

STOCK ASSESSMENT PLANNING FOR THE 2009-2010 FISHING SEASON

The Council approved Amendment 17 to the Pacific Coast Groundfish Fishery Management Plan as a means of providing for a biennial management cycle, more opportunity for public input, regulatory efficiencies, and various improvements in the management process. In this process there is a year in which assessments are done to inform decisions for the following biennial management cycle, followed by a year for deciding the new groundfish harvest specifications and management measures. This agenda item concerns planning for new groundfish stock assessments that are anticipated to be done next year, which will be used to decide the harvest specifications and management measures for 2009 and 2010 groundfish fisheries.

Last year 23 groundfish stock assessments were conducted, peer-reviewed, and ultimately adopted for deciding 2007 and 2008 harvest specifications and management measures. This was an ambitious undertaking, which stressed the Council and National Marine Fisheries Service (NMFS) groundfish assessment process on many levels. The Council therefore sponsored a workshop to critically review the recent groundfish stock assessment process and invited the participants to explore improvements to this process. The summary minutes of the January 13, 2006 Groundfish Stock Assessment Review Workshop with recommended assessment process improvements are provided in Agenda Item F.2.b, Attachment 1.

Dr. Elizabeth Clarke, Division Director at the NMFS Northwest Fisheries Science Center, will report on proposed stock assessments for the next biennial fishery management cycle and recommended criteria for prioritizing these assessments (Agenda Item F.2.c, Attachment 1).

The Scientific and Statistical Committee (SSC) developed a draft Terms of Reference for the Groundfish Stock Assessment and Review Process for 2007-2008 (Agenda Item F.2.d, Attachment 1), which specifies how the next assessment process should occur and defines the roles and responsibilities of various entities contributing to this process. Dr. Martin Dorn, the SSC's Groundfish Subcommittee chair, will report on this draft Terms of Reference.

The Council is to consider the input from NMFS, the advisory bodies, and the public; as well as the recommendations of the stock assessment review workshop participants before providing a preliminary decision on stock assessment priorities by species, type of assessment (full or update), and assessment review schedule. Additionally, the Council should provide guidance on the draft Terms of Reference for the Groundfish Stock Assessment and Review Process for 2007-2008. There will be a public review opportunity between the March and April Council meetings, with the Council scheduled to take final action on the 2007 and 2008 assessment process at the April meeting.

Council Action:

- 1. Adopt for Public Review the Preliminary Terms of Reference for the Groundfish Stock Assessment and Review Process For 2007-2008.**
- 2. Adopt for Public Review the List of Stocks To Be Assessed in 2007.**
- 3. Adopt for Public Review the 2007 Stock Assessment Review Schedule.**

Reference Materials:

1. Agenda Item F.2.b, Attachment 1: Draft Summary Minutes of the January 13, 2006 Groundfish Stock Assessment Review Workshop.
2. Agenda Item F.2.c, NWFSC Report: Preliminary Stock Assessment Priorities for 2007.
3. Agenda Item F.2.d, Attachment 1: Draft Terms of Reference for the Groundfish Stock Assessment and Review Process for 2007-2008.

Agenda Order:

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| a. Agenda Item Overview | John DeVore |
| b. Report from the Stock Assessment Process Review Workshop | Don McIsaac |
| c. Stock Assessment Options | Elizabeth Clarke |
| d. Preliminary Stock Assessment Terms of Reference | Martin Dorn |
| e. Reports and Comments of Advisory Bodies | |
| f. Public Comment | |
| g. Council Action: Adopt for Public Review the Preliminary Terms of Reference, List of Stocks to be Assessed, and Stock Assessment Review Schedule | |

PFMC
02/16/06

DRAFT SUMMARY MINUTES
Groundfish Stock Assessment Review Workshop

Pacific Fishery Management Council
Sheraton Portland Airport Hotel
Columbian A Room
8235 NE Airport Way
Portland, OR 97220
503-281-2500

January 13, 2006

FRIDAY, JANUARY 13, 2006 – 8 A.M.

Attendees:

Dr. Elizabeth Clarke, National Marine Fisheries Service Northwest Fisheries Science Center
Dr. Martin Dorn, National Marine Fisheries Service Alaska Fisheries Science Center, Scientific and Statistical Committee
Dr. Steve Ralston, National Marine Fisheries Service Southwest Fisheries Science Center, Scientific and Statistical Committee
Dr. Alec MacCall, National Marine Fisheries Service Southwest Fisheries Science Center
Dr. Jim Hastie, National Marine Fisheries Service Northwest Fisheries Science Center
Dr. David Sampson, Oregon State University, Scientific and Statistical Committee
Dr. Richard Methot, National Marine Fisheries Service
Mr. Jason Cope, University of Washington
Dr. Mark Maunder, International Tropical Tuna Commission, Quantitative Resource Assessment LLC
Mr. Ian Stewart, National Marine Fisheries Service Northwest Fisheries Science Center
Dr. Owen Hamel, National Marine Fisheries Service Northwest Fisheries Science Center, Scientific and Statistical Committee
Dr. Robert Mohn, Department of Fisheries and Oceans, Center of Independent Experts
Mr. Tom Jagielo, Washington Department of Fish and Wildlife, Scientific and Statistical Committee
Mr. Guy Fleischer, National Marine Fisheries Service Northwest Fisheries Science Center
Ms. Meisha Key, California Department of Fish and Game
Ms. Michele Culver, Washington Department of Fish and Wildlife, Groundfish Management Team
Mr. Brian Culver, Washington Department of Fish and Wildlife, Groundfish Management Team
Mr. Mark Saelens, Oregon Department of Fish and Wildlife, Groundfish Management Team
Dr. Steve Berkeley, University of California Santa Cruz, Scientific and Statistical Committee
Dr. Michael Schirripa, National Marine Fisheries Service Northwest Fisheries Science Center
Mr. Tom Ghio, Groundfish Advisory SubPanel
Dr. John Field, National Marine Fisheries Service Southwest Fisheries Science Center, Groundfish Management Team
Mr. Curt Melcher, Oregon Department of Fish and Wildlife
Mr. Rishi Sharma, Columbia River Intertribal Fish Commission
Mr. Henry Yuen, United States Fish and Wildlife Service

