Report to Center for Independent Experts

of

STAR Panel
Aug 1– 5, 2005
Santa Cruz, CA

Bocaccio rockfish, Kelp greenling, Blackgill rockfish, Widow rockfish

R. K. Mohn
32 School St
Waverley, N.S.
Canada B2R 1S7

Executive summary

Four species were scheduled for review by this STAR Panel. Three of these stocks had been assessed before, of which two were initially scheduled as updates. At the request of the STAT, one of the updates, widow, was reviewed as a full assessment. Kelp greenling was assessed for the first time. The assessments and updates were all accepted, with the exception of the California kelp greenling sub-stock. A brief summary of each assessment is provided below. Data limitation, especially abundance indices, was a principal source of uncertainty. These species are not well sampled by trawl gear used in the fishery independent surveys. Furthermore, fishery dependent abundance indices have been seriously compromised by recent management regulations.

Although more time would have improved the depth of investigation, the Panel was successful in its review. Dedicated and talented members of the STAR and the STAT interacted well together in a constructive environment. As well as the assessments themselves, methods and insights were brought forward which will benefit other assessments and future STAR Panels. Furthermore, as I now have had to opportunity of reviewing six STAR Panels, procedural issues are given more emphasis in this report than in previous reports.

Technical issues on model balance, model convergence, and the SS2 environment are addressed in point form and, where appropriate, recommendations are made. Similarly, three issues are identified related to data: construction and aggregation of data for a first assessment, considerations for data inclusion and a database problem. As this is the first time I have given much emphasis to procedural issues, eight topics are identified. These include the balance of tasks within a STAR, completeness of STAR Panel Reports, and several aspects of communication. Recommendations are made throughout the Report and the word recommendation has been put into bold font to identify them.

Background

Four species were scheduled for review by the August 1-5, 2005 STAR Panel. Three of these stocks had been assessed before, of which two were initially scheduled as updates. At the request of the STAT, one of the updates, for widow rockfish, was reviewed as a full assessment. Kelp greenling was assessed for the first time.

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

André Punt (Chair), University of Washington, SSC representative
Mark Maunder, Center for Independent Experts
Robert Mohn, Center for Independent Experts
Tony Smith, Commonwealth Scientific and Industrial Research Organization
Michael Schirripa, Northwest Fisheries Science Center

Susan Ashcraft, Groundfish Management Team (GMT)
John Field, Groundfish Management Team (GMT)
Peter Leipzig, Groundfish Advisory Subpanel (GAP)

Stock Assessment Teams

Bocaccio	- Alec MacCall, Southwest Fisheries Science Center
Blackgill	- Tom Helser, Northwest Fisheries Science Center
Kelp Greenling	- Jason M. Cope, University of Washington
	- Alec D. MacCall, Southwest Fisheries Science Center
Widow -	- Xi He, Southwest Fisheries Science Center, Santa Cruz
	- E. J. Dick, Southwest Fisheries Science Center, Santa Cruz
	- John Field, Southwest Fisheries Science Center, Santa Cruz
	- Alec MacCall, Southwest Fisheries Science Center, Santa Cruz

Again, because four stocks were under consideration, there was not enough time to fully review individual stocks. Blackgill rockfish was a full assessment. Kelp greenling was being assessed for the first time which always requires more attention to be spent on data preparation; the amount of time required was further exacerbated as kelp greenling was assessed as two stocks, northern and southern. The other two stocks, bocaccio and widow rockfish were originally scheduled to be updates, which should have freed some time for the others. However, the STAT for widow requested that it be treated as a full assessment, and the STAR Panel accepted this proposal. Nonetheless, all the assessments were accepted except for the kelp greenling southern sub-stock. Although the drafts of the STAR Panel reports were better reviewed than on the average, less emphasis was directed towards the provision of draft decision tables, and these were not reviewed by the Panel.

This report contains more on procedure than previous reports to CIE as I now have enough experience to synthesize and draw inter-Panel conclusions.

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 bocaccio, an update of a stock currently in rebuilding. At that time we were asked, if possible, to provide the authors with any pre-meeting comments or questions. Although I reviewed and summarized all the drafts, I only forwarded written concerns for bocaccio (Appendix C) and these were sent via the Chair to the author.

