

**Report to CIE**

**of the**

**STAR Panel**

**September 26– 30, 2005**

**Seattle, WA**

**Canary rockfish, Lingcod, Petrale Sole, and rebuilding analyses**

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## **Executive summary**

Three species which had all appeared in earlier STAR Panels were scheduled for review by this STAR, the mop-up Panel. Lingcod and Petrale sole were referred from previous STAR Panels, mainly because of problems relating to data. Canary rockfish was referred to this Panel by the SSC because they did not believe that it had received sufficient consideration of potential priors or other sources of data. Eight stocks, of the twenty three assessed this year, were over-fished and scheduled for rebuilding analysis at this Panel.

Although more time would have improved the depth of some specific investigations, the Panel was successful in its review. The canary review was quite controversial and took up a lot of STAR time and required several STAT presentations. After some initial confusion about the precise runs that were required, the rebuilding analyses went smoothly.

Technical issues including balancing the components of the assessment model, data aggregation, meta-analysis, non-linear abundance indices, diagnostics and setting starting populations for decision projections are specifically addressed. Also, procedural topics focusing on the composition of the review Panel, the performance of the Chair, and the interplay of subjective and objective criteria in model selection are developed.

An agenda having three somewhat controversial stocks to be assessed, and numerous rebuilding analyses, does not allow sufficient time to fully explore all assessments. I felt that the lingcod, and to a lesser degree, Petrale would have benefited from more scrutiny. I agreed with STAR in all issues, except the handling of the canary assessment. My disagreements will be discussed fully below under procedural topics. In summary, however, I remain unsatisfied that the constitution of this STAR and the performance of the Chair were consistent with optimal review practices or that the best advice was produced. I believe that more emphasis and credence should have been associated with the August 15 STAR approved canary assessment than this Panel did.

## **Background**

The Chair opened the Panel with introductions and presented two stocks that were initially scheduled for review by this STAR Panel, namely lingcod and Petrale sole. Another stock, canary rockfish, was added by the SSC in its meeting which was held a week before this STAR. Although there were only three stocks scheduled, they were rather controversial, especially canary rockfish, and time was again at a premium. Also, eight stocks were scheduled for rebuilding analysis.

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

Steven Berkeley, UCSC, SSC  
Martin Dorn (Chair), Alaska Fisheries Science Center, SSC  
Ray Conser, Southwest Fisheries Science Center, SSC  
Owen Hamel, Northwest Fisheries Science Center, SSC  
Robert Mohn, Center for Independent Experts  
Kevin Piner, Southwest Fisheries Science Center  
Stephen Ralston, Southwest Fisheries Science Center, SSC  
David Sampson OSU, SSC (by telephone)

John Devore, PFMC, GMT representative  
Peter Leipzig, FMA, GAP representative

Stock Assessment Teams (STATs)

Canary rockfish – Rick Methot, Northwest Fisheries Science Center, (NWFSC)  
Lingcod – Tom Jagielo and Farron Wallace, Washington State Department of Fish and  
Wildlife, (WSDFW)  
Petrale Sole – Han-Lin Lai, Jason Cope, NWFSC  
Yellowtail rockfish – John Wallace and Han-Lin Lai, NWFSC

Rebuilding analysis authors

Bocaccio – Alec MacCall, SWFSC  
Canary - Rick Methot, NWFSC  
Cowcod – Kevin Piner, SWFSC  
Lingcod – Tom Jagielo  
Darkblotched – Jean Rogers (not present)  
POP – Owen Hamel, NWFSC  
Widow – Xi He, SWFSC  
Yelloweye – Farron Wallace, WSDFW

Again, the agenda was crowded for this Panel. The STAR had to review three stocks in the so called mop-up session: Petrale sole, lingcod and canary rockfish. Petrale sole and lingcod were referred from their respective STAR Panels. Although canary rockfish was accepted by its STAR, it was referred by the SSC when it reviewed the STAR report. Rebuilding analyses were presented for eight stocks: bocaccio, canary rockfish, cowcod, darkblotched rockfish, lingcod Pacific Ocean perch, widow rockfish and yelloweye rockfish. Once the desired run formulations were decided upon, the rebuilding analyses were quite straightforward. Rebuilding analysis is used for stocks that have been declared overfished and is essentially a stock projection routine which predicts the recovery times under several fishing scenarios.