Mr. Steve Joner, Makah Tribe
Mr. Hap Leon, Makah Tribe
Mr. Rob Jones, Northwest Indian Fish Commission, Groundfish Management Team
Mr. Kelly Barnett, Independent Fish Filleter, Bay City, Oregon
Ms. Stacey Miller, National Marine Fisheries Service Northwest Fisheries Science Center
Mr. Pete Leipzig, Fishermen's Marketing Association
Mr. Brad Pettinger, Oregon Trawl Commission
Mr. Dan Waldeck, Pacific Whiting Conservation Cooperative
Mr. Steve Theberge, Oregon Sea Grant
Dr. Donald McIsaac, Pacific Fishery Management Council
Mr. Mike Burner, Pacific Fishery Management Council
Mr. John DeVore, Pacific Fishery Management Council

A. Administrative Matters

1. Roll Call, Introductions, Announcements, etc.

Dr. McIsaac called the meeting to order at 8:20 a.m. A round of introductions was done.

2. Opening Remarks and Agenda Overview

Mr. DeVore reviewed the agenda. He explained these minutes would help inform the Council process to plan the next suite of stock assessments and the review of those new stock assessments. The Council will consider recommendations from the workshop participants at the March Council meeting. Final adoption of the next round of assessments; new Terms of Reference for stock assessments and assessment reviews; new Terms of Reference for Rebuilding Analyses; and all the other elements of the Council assessment process will occur at the April Council meeting.

B. Perspectives on 2005 Stock Assessment Process

1. Groundfish Management Team (GMT) Perspective

Mr. Saelens provided the GMT perspective. The general thought was 23 assessments were too many done in too brief a period. About 10-15 assessments per cycle seemed more reasonable. The GMT also believed there were too many assessments reviewed per Stock Assessment Review (STAR) panel. In many instances, a base model was not decided until late in the week. It might help to have the most contentious and/or complicated assessments scheduled early in the process. Every effort was made to get the information out to the public as early as possible. The GMT recommends a debriefing by the Stock Assessment Team (STAT) after a STAR panel recommends an assessment. The GMT wants more specific advice from STAR panels and the Scientific and Statistical Committee (SSC) on how the science should be applied to management decision-making. There was also concern that not all assessments had the requisite management estimates and other details mandated by the Terms of Reference. This includes lack of timely delivery of STAR panel reports when an assessment is first considered. Most of the executive summaries in assessments were clear and concise, but improvements can be made, particularly with respect to what models and estimates should be used to formulate management advice. The GMT recommends a management trigger to decide which assessments should be done next. The importance to management or risks to stocks of overexploitation are example triggers for making

this decision. The GMT agrees early decision-making on the next cycle or more of assessments should be done for contributors to prepare data used in assessments. The GMT recommends the next process be set up to get adequate interactions between STAT teams and Council advisors. Dr. Dorn asked if it would help if STAR Panel chairs attended a GMT meeting. Mr. Saelens said that would help, but it was hard with filled agendas to carve out that time. Perhaps some triage to get such interactions for more complicated or contentious assessments is the answer. Need to do a better job planning sampling priorities for use in assessments. This was a time-honored process that has slipped in recent years. The GMT recommends a greater amount of biological sampling needs to occur in the at-sea observer program. The GMT wants a greater role in the STAR panel process. The GMT could help set a probable range of optimum yields (OYs) earlier in the assessment process (i.e., during the STAR panel). The GMT is concerned with the range of methods used to account for total mortality in assessments. A more consistent approach is requested. Ms. Culver expressed the opinion that the number of assessments done last year (23) was not necessarily too many, if the process was changed to accommodate that many (i.e., fewer assessments reviewed per STAR panel). The GMT wants to set up future processes to allow new stocks to be assessed. All overfished species are assessed each cycle and other important stocks are frequently assessed as well, which limits the number of new assessments. The plan needs to incorporate the quality of assessment data as well as risks to the stock when deciding which stocks get assessed. Mr. Culver said better planning on the data going into assessments would benefit the process. He cited the problems with the petrale sole assessment where the STAT Team was not aware of critical data gaps until the STAR panel. Contributing agencies need to tune in to the pre-assessment data workshop. Dr. Clarke commented that the observer program is collecting some ageing data. They are trying to balance the amount of time dedicated to at-sea catch and biological sampling. Dr. Mohn said he was surprised at the lack of risk plots in the Council's assessment process. Mr. Saelens said he thought that should be the fundamental structure of an assessment decision-table. (Currently, decision tables are used to address assessment modeling uncertainty) Perhaps both treatments are needed: one decision table to depict assessment uncertainty and one table depicting risk of alternative mortality schedules using the most plausible base model in the assessment.

