific Coast in 2001. Michael Schirripa and Richard Methot, National Marine Fisheries Service. 2001.
4. Status of the Sablefish Resource off the U.S. Pacific Coast in 2001. Ray Hilborn, Juan L. Valero and Mark Maunder. School of Aquatic and Fishery Sciences, University of Washington. 2001.
5. Sablefish STAR Panel Report, 2001.

C. Longspine Thornyhead

1. Status of the thornyhead resources in 1997. J. B. Rogers, L.D. Jacobson, R. Lauth, J.N. Ianelli, and M. Wilkins. 1997. (Includes both shortspine and longspine thornyheads)

D. Shortspine Thornyhead

1. Stock status of shortspine thornyhead off the Pacific West Coast of the United States 2001. Kevin Piner and Richard Methot. 2001.
2. 2001 Shortspine thornyhead STAR panel Report

Appendix C: Email exchanges

The following is the body of the e-mail I sent to the Chair prior to the Panel concerning the draft shortspine thornyhead assessment

A couple of points came to mind as I reviewed the shortspine.

If it is not too difficult, sensitivity run with two stocks as in the 2001 model. This would help bridge the gap of both new model and new data in the current draft.

A fairly fine profile on M over a broader range. The low M for large thornyheads ~.015, suggest that the 3 trial M's did not range far enough. This is also suggested in Table 15 where M = .04 had the lowest likelihood. (It is a bit surprising the M = 0.06, 0.04 did not fall between A second reason for this request is the discussion on page 14 about tests for convergence. We saw at the last STAR for I believe cabezon, that the fine step profiling revealed the presence of local minima, and it would be reassuring to demonstrate that they were not seen here. The plot I have in mind is of the likelihood as a function of M.

Figure 10. Is q right – the residuals are not well behaved.

My last concern is the effect of the domed selectivity for the surveys. A number of concerns arose reading the draft. The right hand limbs are usually difficult to fit. – generally data just do not have much influence and of course it is confounded with M on the older ages. The top 2 curves in Figure 13 seem quite severe, virtually noting above 40 cm. The previous assessment used an asymptotic form so they could estimate linf but presumably it did not fit too badly. Either a re-run with a milder right hand side, or careful justification during the presentation would be appreciated. Lauth et al. was cited as the source of this but a reference was not given.

Although not a request for more work, the bumps in Fig 20-21 at 43 cm caught my eye – what are they?

I have a few other questions, but they are minor clarifications.