### **Description of review activities**

The draft assessments for Petrale sole and lingcod 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 lingcod. Due to the short time interval, comprising a week, between the SSC meeting and this STAR Panel, materials were not available for canary rockfish in advance.

Monday morning the Chair, Martin Dorn, opened the meeting with introductions and an overview of what we were expected to accomplish. In contrast to earlier STARs this year, the Panel was all SSC members, with the exceptions of Kevin Piner and me. The Chair had asked Piner to join the Panel as an external reviewer to give it more depth.

Because canary rockfish was nominated for the mop-up Panel by the SSC, the Chair gave an introduction for the reasons that it was brought forward. Although technical faults were not found with the draft assessment base model, a number of issues were raised by the SSC. These included the unusually low  $\sigma_R$  and high  $h$  and  $q$  compared to other rockfish. Also the SSC felt that the STAT/STAR should have considered including the juvenile data, as was done for widow rockfish, and the use of priors, particularly on  $h$ . Also, canary rockfish was of unusually

high importance due to the possibility of limiting other fisheries because of canary rockfish bycatch. The Chair of the August 15 STAR at which canary rockfish was reviewed gave an overview of the assessment to this Panel.

Throughout the meeting, I was consulted for practices and precedents of previous STAR's. I also performed a minor set analysis to aid the time-pressed STAT in understanding the role of some of the underlying data in the lingcod assessment. This analysis was a comparison of abundance and catch age frequency data comparing the recent years to their respective long term averages. I also proposed a somewhat radical model for the Petrale sole, which was a very parsimonious model to act as a contrast with the proposed base model. It proved to be quite successful and led to a new and well-behaved base model.

Summaries of the three assessments and the rebuilding analysis are provided below. More detail is available in the respective STAR Panel Reports.

### *Lingcod*

The resource has been assessed since 1986 and the two most recent assessments, 2000 and 2003, were assessed using a model written in ADMB. At the August 15 STAR, the assessment was to have been an update, but the STAT opted to move to the SS2 environment and have the draft reviewed as a full assessment. That STAR did not accept that the strong recent yearclasses seen in the model population of the northern portion of the stock was evident in the data. The STAT went back and extracted the appropriate underlying data (survey and catch at age). They also performed more informative retrospective analyses. This satisfied the STAR, and base models were accepted for the northern and southern stocks. Lingcod is seen to be rebuilt with a depletion of 64% for the combined stock, although the smaller southern portion has a depletion of 24%. These assessments would have benefited from more time at this Panel, as their diagnostics were not well reviewed due to time constraints.

Because of the attention given to canary rockfish, lingcod, especially the model of the southern component, did not receive the degree of attention it deserved, or indeed that it received in the August 15 STAR.

### *Petrable sole*

Petrable sole has been assessed in 1984, 1993 and 1999 and is modeled as two stocks, northern and southern. It was referred to the mop-up because of the arrival of data for the northern stock which arrived too late to be included into the analysis. Although the southern portion of Petrable was accepted by the STAR, subsequent review suggested that it also should be reviewed in the mop-up.

Base models were accepted and showed that the northern portion had a depletion of 34% and the southern 29%.

### *Canary rockfish*

Canary rockfish was last assessed in 2002. The model in the draft assessment was re-written in SS2 and reviewed as a full assessment at the August 15 STAR. That STAR accepted the assessment which showed that the stock had been over-fished and is under rebuilding. They found that biomass was minimal in 1999 and has shown very little recovery since then. There is no indication of an improvement to recruitment in the data as was seen in several other species of

rockfish. The SSC felt that the assessment should not be accepted mainly because the STAR did not consider some other sources of information, principally a meta-analysis of rockfish steepness parameters (Dorn, 2002) and the juvenile survey. These are discussed below in more detail.

It became apparent that there were two factions within the Panel: One that preferred the base case model as approved in August 15 STAR, and the other that felt that this model was too conservative (that the terminal biomass was an underestimate). The STAT provided an alternate model which had fewer selectivity parameters and fit the data less well, but did have a higher terminal biomass. A poll of the Panel showed about a 50:50 split in the preference between these two models and both went forward in a blended model. The depletion is of the order of 5% from the August 15 base model and on the order of 10% when integrated across the base model and the alternate model, the so-called blended model.