2. Groundfish Advisory SubPanel (GAP) Perspective

Mr. Ghio provided the GAP perspective. Originally, STAR panels were set up to solicit industry input and instill industry confidence in the assessment process. Now, the GAP representative to a STAR panel has a much diluted role. There is also a critical need to have a STAT team member or the STAR panel chair interact with the GAP to answer questions on assessments. The GAP needs a better understanding of the assessment details to make informed recommendations on OYs. In general, he agreed with the comments and recommendations of the GMT as expressed by Mr. Saelens. Mr. Ghio thought one of the priorities in the assessment decision-making process is to assess the more constraining and/or valuable species more frequently. STAR panels spent the majority of time on modeling approaches rather than the quality of input data or the assessment result.

3. SSC Perspective

Dr. Dorn provided the SSC perspective and requested other SSC members in attendance to chime in. The SSC were the architects in this process and did warn the quantity of assessments would compromise the quality. This did occur to some degree; however, the overall quality of assessments given the magnitude of the task is laudable. Now we should think about how to make the process more efficient by doing fewer things better. Shifting more stock assessments into an update mode is one way to achieve this goal. Especially now that the Stock Synthesis 2 (SS2) model is tried and true, there should be more stability in the next cycle. Thoughtful planning on which new assessments should be done will help keep future problems to a minimum. Dr. Ralston agreed one of the major changes to the process last year was to have SSC members chair STAR panels. This provided continuity despite the extra workload. This was a good idea and should be continued. Dr. Dorn thought one problem was the STAR chair became too wedded to the STAR panel recommendations. There should be more sensitivity to outside views of SSC members and other advisors by the STAR chairs after a STAR panel has finished their business. Mr. Jagielo emphasized the problem with the process last year was everyone was working in a new modeling environment (SS2). However, he gave kudos to Dr. Methot for helping everyone understand the complexities of SS2. Dr. Berkeley recommended some greater thought in what kinds of data should be incorporated in an assessment. More consideration of the age structure of the spawning stock and genetic structures should be incorporated more thoroughly in assessments. Ecosystem-based principles needed to be considered as well. More complex spatial management issues need to be considered more thoroughly. Perhaps trophic relationships should be more thoroughly considered as well. One possible improvement might be to do multi-species assessments instead of single species assessments. The scientific community is currently grappling with these issues. Dr. Mohn thought some of the Council's data issues compromise current single-stock assessments. There should be more thought on the biological data sampling and some of the shortcomings of current data (i.e., lack of ageing structures, etc.). Dr. MacCall thought these issues should be addressed during the assessment "off-year". Dr. Field said North Pacific scientists are starting to incorporate food web/trophic relationships in assessment and cited recent pollock assessments. Dr. Berkeley said spatial considerations are critical to avoid localized depletion and other problems. Dr. Dorn said there is a current mandate to evaluate ecological, spatial issues. There is a problem with the lack of informative data that are useful. Dr. Clarke said the Council also needs to plan on how they use ecosystem-based information in their management decisions. Dr. Ralston said there is currently tension between doing updates and incorporating ecosystem considerations in assessment. Such new assessments require more thought and review and will compromise the number of assessments that can be done in a cycle. Dr. Hamel said it will take time to decide how such new information will be incorporated in assessment and used in management decision-making.

4. Northwest Fisheries Science Center (NWFSC) Perspective

Dr. Clarke provided the NMFS perspective and had a Powerpoint presentation to emphasize her points. She also handed out a summary of reviewers' comments to the 2005 STAR process. She reviewed the previous process from the data workshop through the variety of STAR panels. Each STAR panel was chaired by an SSC member and the number of panel members was N (number of assessments) plus 1. There was a single CIE reviewer (Dr. Mohn) who attended each STAR panel except for the hake STAR panel. SS2 was used in most cases. The NWFSC requested summary items for the executive summary of each assessment (new mandate). The NWFSC requested assessment authors list all their intended input data after the Data Workshop. This was done to prepare data contributors, but was only partially successful. Another new item

was the “sweep-up” or “mop-up” STAR panel, which was useful (3 assessments were referred to this panel).

Some shortcomings to the process: Several assessments were incomplete coming into the STAR panel or were distributed later than two weeks prior to the STAR panel. There was not enough participation in the Data Workshop. This was a new workshop and more people are expected to tune in to the next workshop. There was not enough utilization of assessment authors’ list of data needs. There were too many assessments done last year and too many assessments reviewed at each panel. There were no species-specific data workshops prior to STAR panels. There were no species-specific presentations to the Council family after the STAR panel.