Monday morning on August 1st, the Chair, André Punt, opened the meeting with introductions and an overview of what we were expected to accomplish. He requested that written requests to the STAT were to be accompanied with a rationale. This Panel was not a rigid as some in recording the details of the requests to and responses from the STAT. As most of the Panel was not familiar with updates, he drew our attention to the Terms of Reference for Expedited Stock Assessment Updates.

A summary of the four assessments is provided below. More detail is available in the STAR Panel Reports.

Blackgill rockfish

The last assessment for blackgill was conducted in 1998. The stock is modeled as a single unit centered off California which accounts for the majority of the landings. A considerable portion of the resource is in Mexican waters as well. Although the Panel had given detailed instructions for projections, neither the projection nor a final depletion estimate was available by the end of the meeting. The depletion in the draft for 2005 was on the order of 40%.

Widow rockfish

The widow rockfish had been assessed in 2003 and had been scheduled to be reviewed as an update. But because of some changes to the data and migration to the SS2 framework, the STAT requested that it be reviewed as a full assessment. The STAR agreed and the assessment was accepted. The depletion from the base model was 28%.

The widow rockfish differs from most other rockfish in that it is semi-pelagic which also affects its availability to survey gear. Another distinction is the use of a non-linear relationship for its juvenile index. The Panel spent considerable time on this non-linearity and contacted members of the previous STAR for widow to aid in out deliberations.

Bocaccio

The bocaccio assessment was presented as an update and retained the same SS1 model (STATc base case) that was use in the 2003 assessment. The data were updated to 2004. The Panel accepted the assessment as satisfying the terms of Reference for an Expedited Stock Assessment Update. The stock is severely depleted, on the order of 10% of B0, but slow recovery is projected over the next decade.

Although this was an update the Panel requested diagnostic analysis and some summarization of results. Also, the 2003 STAR Panel requests were reviewed and updated by the Panel.

Kelp greenling

This assessment was the first for kelp greenling. In the draft assessment, the resource was divided into two independent sub-stocks divided at the California-Oregon border. Although the STAT had obviously worked hard before and during the meeting, the Panel did not accept the California sub-stock assessment because of perceived inconsistencies within the model. The Oregon assessment was accepted although the estimates, particularly of biomass, were quite uncertain. Although uncertain compared to other rockfish, the depletion estimates for 2005 did not indicate any threat of an overfished state.

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. Furthermore, as I have had to opportunity of reviewing six STAR Panels, procedural issues will be given more emphasis in this report.

There are a couple of common themes among my reviews of the 2005 STAR Panels. The first is that four stocks are too many for a five day STAR Panel. The second is that the STATs do not look at the underlying data enough and do not complement their (generally SS2) analysis with simpler models. If the models agree, the base case is made stronger. If they disagree, the authors then have to contemplate the reasons. It is this contemplation that does not seem to take place, particularly during the drafting of the assessment. The wider experience represented by the STAR can help in the contemplation and resolution of the divergence, but only if the additional analysis and data summary are provided. I realize that there is a cost in developing more than one model and in data summaries, but it leads to results that cannot be obtained in any other way. The more common practice of producing a large number of SS2 runs is a much less effective way to explore alternative descriptions of the resource.

Although I have not been successful in changing the general approach to assessments, the role of provision of continuity and of winnowing experiences from previous Panels seems to be valuable and is appreciated at the Panels. I would **recommend** that such a role be used again in the next round of assessments. The divergent approaches seen from Panel to Panel on such problems as balancing the model and the quantification of uncertainty remains somewhat surprising in that all the Chairs are from the SSC and attended the 2004 Stock Assessment Modeling Workshop.

Technical topics:

T.1) Balancing the components of the assessment model.

The problems and practices related to balancing the components within SS2 models were again an issue. I reported that this practice was considered desirable by previous STARs. One STAT member argued against the practice, stating that one might consider that one is balancing the model, but in reality, one may be giving all the weight to one data type or source. It is **recommended** that a mechanism or protocol to explore the sensitivity of weightings, especially examining the possibility of what might act like local minima, should be addressed in a technical environment. This topic also highlights the ongoing conflicts between conflict of objective (statistical) and subjective criteria

The frequently used, and accepted, practice of balancing the effective N's (effNs) by regressing against the observed N's had presented an interesting problem in one of the assessments (the spike seen in the lower half of Figure 29 in the widow draft assessment). The regression had not been constrained to go through the origin and it resulted in very high balancing factors near the origin. The regression should be constrained to the origin and it should be a standard practice to provide and review the regressions if this technique is used. Further to balancing, the order in which the components were balanced is important**.** It is **recommended** that the root mean square errors on the survey abundances be first iterated and then the effN regression on the size or age compositions be done.