### ***Rebuilding***

Eight stocks were presented for rebuilding analysis, bocaccio, canary rockfish, cowcod, darkblotched rockfish, lingcod, Pacific Ocean perch, widow rockfish and yelloweye rockfish. These analyses are fairly mechanical as the inputs have been agreed to (at the respective STARs) and the software is stable and apparently well known. About the only discretionary input for the rebuilding is the choice of recruitment method and how uncertainty is incorporated. There was some confusion about the catch streams for the projections and several runs and, in a few cases, re-runs were required for each stock. Soon the required runs were agreed upon, and the rebuilding analysis went quickly. A July 2005 memo, the so-called Hastie memo, defined 6 runs which were the basis for the agreed upon catch streams and analysis.

### **Summary of findings**

As was seen throughout the year, there was not enough time to thoroughly review all the stocks. An agenda having three somewhat controversial stocks to be assessed, and numerous rebuilding analyses, does not allow sufficient time to fully explore all assessments. I felt that the lingcod, and, to a lesser degree, Petrale sole would have benefited from more scrutiny. I agreed with STAR in all issues, except the handling of the canary rockfish assessment. My disagreements will be discussed fully below under procedural topics. I remain unsatisfied that the constitution of this STAR and the performance of the Chair were either consistent with optimal review practices or that the best advice was produced.

As in the August 15 STAR, we were again supplied with a router so that the Panel had both LAN and a local printer. This technology greatly improved communication and tracking of the numerous requests, re-runs, etc. Considering the negligible expense, this mode of support should be available at all STAR Panels.

These stocks were successfully assessed which can be attributed to the talent and dedication of the authors (and their support teams), with a special mention of Rick Methot's efforts with the canary rockfish analysis. As well as the assessments themselves, methods and insights were brought forward which will benefit other assessments and future STAR Panels. As they were so important in the canary rockfish review, procedural issues related to that stock will be given extra emphasis in this report.

## ***Technical topics***

Many of the technical topics itemized below have been seen at previous Panels. The topics dealing with Delta-GLM, meta-analysis, and starting populations for decision tables are more specific to this review.

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

Again, the question of balancing the data components within SS2 is raised. Where the August 15 STAR felt that it was necessary to balance the data, this Panel was less emphatic on the subject. One STAT member felt that subjective criteria, for example gave the survey more weight than strictly statistically defined. A citation was brought forward which also suggests that balancing may not be always required. (Lenth, 2001)

As was done in the previous report, I **recommend** that a technical workshop deal with this issue before the next round of assessments.

### *T.2) Delta-GML (Petrale sole)*

The delta-GLM method used routinely for CPUE data was not successful when applied to the Petrale sole data. The author said that for some reason the software did not work. This is the first time that this problem has been mentioned at a STAR and should be resolved.

### *T.3) Aggregation of data into 'super-years'*

Again with the Petrale sole, the author introduced some super-years which aggregated data from a number of years to get sample sizes up to an arbitrary threshold. Again this is not a common practice and I **recommend** that the implications of this practice be investigated.