We need to collectively decide the goal of the assessment process. We should be explicit that the goal is not to assess every groundfish species managed under the FMP. This is neither attainable nor critical to the process. She underscored the value of Stacey Miller’s coordination efforts. She solicited comments from the groups on how to make the logistics more efficient. Dr. Ralston requested more dialogue between the NWFSC and the Southwest Fisheries Science Center (SWFSC). Dr. Clarke said the SSC was the group the NWFSC coordinated with. Dr. Ralston said the SWFSC is doing more planning regarding sampling and assessments. Dr. Clarke agreed more coordination with the SWFSC was a good idea. Dr. Methot said one of the overarching objectives implied in the law and policy is to assess all species. Perhaps a multi-species approach should be more carefully considered. What do we need to say to defer a species’ assessment? What is the probability we are avoiding overfishing in the current and future management regime if an assessment is not done? These are important questions that need to be answered in the process. Dr. MacCall said there seemed to be many entities involved that appeared to be in charge (NWFSC, SSC, Council, and Council staff). Dr. Clarke said the Council is in charge of this process according to FACA rules. The Council delegates science advice and direction to the SSC and logistic support to the NWFSC. Her perspective is that many entities chipped in to help move the process along. Dr. MacCall requested more formal direction from the Council. Dr. Methot said, while ownership of the process is with the Council, there is the issue of corporate ownership of the assessment itself. NMFS relies on the Council review process to decide whether an assessment is the best available science despite the fact that the agency does an independent review of the quality of the assessment and the review. Dr. Clarke said the NWFSC works with the Council to ensure the Council science review process satisfies OMB rules and policies. For any assessment coming from the NWFSC, she signs a letter validating that it complies with the OMB circular. Dr. Dorn said the modeling environment of SS2 is now locked into the Council process. Perhaps different types of assessments and assessment models should be considered. A lot of data is left unexamined. Dr. Methot said there is nothing in the Terms of Reference mandating SS2. Dr. Dorn stated implicit in the current process is the need to fit the data to an assessment model. Returning to Dr. Methot’s recommendation to address all FMP species is to use what you do know in a NEPA document or a multi-species assessment to decide management risk. For instance, identify species with de minimus exploitation. Dr. Schirripa thought that to do this, more flexible rules/guidelines are needed for determining if a stock is overfished or experiencing overfishing. Dr. Methot said there are a variety of processes used nationwide to decide management risk. It is better to gain your flexibility in methods for determining stock status and risk rather than changing the rules.

5. Council Perspective

Dr. McIsaac polled Council members on their perspectives. He talked with Frank Warrens, Don Hansen, Dave Ortmann, and Bob Alverson; and also received emails from Patty Burke, Rod Moore, and Marija Vojkovich. General comments: 23 assessments were too many (with current resources), there were too many full assessments, the roles of GAP and GMT representatives on STAR panels needs to be formalized, 4 assessments per STAR panel were too many and 3 may be pushing it, there was not enough debriefing on individual assessments (many Council members were not comfortable with the advice, or lack of advice, given), more specific management advice is needed (e.g., how should the kelp greenling assessment be used for management?), consistent and useful decision tables are needed, timely delivery of stock assessments and STAR reports was lacking in some instances, more resources/funding for this process is needed, guidelines are needed to prioritize assessments, and many Council member gave their compliments for achieving such an ambitious goal of doing 23 assessments.

Mr. Saelens complimented staff for their roles in the process. He encouraged assessment authors to date-stamp all their documents to maintain version control.

C. Improving the Stock Assessment Process

1. Pre-Assessment Planning
 - a. What Worked and What Didn't in 2004-2005
 - b. Recommended Improvements for 2006-2007

Dr. Clarke said one consistent recommendation from reviewers was better reviews depended on scheduling fewer assessment reviews per STAR panel. Addressing this requires either fewer assessments be done, more reviewers dedicated to the process, or fewer reviewers per panel. Most reviewers thought 2 assessments per panel was ideal for a 1-week panel with the potential of adding a third assessment if they are not too complicated. Some reviewers and assessment authors stated their workload was too high. Dr. Sampson said incorporating the new SS2 model during 2005 added to the workload because of the steep learning curve. Dr. Clarke said another factor is the delivery of assessment input data. For instance, trawl survey data from the previous summer and fall are delivered in February. Some NWFSC recommendations: try to schedule only 2 assessments per panel, plan for a maximum of 8-10 full assessments, not all assessments need to be done each cycle, clear criteria should be developed for determining priorities for full assessments, updates should be reviewed by the SSC only. Dr. Dorn thought a separate meeting of the SSC Groundfish Subcommittee to review all updated assessments might be advisable. The review itself should be expedited and could be done early in the process. Another idea is to review 2 full assessments plus 1 updated assessment per STAR panel. Dr. Mohn thought that process improvement would work; however, there was a problem with some "updated" assessments coming in that were not really updates (i.e., yelloweye). Dr. Mohn recommended reviewing "benchmark" data-poor assessments early in the process. Much can be learned reviewing such assessments that can be applied in later assessment reviews. Mr. Ghio said a disciplined approach in the assessment review is needed to ensure assessments comply with the Terms of Reference. Mr. Burner said scheduling an SSC review of updated assessments was and could continue to be problematic given SSC members' heavy workload. Mr. Saelens thought updated assessments could be done and reviewed in the off-year. Dr. McIsaac said if the intent is to use these assessments in the next management cycle, then it is hard to defend that decision-making uses the best available science if a reviewed assessment is sitting on the shelf. The potential benefits of multi-year management are eroded in this case and the management regime