The practice of balancing through iteration the variance on the stock recruitment relationship, explicitly σ_R, either to convergence or even a single step, had been advocated by previous panels. STAR Panel member Mark Maunder, citing a paper he recently published with Rick Deriso (Maunder and Deriso, 2003), advised against this. Their study using simulated data showed that this parameter is very difficult to estimate iteratively and can lead to erroneous values. It is interesting that neither the participants at previous Panels nor from the Stock Assessment Modeling Workshop in 2004, including Mark himself, made this recommendation, at least not with sufficient emphasis that it was not picked up.

Although not strictly a balancing issue, the estimation of the period during which the recruitment deviations should be active is a related topic. The goal is to match this period to informative data and these plots provide a semi-quantitative means for doing so. During one of the responses to a STAR request the widow team presented both the standard deviations of the recruitment deviations on terms of 95% confidence intervals (as has been earlier advocated) as well as the recruitment deviations themselves. This is the first time I have seen this plot and **recommend** its consideration as a diagnostic.

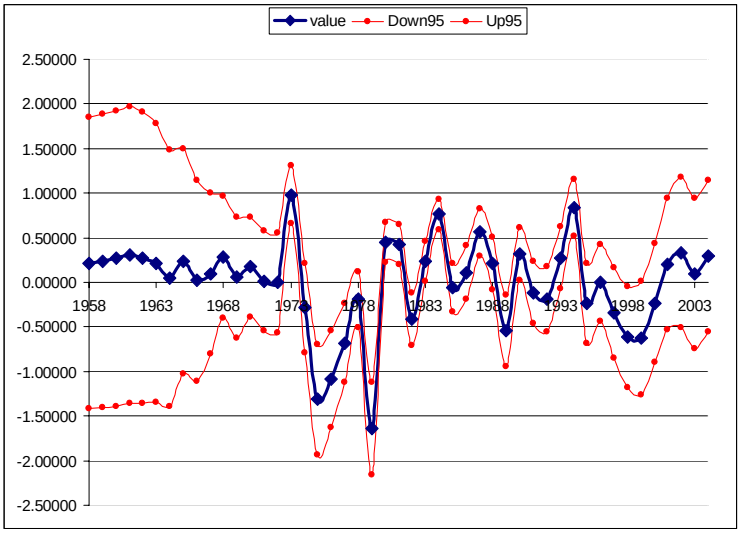

Figure 1. Recruitment deviations and their confidence from widow rockfish. Xi He, personal communication.

This figure shows an early period of low information which cannot be assigned to specific yearclasses but of general good recruitment which would have been harder to detect using separate figures.

T.2) Testing for convergence

In one assessment, it was observed that the likelihoods in a set profile runs did not match the likelihood when the profiled parameter was freely estimated. This is a symptom of problems in convergence as the pit of profile was lower than free estimation. I suggested a 'jitter' test, but the Panel did not feel it was warranted at the time. Another author mentioned that he had performed jitter tests during the draft phase but did not report them as they did not seem sufficiently important as the convergence problems did not occur near the best fit (of that particular model).

I would like to repeat this **recommendation** from my previous reports, and note that it is in the Terms of Reference provided by the SSC, that tests for convergence be performed and reported routinely.

T.3) Stock Synthesis II

The SS2 assessment package is receiving considerably less criticism from the STAT members. This is probably due to a mixture of increased experience among users and its author's responsiveness to complaints or requests for enhancements as they arose. One related problem is emerging however. As SS2 is becoming more the accepted environment, it became obvious that

the Panel (and to a lesser degree the STAT) needed to be familiar with its input and output files. It will become difficult for reviewers outside the NWSFC/SWFSC community to keep up with the sort of shorthand/jargon that is evolving with the assessment package. This increasingly becomes a factor with the need to quickly communicate the results of multiple re-runs in a tightly scheduled STAR. There was no time, or at least time made available, compared to the number of requested re-runs for the STAT team to produce summaries (and which in turn could not be printed and handed out for later STAR deliberation). In summary, this means that reviewers have to be able to read raw SS2 output and STAT, and in turn STAR, are impacted when the schedule is too tight to allow time for reflection, winnowing and summarization.