### *T.4) Meta-analysis of survey $q$ 's and other parameters*

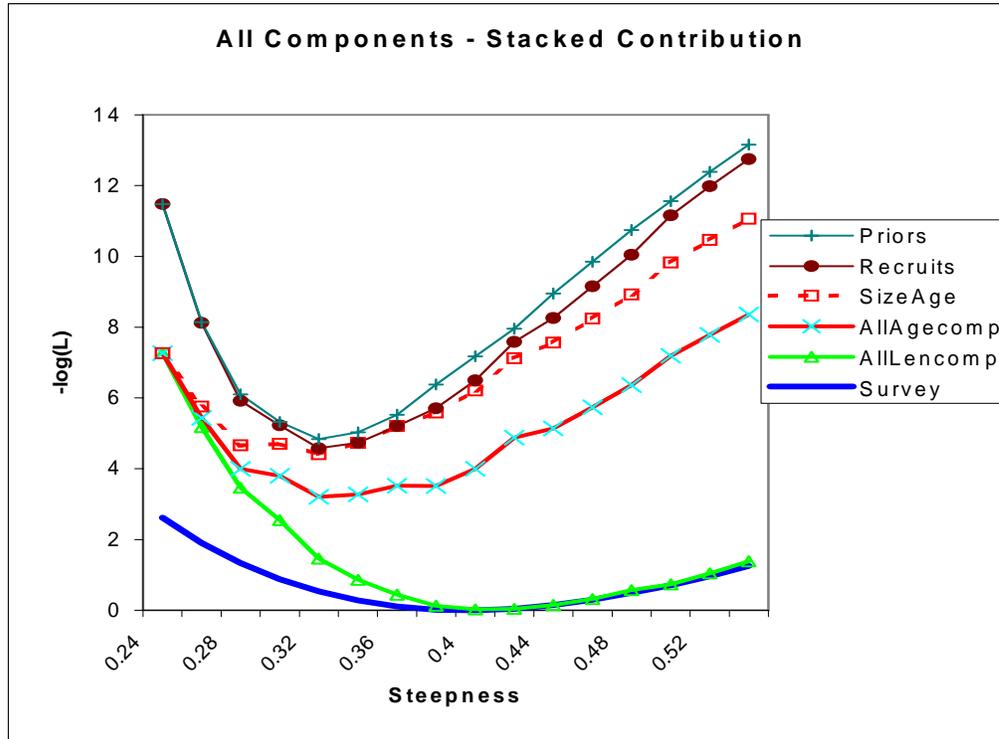
The power of the survey gear,  $q$ , is confounded with the selectivity of the survey. The canary rockfish author suggested a lumped biomass  $q$  which is the ratio of the survey biomass to the modeled biomass would be a more universal metric for meta-analysis. This is a good idea which should receive further testing.

I **recommend** a meta-analysis be carried out which would compare the principle biological parameters, and recruitment events in preparation for the next round of assessments. Also, care will have to be exercised to record the details of the assessments that affect the parameters. Questions to be considered include whether the inputs were balanced, was sigmaR iteratively estimated, which parameters were estimated, etc. Furthermore, during the next round of assessments, the meta-data should be updated during the year as results become available, at least in draft form.

### *T.5) Diminished inclusion of data using non-linear $q$ 's*

In the canary rockfish assessment, an attempt was made to include the juvenile survey as a non-linear index of abundance. This was discussed at the August 15 review of canary rockfish, and that Panel recommended against the inclusion. Part of their criticism was that this survey is localized in California while the bulk of canary rockfish resource is too the north. As was done with widow rockfish, the STAT tried to introduce these data via a power transform. This STAR Panel rejected it. At least part of the problem was that the only error structure in SS2 was log-normal which clearly did not fit these data. It is **recommended** that the use of such data receive further investigation, and that SS2 be expanded to handle other error structures. As was mentioned in my CIE report (Mohn, 2005) on the August 15 STAR, these data can be included in an informative way even if they are not used in fitting the population directly in SS2.

T.6) Diagnostic plots



Contributions to the log-likelihood from canary rockfish (R. Methot, personal communication.)

These plots show the contributions of various data sources to the model and reveal tensions among the various sources. I **recommend** that their usage become a standard diagnostic in draft assessments.

Another useful diagnostic which was presented during the canary rockfish discussions was a comparison of the effective N's between two models. This was done graphically, although a table could also be used.

T.8) *SPR as index of fishing mortality*

In the yelloweye rockfish stock, both growth and maturity has changed over time which confounds F within the SPR calculation. I **recommend** that an integrated F (a possible candidate is the exploitation rate), which is independent of growth and maturity, be considered as the standard metric of fishing intensity.

T.9) *Starting pop's for decision tables*

Throughout the year, there have been problems related to the setting of the starting populations for decision tables. In some cases, this was done by altering  $M$  or  $q$  to get the required starting biomass for alternate states of nature. Of course this has perturbed the age distribution. Two more direct methods were suggested during this STAR. One was to put in a catch series to perturb the population to the desired levels, but this again may affect the age structure in unwanted ways. The second, and probably better, method, is to introduce an artificial survey with a very high weight to perturb the population. A better and cleaner method than the aforementioned ones would be to allow the user to explicitly input the starting populations for

decision projections. I **recommend** that this be considered for future versions of SS2. This and the explicit control of uncertainty would give SS2 projection capabilities more in line with standard projection software.

### *Procedural topics*

The assessment of canary rockfish proved to be a controversial for a number of reasons, of which many were more procedural than technical. Although several of these topics have been touched upon in previous reviews, the magnitude and importance of process was much more pronounced in this STAR.