is vulnerable to legal challenge. Ms. Culver asked if there was a requirement to do a full assessment of overfished stocks every cycle. The mandate is to review rebuilding plans at least once every other year and a full assessment, or even an updated assessment, is not necessary. A data review may be sufficient to decide whether catches are staying within OYs; however, it may be advisable to at least do an updated assessment every cycle for a stock under rebuilding. Dr. McIsaac encouraged brainstorming on a policy for this and let the Council decide a policy later after receiving recommendations. Dr. MacCall recommended putting into the Terms of Reference a requirement for STAR panels to specify whether an assessment is sufficiently developed to do an update in the next cycle.

Dr. Clarke discussed recommended criteria for determining assessment priorities and whether they should be full assessments for the next cycle. Criteria include assessments not currently done using SS2, new stock assessments, etc. for deciding whether an assessment should be a full one. Dr. Hastie said NMFS Headquarters has also determined if an assessment hasn't been done within five years, it is considered out of date.

Dr. Ralston recommended pre-assessment planning within NMFS between the NWFSC and the SWFSC before a recommendation is brought forward into the Council process. Data needs and resource capacity needs to be internally deliberated to decide what can be done. Dr. Clarke thought the first step is to develop criteria for deciding the list of stocks that should be assessed.

Dr. Clarke recommended a pre-STAR data workshop to prepare for assessments. Dr. Dorn thought it would be more useful if there were multiple single-species workshops to bring the right people into the process and deliberate assessment data needs in more detail. Mr. Culver recommended a sampling meeting earlier in the process to prioritize preparation of assessment data. Dr. Methot thought workshops that are subject oriented, such as a trawl survey workshop, would be most efficient. Such workshops would be useful for a host of stock assessments.

A discussion of how to balance the assessment workload with a mix of full and updated assessments ensued. There is a dynamic tension between allowing creativity and innovation in an assessment and engineering a stable process by planning for updated assessments that do not need such a comprehensive review as a full assessment. With the limited resources available, this will remain a conflict.

Dr. Sampson asked if we need a modeling workshop for the next cycle. There were other ideas for workshops beyond those already recommended for this year. Issues, such as how to address model uncertainty, require a lot of careful planning and preparation. Workshops are expensive and need to be carefully planned and prioritized. Some workshops are generic (i.e., the data workshop) and others are specific to one issue (i.e., the contemplated juvenile survey workshop).

2. Stock Assessment Reviews

- a. What Worked and What Didn't in 2004-2005
- b. Recommended Improvements for 2006-2007

Dr. Mohn provided his perspectives on the 2005 STAR process. He thought the process would benefit from more pre-review vetting of data issues. Assessments need more documentation of input data and better descriptions of methodologies. In some cases, which were rare but serious, pre-review assessment drafts were incomplete. In his opinion, there was inadequate contemplation of data (and this was more common). More interaction with fishermen would benefit the sensibility and quality of input data. There was too little context of why assessments

were done the way they were. The previous STAR reports with lists of recommended improvements were helpful, but needs to be emphasized. There was too little synthesis of data in pre-review assessments. Requests for re-runs/alternate model runs varied from panel to panel and were not always clearly articulated to STAT Teams – this could be improved. The STAR review schedule was too ambitious- review fewer assessments to improve quality of assessment reviews. Updates should stay as updates- inject more discipline in the review process. The roles of STAT Teams vs. STAR members created a natural tension that was hard for STAR chairs to fix. The SSC, having such a strong role in the STAR process, was mostly positive despite their lack of independence in the process. The choice of a chair for the STAR panel is perhaps more critical than reviewers because there are a number (3-4) of reviewers to help one another, but the chair has no back-up. Communication in the process could be improved. Not all STAT teams attended all the Council, SSC and other meetings that were integral in the process. Treatment of uncertainty varied greatly from panel to panel. Determining model plausibility was done in a somewhat ad hoc fashion. More thought could be given to this. One recommendation might be to do a real-time meta summary of important parameters, such as M (natural mortality rate), h (stock-recruitment steepness), and q (catchability), as well as the recruitment time series by species. This could help identify outliers and potentially aid in model selection. Synthesizing estimated vs. assumed parameters and listing/plotting these parameters would be informative. Another recommendation is to plot the difference in model results pre- and post-STAR. There are competing philosophies on whether the STAT Team prepares the draft assessment to a minimal level anticipating that the STAR panel will change it or defends a more complete draft assessment at a STAR panel. Dr. Clarke said that during 2005 UW and NMFS staff did a lot of vetting of assessments prior to STAR panel review and that helped improve the quality of pre-STAR draft assessments.