Data topics:

D.1) Construction of assessment data

Especially in cases when it is the first assessment, the criteria for ascertaining if there are sufficient data to spatially disaggregate a stock need to be formalized. The draft for kelp greenling contained a two area model. The STAR did not accept the model for the southern component. It is neither clear what criteria were used nor what should be used to aggregate or disaggregate the resource into components. The trade-offs between having enough data for a reliable fit on one hand against geographically distinct fisheries, biological parameters and the potential management at finer resolution on the other. These issues are important for the first assessment but are also relevant to established assessments as the decisions have become more codified and are often not looked into again. It is **recommended** that a future data or modeling workshop address these questions and at least supply a checklist of criteria for authors.

D.2) Accepting/rejecting data series within an assessment

A distinction was made the between cases where the STAR Panel removed an index or data source and when the author removed it. The STAR Panel removal has more weight, where as when the author removes it, it can be reinserted easily. An author mentioned that he removed an index as it would be easier to reintroduce it in the future. It is not clear what the best approach would be. Perhaps it would be best to have the draft contain as many series as possible with their diagnostics which would put the most information before the STAR. The STAT should still be free to re-introduce a series but of course a justification would be required.

It is a similar situation in the case when an index is partially removed. This may by down-weighting with a lambda in the objective function, or by specifying an arbitrary non-linear relationship thereby adding at least one free parameter.

D.3) Problems with databases

In one of the assessments, a problem was found with the RecFIN data in which there were cases when lengths were recorded as weights. Also, cases were found when there no records or when there was no catch and a zero was entered in either case. Why did the previous data workshop not find or report these errors? This observation would tend to reinforce the **recommendation** for a data workshop next year.

Procedural topics:

P.1) Chair and balance of STAR roles

The Panel, under the guidance of the Chair, must partition its time among review, re-runs discussion and production of the Panel Reports. Each Chair will have his/her own priorities, inclinations and style to set a balance among these roles. It is difficult to be critical of a Chair who did a good job and is conspicuously talented in the area of stock assessment. However, I think a better job could have been done, and part of the problem was the conspicuous talent itself. Frequently, the Chair rapidly came to a conclusion and did not wait for Panel to catch up. Before consensus could be reached, the next topic was introduced. Brief pauses for reflection or for consideration of responses would have benefited the review. On the other hand, I felt that too much time that could have been used for more interaction with the STATs was used in editing the STAR Panel reports.

Another distinction between this Panel and the others I attended this year was in the drafting of the Panel Reports. The Chair mentioned that he was crafting the STAR Reports to be more in line with SSC protocols, which presumably meant a time savings for the next stage of review. One instance of this was the cleaning up of the requests from the STAR Panel to the STAT. This included removing some of the 'blind alleys' that were requested. My own preference is to leave more detail here as there will be number of users of this report in the future, and not just the SSC. Future STARs or assessors may value from the investigation of a 'blind alley'. We need to do STAR things and not be pre-filtered.

In summary, contrasted to other Panels, and due to lack of time and emphasis from the Chair on report production and editing, current stock status, diagnostics and, where appropriate, projections from base runs were not distributed. To reiterate, I feel that a good review was done, but a better one was within our reach.

P.2) Cut-off date for data

A request came from the STAT that an attempt be made to set a final date after which new data cannot be introduced into an assessment. This is a reasonable request, but, I would **recommend** that, if possible, the STAT should perform at least one sensitivity run using the late data to show its significance. If it were critical to the perception of the stock, it would signal the need for rescheduling the assessment. If the assessment were accepted, such a run might also affect the perception of uncertainty and the probability of alternative states of nature.

P.3) Previous STAR Panel reports

There was a problem in referring to previous STAR Panel output in that there was not sufficient documentation to support one of the decisions. Members of that STAR Panel were contacted to fill in the missing justification. Time and priority must be given to assuring the completeness of the model description and rationale for the final base case and, if appropriate, how uncertainty was captured. The SSC review of the Panel Reports is probably too late to assure the proper level of detail, but it would have the advantage of not having been at the meeting and therefore liable to subconsciously filling in the missing information. All that probably can be done is to emphasize the need in the Panel's Terms of Reference and instruct the future Chairs.