The STAT and August 15 STAR agreed on the canary rockfish assessment. On technical merits, both the draft and its presentation were one of the stronger assessments I saw this year. Considering the experience and talent of the STAT, this was not a surprising outcome. The SSC's reasons for referral to a second STAR were that canary rockfish fell outside the expected range of key parameters for a rockfish and that the juvenile survey had not been included. This STAR posed the question as to if any of these short comings represent a critical flaw which would cause the assessment and its base case, to be rejected. The first of the key parameters was the  $\sigma_R$  of the Beverton-Holt stock-recruit relationship. In this case, it was smaller than expected, which suggests that the data fit the model better than the average rockfish. Comparisons among results of  $\sigma_R$  are compromised by their dependency on balancing and iterative updating practices. I find it difficult to give much weight to this as a critical flaw. The second parameter in this argument was the survey  $q$ . It was estimated at 0.7 in the base model, and a meta-analysis suggested that the range for rockfish was from 0.1 to 0.5. But this  $q$  is dependent on the models used. For example, a domed partial recruitment will lower the  $q$ .  $h$  was also relatively high, but given the unusually good fit and recalling that canary rockfish is not as data poor as many rockfish, I did not feel that this argument represented a critical flaw. The decision whether to include the juvenile data was discussed at the August 15 STAR, and that Panel recommended against it. This STAR concurred with that decision. Although no critical technical flaw was identified, several members of the Panel were still unable to accept it as the base case model.

#### *P.1) Role of STAR and SSC reviews*

This panel is a mixture of STAR and SSC Panels. STAR has the principal responsibility for, technical review. It contains some independent and more technically oriented members. They have a lack of history which may be detrimental in putting results in context, but at the same time, the members are unencumbered by this same history. As well as providing for an unbiased review, outside Panel members represent a potential infusion of new ideas and approaches. Although I have not seen the SSC in action, the SSC's role as defined in the STAR Panel Terms of Reference seems to have two major components. The first is to serve as a two-way conduit between the STAR and GMT and Council advisory bodies. The second is to "serve as arbitrator to resolve disagreements between the STAT Team, STAR Panel or GMT". The possibility of a STAR-SSC disagreement was not discussed in the terms of reference, and no mechanisms for resolution are offered. I do not know if this is an unprecedented occurrence.

The other STARs this year, and the couple I attended in earlier years, were set up as technical review panels. There were three to four external reviewers, a Chair from the SSC and GMT and GAP representatives. This Panel - I hesitate to call it a STAR - had a very different composition. It had six SSC members and two external reviewers, as well as the GMT and GAP personnel. The SSC had rejected the canary rockfish assessment and then sent it back to an SSC dominated Panel for further review. A more independently composed or more balanced with non-SSC

people Panel would have assured a better third look at the canary rockfish assessment. Another aspect that made canary rockfish different from the other two mop-up stocks was that when they were reviewed and rejected, the STAT team was present. It is my understanding that this was not the case when canary rockfish was sent back; sort of a trial *in abstentio*.

*P.2) Performance of the Chair*

The Chair seems to have more difficulty than most in gaining consensus. Of the seven STARs I attended, only two STARs had to vote to get over deadlocks, and this SSC member chaired both. In the May 9-13 STAR, votes were taken to assign the probability of states of nature for the decision tables. I was critical of this approach then as it was an unweighted average of informed and relatively uninformed opinions and I was not sure what the mean of such a vote meant. In the present context when the distribution of feelings on accepting the canary rockfish base case model were essentially bimodal and although the vote was introduced as a consensus building exercise, I was again critical of the approach but was in the minority. The vote was the relative probability of the base model or the alternate model (base with fewer selectivity parameters) being correct. The results did not establish any consensus but rather just reflected the degree of the schism. The mean of such a vote is in my opinion meaningless, although the distribution is interesting.

Base	Alternate
0.75	0.25
0.70	0.30
0.66	0.33
0.60	0.40
0.55	0.45
0.40	0.6
0.05	0.95
0.00	1.00
Ave 0.46	0.54

The majority of the Panel felt that the base model was more probable, but the two outlier votes strongly in favour of the alternate model dominated the mean. Although the vote was a secret ballot, in subsequent discussion the Chair revealed that he was the 0::100 vote against the base model. I believe that the prime duty of a chair is to (impartially) get the knowledge of the panel collected and distilled into the panel's report. In this case when the Chair held such strong opinions on the assessment, he should have recused himself from the chair at least when canary rockfish was under discussion and probably from the chairing the Panel altogether.