Logistic improvements: provide a LAN router/printer at each STAR panel, more attendance of STAT members at more STAR panels, off-season benchmark assessments and reviews could help set the stage for the next round of assessments and reviews (benchmark assessments can be characterized as a prototype and can be done by committee), and a second STAR reviewer who goes to all STAR panels to provide more continuity. There should be more attention paid to the use of priors in assessments. A workshop on the use of CPUE data may be particularly useful in this next assessment process. Dr. Clarke remarked that more and better input from the GAP and GMT on this subject would be useful. Dr. Mohn said the non-linearity of CPUE trends from various surveys is a problem to resolve. Dr. Maunder thought it could be helpful to appoint a data expert on a particular dataset used as an index (i.e., Dr. MacCall's expertise in using recreational CPUE). Dr. MacCall said the process evolved from more ad hoc assessments, which led to the process of dismissing data wholesale, as is the current practice. He disagreed with the process of limiting input data. Others disagreed and championed thoughtful analysis of data before deciding whether they were useful for an assessment. Dr. Mohn said the important distinction is whether the data are used to inform the assessment versus their use in tuning the assessment. Data used to tune an assessment need to be carefully discriminated. Dr. Dorn said part of this discrimination is the quality of the analysis used to create the index. Dr. McIsaac asked about the comment that some assessments were incomplete coming into the STAR panels last year. He wanted to know how frequently that occurred and Dr. Mohn said it was rare. Dr. Clarke said about 25% of the assessments were delivered late (not within two weeks prior to the STAR panel).

Dr. Sampson gave the SSC's perspective on the review process, although he said he was not able to poll SSC members and these comments should be considered his own. He thought lessons learned at the first STAR panel for flatfish were useful in subsequent panels. He recommended

capturing and disseminating these lessons. There needs to be better follow-up on recommendations for improving assessments from previous STAR panels. One problem that arose last year is that data issues would crop up during a STAR panel that led to snap decisions. There was inconsistent treatment of common issues, such as treatment of residuals, effective sample sizes, outliers, spatial structure, etc. He recommended that assessment scientists should not serve on more than one of the STATs being reviewed during a STAR panel. Dr. Clarke said, while they know the lead authors for an assessment ahead of time, they were not informed of all STAT team members prior to setting up the STAR panel. More interaction with industry members early in the process prior to a STAR panel would be helpful. Dr. Sampson thought the process loses some of its independence by having SSC members serving on STAT teams, STAR panels, and on the SSC during the final review phase. Dr. Ralston said part of the issue is deciding if a STAR panel needs to be an independent review body or a peer review body. Dr. Sampson said, while it may be appropriate to have SSC members chair STAR panels, there is a cost to the independence of the SSC members in their respective roles. Dr. Ralston pointed out that, in one circumstance, the SSC rejected an assessment (and sent it to the mop-up STAR panel) after the first STAR panel recommended it. This indicates the SSC maintained some level of independence. Dr. McIsaac asked how often SSC members voted within the SSC on their own assessment and was told those members recused themselves from the vote. Dr. Dorn thought this should be formalized in the Terms of Reference and that these members should not write the SSC report on their own assessments. Dr. MacCall said we should not make SSC members totally independent of the review process since the process would lose that expertise. Mr. Ghio asked if the SSC review step should be a two-meeting process and was told there was not enough time in the process to do this (at least there was not enough time in last year's process). Ms. Culver thought the final review step could be a joint SSC-GMT deliberation.

Dr. Clarke provided the NMFS perspective and recommended improvements regarding the review process. She recommended distributing STAR panels coastwide as was done last year. There should be N plus one reviewers at a STAR panel with a maximum of three reviewers. There should be at least one reviewer independent of NMFS and the process at each STAR panel (CIE reviewers are not available for all panels). Dr. Ralston pointed out that some NMFS personnel may be independent of the process and should be considered in the STAR process as an independent reviewer. Dr. Sampson thought it was problematic to limit the panel to three reviewers as a maximum. SSC members should continue to serve as STAR chairs, but should rotate through the stock reviews. There should be strict adherence to Terms of Reference and update criteria. Should there be a rapporteur assigned for all STAR panels in a cycle? Rapporteurs should produce real-time assessment summary tables, which should be produced at each panel to track changes in the assessment as the review progresses. The rapporteur would also track requests by the STAR panel and the responses made by the STAT. The rapporteur duties should not fall to the chair or the CIE reviewer. These notes and a summary of changes to the assessment could be posted to a web site so other STAT teams and STAR panel members can better understand how each panel addressed review issues. Dr. Mohn did not think it was too onerous to be a rapporteur at a STAR panel and at the same time effectively critique the assessment. Dr. Hastie thought STAR panel members can share rapporteur duties as is current practice.

Assessments need to be complete coming into a STAR panel. These draft assessments need to be internally reviewed prior to delivery to a STAR panel (if not just to make them more readable). Decision tables should be incorporated in pre-STAR drafts and should be standardized. Executive summaries should be complete and included in the pre-STAR draft. There needs to be a standard minimum set of diagnostics produced for each model run. Each

assessment needs an explicit section responding to recommendations for improvement from previous STAR panels. Dr. Sampson pointed out this used to be in the Terms of Reference but was dropped recently. A review of available information from Canadian and Alaska assessments should be included in each assessment. Finally, maps showing the geographic scope of the assessment need to be included.