P.4) Full or update assessment

This was the first instance this year when an author had been tasked with an update but moved to a full assessment. However, this decision has a cost in terms of the STAR Panel's time - time that could have been allotted to other assessment topics. In making his case, the author cited the list in the Terms of Reference (Groundfish Stock Assessment and Review Process for 2005-2006, pg.21) and felt that much of the list had changed. However, all of these changes may have had only minor impacts and not affected our perception of the stock. It seems that the 'anything serious' criterion is missing from the Terms of Reference. When the situation is mostly new (1-3 years) data, the author then owes the Panel a rigorous accounting of the changes and the impacts from the last assessment to justify a full assessment in a crowded agenda.

P.5) Review of technical documents not specific to the stocks under review

A fair amount of time was spent reviewing a paper from the primary literature on one-sided priors on the steepness parameter. The method presented in this manuscript was used in the widow rockfish assessment. This presented the Panel with the choice of advocating its use in the assessment under consideration, which it did. After the question (concerning accepting the technique for rockfish in general versus reviewing the manuscript and potentially accepting the technique for all stocks) was discussed, it was concluded that we were not a "methods" and should not entertain such a role.

P.6) Inter-Panel and STAT-STAR communication

This Panel seemed unusually frenetic and did not find time to explore implications of intermediary results. Furthermore, a more rigid Request-Rationale-Response format would have been valuable to assure continuity amidst flipping from stock to stock. Repeating a **recommendation** from previous STAR's, having a file server and LAN to make accessible the various responses especially when they were un-digested rep files from SS2 would be extremely valuable. These considerations are more important when time is constrained by too many assessments, especially when some of those are being done for the first time.

P.7) Feedback

It was encouraging to see that one of authors had enhanced the bubble plots of residuals to incorporate one of my requests at an earlier STAR Panel. The request was to scale the bubbles to show significant residuals. This was done by changing the circles to squares when the standard deviations were greater than 2. This was not accomplished by official feedback (line managers, SSC, etc.) but via communication within the STAT community. It also suggests that more attendance by potential STAT members would help disseminate the practice and craft of assessments.

We got valuable feedback from the Chair (an SSC member) concerning vermillion in which we did not get a base case but gave a range and how SSC deals with such a situation. He explained that we (the STAR) were not sufficiently explicit that these ranges were not "numbers" (states of nature) to chose from; It would be beneficial if other clients gave considered and explicit feedback to STARs at least as a preamble during the opening session. Although these comments might vary depending on who was there, it would still focus the Panel and improve the relevance of the reviews.

P.8) Panel consensus

I was critical at an earlier Panel on the use of the Delphi method to assign probabilities to the states of nature in projections. My main criticism is that the Delphi approach does not incorporate the concept of consensus but merely averages divergent opinions. This Panel came up with a more attractive method to subjectively assign of the probabilities of the states of nature. We were told to try and rank the states, which turned out to be possible on which to reach consensus. The rankings were then crudely cast into probabilities as 40, 30, 20 and 10%. Of course, in such cases the report must clearly identify how the probabilities were assigned.

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

The primary source of uncertainty for these species is the availability of appropriate data. Fishery independent surveys are frequently compromised because of the behavior of the species. Preference for rocky habitat, and in one case a pelagic distribution, reduces the quality of abundance estimates, or composition data, from trawl surveys. The utility of fishery dependent data has been compromised by recent management restrictions. Aging and discard practices are problems for most stocks as well. These are widespread concerns and this Panel was not greatly different from the others. Specific data related recommendations have been made with each species' Panel report and will not be repeated here, nor do I have anything substantial to add.

How uncertainty is incorporated into the assessment results does vary from Panel to Panel. When this question came up, I cataloged how previous Panels had dealt with the issue. This Panel adopted and refined - thanks to the Chair - my preferred method of having a sufficiently unconstrained base case and then integrating the distribution of a variable of interest, typically depletion or biomass in the terminal year. At that Panel we had placed the states on nature capturing uncertainty at approximately 25% for the bounding cases and 50% for the base case. The Chair informed us that +/-1.15 standard deviations from the mean should exactly produce the desired 25-50-25 splits when using the normal distributions produced by the Hessian.

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

The strengths of this Panel were those observed in the other Panels, highlighted by a dedicated and talented STAT matched with an experienced STAR Panel. This Panel did not stand out from the others, except in those ways described above under Procedural Topics.