Furthermore, I believe that the vote on models was somewhat confused. The discussion began as a question as to whether or not the uncertainty about the base model was broad enough. I felt there could have been consensus on broadening the uncertainty without the attempt to reject the base model. The Panel then directed the STAT to essentially blend the two models by re-sampling them simultaneously. This in essence defined a new base model in the center of the joint, and, as I recall, non-overlapping, distributions of each model's uncertainty. This pulled the base model into a new place and acted as a bias introduction (or bias correction) rather than a variance redefinition.

From the Terms of Reference, it is clear that it is not necessary to reach consensus. Two quotes from the ToR seem relevant. The first is that "the Panel's decision that an assessment is complete

should be made by consensus. If a Panel cannot reach agreement, then the nature of disagreement must be described in the Panel's report". The other is that "under ideal circumstances, the STAT team and the STAR Panel should strive to reach a mutual consensus on a single base model, but it is essential that uncertainty in the analysis be captured and transmitted to the managers." I agree with these guidelines and repeat a comment from an earlier report that it is a better representation of the uncertainty to tell the clients that consensus could not be met (and why) than to manufacture an artificial consensus.

As well as some dubious science, an unpleasant consequence of this meeting was the uncongenial atmosphere which sometimes surfaced and resulted in time being spent in unproductive and occasionally unprofessional exchanges. Some of the blame at least must be attributed to the Chair.

*P.3) Conflict of objective and subjective criteria*

In my previous two reports, I commented on the difficulty in choosing between subjective and objective criteria as they relate to balancing the model. In this STAR the conflict was more profound as it seemed to determine the choice of most probable model. The base case model from the August 15 STAR I would suggest is the most objective choice, it fit the data best. Although formal model selection criteria were not invoked, the benefit in terms of AIC, justified its choice compared to the slightly simpler alternate model.

A STAT member somewhat whimsically mentioned a source of uncertainty that is not usually considered, "STAR uncertainty". That is, that the two STARs having different memberships, could be expected to end up with different base case models for a given assessment. There is some truth in this observation, but it would be difficult to quantify. I submit, however, that this uncertainty would be minimized if objective criteria were adhered to. Let the data speak. One would also expect that more similarly populated STAR's would minimize STAR uncertainty. As mentioned above, this STAR was very different from most in terms of its membership.

*P.4) Other*

This Panel, and indeed several before it in this cycle, did not adhere to the request/rationale/response format to the degree that I would have liked to see. A more rigid approach benefits both STAT and STAR. Also, and perhaps because of the intense canary discussions, reference to earlier STAR reports and those from this year for the referred stocks was at a lower level than most, and lower than is desirable to keep the discussions in context.

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

As is common with other rockfish, the primary source of uncertainty for these species is the availability of appropriate data. This STAR did make some advances in explicitly examining the contribution of model uncertainty and compared it to process uncertainty. This initiative should be developed further in a workshop environment.

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

The weakness of this Panel compared to those seen earlier this year was in its domination by SSC members. This shifted the emphasis from a technical review to a more subjective investigation. The reviews from the Panel were further compromised by the bias of the Chair.

***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. 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 STAR panels 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 a specific example which was mentioned above, I recommended a parsimonious model for Petrale sole. I also made several technical comments related to capturing and expressing uncertainty for the canary rockfish. Canary rockfish represented a first attempt to incorporate model and process uncertainty.

## **Conclusions/Recommendations**

The bulk of my recommendations and conclusions are in the Description of Review Activities above. The word recommendation has been put into bold to facilitate their location. They have been broken down into technical and procedural classifications and have been dealt with in point form.

I am not familiar with the manner in which the mop-up review has been struck in the past; indeed, this may have been the first one. I would recommend that if a significant number of stocks, say two or more, are to be reviewed at the mop-up review, that the review have a balance of personnel more similar to a usual STAR. The rebuilding analysis did not require technical review and was done rather easily once the desired runs were understood by the various authors. Finally, although I am not aware of how the Chairs are chosen, some care should be given to assuring that they are impartial and not too closely opinionated regarding any of the stocks under review.

## **References**

Dorn, M. W. 2002. Advice on West Coast rockfish harvest rates from Bayesian meta-analysis of stock-recruit relationships. *North American Journal of Fisheries Management* 22: 280-300.