Mr. Ghio provided some of the GAP and industry perspective in the assessment review process. There is general distrust by industry of the process. To rectify this, industry needs to have direct input in the process prior to the STAR panel. Dr. Clarke said the intent of listing data to be used in each assessment early in the process was to solicit industry feedback, but the approach was not effective. Ms. Key said she reached out to industry to prepare for the gopher rockfish assessment and thought that helped the quality of her assessment. Individual authors approached this type of feedback differently. Dr. Clarke thought this might be difficult to formalize in the Terms of Reference. Dr. MacCall recommended that GMT and GAP members should be formally recognized and incorporated in the STAR process. Dr. Sampson thought this would work under an N + 3 process, but not an N + 1 process. Dr. Sampson thought coordination with the port liaison project (or other source of funding for fishermen) would benefit assessments by providing ideas for data inputs that might not be obvious to an assessment author. Dr. Hastie said older versions of the pre-assessment workshop were more hands-on with lots of industry input. This would be a good way to reintegrate industry early in the assessment planning process.

3. Scientific and Statistical Committee Reviews
 - a. What Worked and What Didn't in 2004-2005
 - b. Recommended Improvements for 2006-2007

Dr. Dorn provided a review of last year's SSC review process. All assessments were reviewed in two SSC meetings with each STAR chair leading the discussion on the assessments reviewed at their panel. The chief concerns were having too many assessments in the cycle and too many assessments reviewed at each panel, which compromised the quality of the review. This also compromised the SSC review step. For example, new assessment elements, such as the environmental index in the sablefish assessment and the canary assessment, did not receive adequate attention by the SSC at their meetings. The SSC needs to be more sensitive to STAR chairs defending the STAR reviews they chaired. Dr. Sampson thought it might be better if an SSC member who did not chair a particular STAR panel lead the discussion in the SSC meeting. Dr. Clarke wanted a better definition of the SSC's role in the review process. Drs. Sampson and Dorn thought the SSC's role should be review of the assessment, not reviewing the STAR panel report. Dr. McIsaac said the SSC's role is to recommend the best available science to the Council and needs to critically review all aspects of an assessment. Mr. Burner said the SSC's approach at their review last year was limited by the time they could allot to the review. He was not sure an SSC member could find the time to review and report on an assessment if that SSC member had not been present at the assessment's STAR review. Drs. Sampson and Ralston thought the extra cost of an SSC's member time is real, but independence of the SSC could be maintained if the SSC member reporting to the SSC on an assessment was not the person who had chaired the STAR for that assessment. Dr. Methot wondered if there was any opportunity to address SSC concerns during an SSC meeting and Dr. Hamel said the mechanism for further modeling to resolve issues is to send the assessment to a mop-up panel. Otherwise, the SSC decision is either approve or reject the assessment. Mr. Ghio reiterated the need to have the GAP and GMT review a post-STAR assessment as well. Dr. Ralston thought a good mechanism would be to have the independent SSC reviewer solicit GAP and GMT feedback during their

review. Dr. Dorn said, in the past, there were formal presentations of assessment results to the Council family. Such a debriefing was beneficial. Dr. Field thought subcommittees from the GMT and GAP could attend these debriefings to manage workload. Mr. Ghio said the main issue with the GAP is erosion of confidence in the assessment process due to lack of interaction with STAT teams and a loss of institutional knowledge within the GAP itself. Staggering the final Council review step across more meetings would help, as would reducing the number of assessments done. Mr. DeVore explained one GMT recommendation was to improve SSC advice on how assessment results should be used. Some of the SSC statements were somewhat vague in that regard. Dr. Hastie said another aspect of GMT deliberations on recommending OYs based on a new assessment are that there is reticence to recommend alternative model results or recommending an OY alternative for analysis that is above the acceptable biological catch (ABC) from the base model in the assessment. Dr. Field said there was discomfort in the GMT recommending specifications from alternative models since there was thought these models did not represent the best available science. Dr. Ralston offered an approach where one decision table is prepared to address model uncertainty and another decision table is prepared to address statistical uncertainty within the base model. Dr. Methot thought the approach taken in the most recent canary assessment, blending the uncertainty of equally plausible models, to be fertile ground for an approach. Alternative models that are not considered as plausible could also be blended with a weighted approach based on probability distributions. If this approach was conceptually accepted, the modeling details could be worked out.

Dr. MacCall thought some consideration to trade assessment authorship with outside entities might help. That is, west coast assessment scientists could do some east coast assessments and vice versa.

D. Terms of Reference

1. Review the “Terms of Reference for Groundfish Stock Assessment and Review Process for 2005-2006” and Provide Recommended Edits
2. Review the “Terms of Reference for Groundfish Rebuilding Analyses” and Provide Recommended Edits

The workshop participants discussed the process for modifying the Terms of Reference. This will be done at the March and April Council meetings and will be informed by advice from participants at this workshop and other advisors to the Council. The Council will adopt a final Terms of Reference in April.