As in most other STAR Panels which I attended this year, the congested agenda inhibited some discussions and/or potential additional analysis. One specific example was that there was not enough time to review kelp greenling as completely as would have been desirable and get constructive Panel feedback back to the authors. Such feedback requires some interaction with the STAR and iteration with the STAT. These Panels represent a special opportunity for the STAT team to receive (and indeed provide) ideas from a widely experienced Panel, and this aspect of the STAR process should be encouraged as much as time will allow.

Another weakness is the inability, or at least hesitancy, to use simpler models and direct data summaries. I find this at every STAR I have attended this year and do not understand its origins or pervasiveness. Thus, the data and their relationship to the model results do not get enough attention. This situation may also be a symptom of the lack of time spent considering what the

assessment's analysis mean because it was all spent in producing tables, figures, and text for the draft.

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

Such recommendations were provided throughout the meeting and several points are described above in the Description of Review Activities. Many 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 simpler analysis showing the data before they are incorporated into the base model and requests for more diagnostics. As well, when appropriate, I ask for the consideration of simpler models (production models, VPA…) but in the context of a given STAR Panel, their development is unlikely; hopefully, this request will influence future assessments.

I was encouraged when the Chair explicitly endorsed my standing recommendation to look directly at the data. He suggested that the abundance data could be conveniently summarized by combining them into a single regression with each component series weighted inversely by its variance.

Conclusions/Recommendations

The bulk of my recommendations and conclusions are in the Description of Review Activities. The word 'recommendation' has been put into bold to facilitate locating key recommendations. The recommendations themselves have been broken down into technical, data and procedural classifications and have been dealt with in point form. Also, I made several recommendations regarding the form of the Panel Reports and Decision Tables derived my experience in from earlier.

A more general conclusion, and one that has been mentioned repeatedly, is that these Panels are seriously compromised by having to consider four stocks in one week. I am not aware of what criteria were used to arrive at this load nor of the trade-offs that were considered in sacrificing the depth of review for covering more stocks less well. The losses are very difficult to quantify, as they were not explored. Hopefully, the next round will find a way to constrain the Panels to a more manageable number of stocks. When I have completed the series of 2005 Panels, I will attempt to make some recommendations for setting priorities to limit the number of stocks to be considered.

References

Maunder, M. N., and R.B. Deriso. 2003. Estimation of recruitment in catch-at-age models. Can. J. Fish. Aquat. Sci. 60:1204-1216.

APPENDIX A: Statement of Work

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 widow rockfish, bocaccio rockfish, blackgill rockfish and kelp greenling 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 widow rockfish, bocaccio rockfish, blackgill rockfish and kelp greenling 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 widow rockfish, bocaccio rockfish, blackgill rockfish and kelp greenling stock assessments;
- Most recent previous stock assessments for widow rockfish, bocaccio rockfish, and blackgill rockfish (kelp greenling 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 Stock Assessment and STAR Panel Process for 2005-2006;
- Summary reports from the Recreational CPUE Statistics workshop and the West Coast Groundfish data and modeling workshops held in 2004.
- Stock Synthesis 2 (SS2) Documentation
- 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 Santa Cruz, California from August 1-5, 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; and
6) Complete a final report after the completion of the STAR Panel meeting.
7) No later than August 19, 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.

Table of Contents for the Background Materials CD for
Widow rockfish, Blackgill rockfish, Kelp greenling and Bocaccio rockfish update
Stock Assessment Review (STAR) Panel

August 1-5, 2005
Southwest Fisheries Science Center
Santa Cruz, California

I. Current Draft Stock Assessments

A. Widow rockfish

1. Status of the widow rockfish resource in 2005. Xi He, Donald E. Pearson, E.J. Dick, John C. Field, Stephen V. Ralston, and Alec D. MacCall. *Draft.*

B. Blackgill rockfish

1. Stock assessment of blackgill rockfish (*Sebastes melanostomus*) population off the West Coast of the United States in 2005. Thomas E. Helser. *Draft.*

C. Bocaccio rockfish (Update)

1. *To be sent separately via email later in the week. Please review 2003 bocaccio assessment for reference.*

D. Kelp greenling

1. Status of Kelp Greenling (*Hexagrammos decagrammus*) in Oregon and California Waters as Assessed in 2005. Jason M. Cope and Alec D. MacCall. *Draft*