Lenth, R.V. 2001. Some practical guidelines for effective sample size determination. *The American Statistician* 55: 187-193.

Mohn, R. K. 2005. Report to CIE of STAR Panel August 15– 19, 2005 Seattle, WA. Canary rockfish, lingcod, yelloweye rockfish, and yellowtail rockfish. Submitted to the Center for Independent Experts (CIE).

## **Appendix A: Statement of Work for September 26-30, 2005 STAR Panel 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 for the Petrale sole and lingcod resources off the U.S. Pacific coast.

The consultant will participate in the Mop-Up Stock Assessment and Review (STAR) Panel of the Pacific Fishery Management Council (PFMC). The Mop-Up panel will review two stock assessments that were considered during previous STAR panels but were not approved due to time deficiencies. 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 Petrale sole and lingcod stock assessments;
- Initial STAR panel reports for Petrale sole and lingcod;
- Most recent previous stock assessments and STAR panel reports;
- 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 review of the Petrale and lingcod stock assessments, which will be held in Seattle, WA from September 26-30, 2005. The consultant is requested to participate only in the review of the mop-up assessments and not the review of rebuilding analyses. Participant is strongly encouraged to voice all comments during the Mop-Up 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 Mop-Up panel; and
- 6) Complete a final report after the completion of the Mop-Up Panel meeting.
- 7) No later than October 14, 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 Shivlani, via e-mail to [mshivlani@rsmas.miami.edu](mailto:mshivlani@rsmas.miami.edu).

### **Submission and Acceptance of Reviewer’s Report**

The CIE shall provide via e-mail the final reports of the consultants in pdf format to Dr. Lisa L. Desfosse for review by NOAA Fisheries and approval by the COTR, Dr. Stephen K. Brown by October 28, 2005. The COTR shall notify the CIE via e-mail regarding acceptance of the report. Following the COTR’s approval, the CIE shall provide the COTR with pdf versions of the final report with digitally signed cover letters.

## **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 the draft assessments and draft rebuilding analyses and background material was supplied before the Panel convened. Also, an LAN was provided to access any changes that occurred to the draft assessments or documents/presentations that were produced after the CD-ROM was written.

### Draft Assessments and rebuilding analyses:

Hamel, Owen S., 2005. DRAFT. Rebuilding analysis for Pacific Ocean perch.

He, Xi, Andre Punt, Alec D. MacCall and Stephen Ralston. 2005. DRAFT. Rebuilding analysis for widow rackfish in 2005.

Jagiello, Thomas H., and Farron R. Wallace. 2005. DRAFT. Assessment of Lingcod (*Ophiodon elongates*) for the Pacific Fishery Management Council in 2005. (with 4 separate appendices)

Lai, Han-Lin, Melissa A. Haltauch and Andre E. Punt. 2005. DRAFT. Stock assessment of Petrale sole: 2004.

MacCall, Alec D., 2005. DRAFT. Bocaccio rebuilding analysis for 2005.

Methot, Richard, 2005 DRAFT. Updated rebuilding analysis for canary rockfish based on stock assessment in 2005.

Methot, Richard D. and Ian J. Stewart. 2005. DRAFT. Status of the U.S. canary rockfish resource in 2005. (with separate appendix)

Piner, Kevin, 2005. DRAFT. Cowcod rebuilding analysis 2005 – analysis of the progress towards rebuilding August 21, 2005.

Rogers, Jean Beyer, 2005. DRAFT. Rebuilding analysis for darkblotched rockfish for 2005.

Tsou, Tien-Shui and Farron R. Wallace. 2005. DRAFT. Rebuilding analysis for yelloweye rockfish for 2005.

Wallace, Farron R. and Han-Lin Lai. 2005. DRAFT. Status of the yellowtail rockfish in 2004.

Wallace, Farron R. Tien-Shui Tsou and Thomas H. Jagiello. 2005. DRAFT. Status of yelloweye rockfish off the U.S. West Coast in 2005 (*Sebastes ruberrimus*)

### Supporting Documents:

Anon. 2004. Recreational CPUE Statistics Workshop June 29-30 Santa Cruz, California July 26-30, 2004 in Seattle Washington. MS 17pp.

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

Anon 2004. Groundfish stock assessment and review process for 2005-2006. (Terms of Reference - SSC)

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.

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

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