II. Background Materials

A. 2004 Workshop Reports

1. Recreational CPUE Statistics Workshop, June 29-30, 2004, Santa Cruz, California. A Report of the SSC Groundfish Subcommittee –Based on a Meeting Held at the Southwest Fisheries Science Center Santa Cruz Lab, June 29-30, 2004.
2. 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.
3. 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. 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

C. 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.

D. 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. Widow rockfish

1. Status of the widow rockfish resource in 2003. Xi He, Stephen V. Ralston, Alec D. MacCall, Donald E. Pearson, and Edward J. Dick. 2003.
2. Widow rockfish STAR Panel Meeting Report. 2003.
3. Status of the Widow rockfish resources in Y2K. 2000. Erik H. Williams, Alec D. MacCall, Stephen V. Ralston, and Donald E. Pearson. 2000.
4. Coastwide Widow Rockfish STAR Panel Meeting Report. 2000.

B. Blackgill rockfish

1. Stock Assessment for Blackgill rockfish. 1998. J.L. Butler, L.D. Jacobson, and J.T. Barnes.
2. Star Panel Report on the Blackgill Rockfish *(Sebastes melanostomus)* Assessment. 1998.

C. Bocaccio rockfish

1. Status of Bocaccio off California in 2003. Alec MacCall.
2. Bocaccio STAR Panel Report. 2003.
3. Status of Bocaccio off California in 2002. Alec MacCall.
4. Bocaccio STAR Panel Report. 2002.

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 bocaccio assessment. The Chair forwarded these to the appropriate STAT member.

As this is only the second update assessment I have seen, I am not sure about the degree of detail required. The other update, POP, had more detail, analysis and diagnostics available, but that may not have been the standard or required. I also compared the draft update to the observations and recommendations in the 2003 Panel Report.

The rebuilding analysis is cited in the draft but is not available on the CD-ROM. Would it be needed, or useful, when reviewing the update?

Most of my requests are for more information or for synthesis of presented information.

It would be handy to have a growth curve available. I did not see one in the either the 2002 or 2003 assessments. The 2002 document mentions that age 1 fish are 24 cm. Does this suggest that the mode at approximately 32 cm in Figure 1, should have been seen somewhere in 2004? Perhaps as seen in Figure 2 for the triennial survey and that there is indeed fairly good evidence for a strong 2004 yearclass? Should this affect the projections?

A summary table should be provided that describes the data, parameters, priors (if any) for the 3 models under discussion. Here is an example for one of my old assessments which could be modified to the STAR/SS1 environment.

Parameters:

Log survivors - $\ln(N_{i,2001})$ i = 1 to12
Calibration coefficients - $q_{J,i}$, i = 1 to6 for July RV survey
Calibration coefficients - $q_{S,i}$, i = 2 to8 for Sentinel survey

Structure Imposed:

Error in catch assumed negligible
F on oldest age (12) set to the average F ages 8,9 &10
No intercept was fitted
M = 0.2 for all ages in 1970-1984, .25 in 1985, .30 in 1986, .35 thereafter

Input:

$C_{i,t}$, i = 1 to 12; t = 1981 to 1997 (May to October catch at age)
$J_{i,t}$, i = 1 to 6; t = 1970 to 2001 (July RV index)
$S_{i,t}$, i = 2 to 8; t = 1995 to 2001 (Sentinel index)

A summary figure would be helpful showing the 1+biomass from the 2002 assessment, 2003 and the draft say STATc estimates. This would showthe progression of our perception of this stock. Also, a summary figure with the q- corrected indices of abundance for STATc and the model abundance. As well as the fit to the model, this

would show the divergence in the CPUE and triennial survey indices mentioned in the Panel report. Similarly, we do not have any diagnostics with the update. It would be informative to see how the model is doing, especially for the last couple of years.

The 2003 STAR Panel suggested two base models as an indication of uncertainty and then went on say that the true uncertainty was "very likely of higher magnitude". In fact Figure 6 of the draft, suggests that they are very similar, except for B0. Even though it is an update, we should have a paragraph about the manner in which uncertainty was treated. Similarly, how was the dispersion in the projections in Figure 7 modeled?

Natural mortality seems to have been an issue with the change from the 2002 to the 2003 (0.2 and 0.1) assessment and the divergence between the STAT and STAR preferences (0.1 and 0.15) in 2003. The 2003 STAR requested a profile on M. It still seems that it would be an informative analysis.