Dr. Hastie asked if the Terms of Reference would be cycle-specific or more generic to the process. Dr. Ralston said these documents have evolved over time and would likely continue to change. Dr. Clarke asked how comments need to be provided- redline/strikeout or general comments? Dr. Ralston said the former vehicle is more specific and clear. Dr. Mohn thought the existing Terms of Reference for stock assessments was quite useful and the rebuilding Terms of Reference less so.

Dr. Ralston reviewed the elements of the current stock assessment Terms of Reference. The roles and responsibilities of various entities are explained followed by stock assessment priorities, terms for STAR panels and their meetings, suggested template for STAR reports, and terms for STAT teams. The appendices go into further detail on what needs to be included in assessments and STAR reports.

Dr. McIsaac asked what the penalty should be if Terms of Reference are violated? Some items should be truly mandated, such as timely delivery of STAR reports (according to some participants), where failure to provide these elements causes the assessment to be rejected. Other omissions are less egregious and should not result in such a harsh penalty. Dr. Ralston thought each violation should be judged specifically to each case- it's hard to draw lines in the sand. Dr. Methot said there were numerous instances of late delivery of critical assessment data. This compromised the timely delivery of assessments and the following STAR and Council process. He recommended a firewall on considering such late data. Ms. Key said another issue was the evolution of the SS2 model during the process. Many stated that many of the SS2 changes were made at the request of assessment scientists to Dr. Methot to fix certain aspects of the model. Dr. Clarke said the mop-up panel should be used to fix assessment problems identified during the review process, not to incorporate data arriving late in the process. Dr. McIsaac said it will be hard to list all possible offenses and requisite penalties in a Terms of Reference, but a process where rules are established regarding how and who decides if an omission is critical enough to reject an assessment could be considered for the Terms of Reference. Dr. Clarke said many of the fixes are on the front end with better data and modeling workshops and more time for assessment authors to do their work. While this won't solve all the problems encountered with late data delivery, it will help. Dr. MacCall said a schedule of deliverables would be helpful.

Dr. Ralston then reviewed the rebuilding analyses Terms of Reference. He agreed with Dr. Mohn's assessment that this Terms of Reference was not as useful. This Terms of Reference needs to incorporate an evaluation of existing rebuilding plans and revision rules if rebuilding progress is lagging or ahead of schedule. An ad hoc process was used in 2005 to have additional rebuilding runs done to evaluate rebuilding progress. Given uncertain outcomes in current litigation, Magnuson-Stevens Act (MSA) reauthorization, and potential changes to National Standard 1 (NS1) guidelines, it may not be useful to modify this Terms of Reference by April.

Dr. Clarke encouraged folks to send a list of candidate species for the next cycle to her. She would compile this list for the March briefing book. Dr. Hastie encouraged folks to look beyond the upcoming cycle when recommending which assessments are done next. Dr. Ralston encouraged folks to identify which assessments should be full assessments and which assessments should be updates. Dr. Hastie recommended folks provide the rationale for their recommendations and judge whether the draft NWFSC list has any fatal flaws. Dr. Clarke asked for a prioritized list (i.e., the top eight stocks for assessment). Dr. Dorn asked whether multi-species data summaries should be done.

Summary of Workshop Participants' Recommendations

Improving the Stock Assessment Process

Pre-Assessment Planning

- Fewer assessments (than the 23 done in 2005) should be done per cycle- consider a maximum of 10-15 full and updated assessments. Limit the number of full assessments to a maximum of 8-10.
- More pre-review vetting of data issues. Consider scheduling either subject-oriented (i.e., trawl surveys, CPUE indices) or species-specific workshops in the “off-year” prior to doing assessments.
- More interaction with fishermen in planning an assessment would benefit the sensibility and quality of input data.
- Develop guidelines for prioritizing full stock assessments in a cycle. Such guidelines include: the stock’s importance to management, relative risk of overexploitation, whether the stock has recently been assessed (NMFS Headquarters considers an assessment older than five years to be out of date), whether the most recent assessment uses the most up-to-date model (i.e., SS2), the quality of available data for that species, etc.
- Develop a schedule of deliverables with deadlines when planning an assessment.
- Identify which assessments should be full and which should be updates when recommending an assessment for the next cycle. Also provide the rationale for these recommendations.
- Look beyond the next cycle when recommending assessment priorities (a three-cycle horizon?).

Stock Assessment Reviews

- Attempt to schedule only 2 full assessment reviews per STAR panel.
- Schedule earlier reviews of more contentious or complicated assessments.
- Schedule earlier review of “benchmark” data-poor assessments to serve as a guide on how to resolve common problems when reviewing such assessments.
- Continue to distribute STAR panels coastwide.
- Emphasize recommended improvements from previous STAR panel reports in the review.
- More discipline needed in reviews to ensure assessments comply with the Terms of Reference (i.e., updates need to comply by not entertaining new models).
- Continue to have one reviewer attend all STAR panels to provide continuity. Consider a second “continuous” reviewer.
- Provide a LAN and a printer at each STAR panel meeting.
- Rapporteurs should produce real-time assessment summary tables to track changes in the assessment as the review progresses, STAR requests, and STAT responses to those requests. A summary table of important parameters, such as the recruitment time series by species, should be provided. Such summaries should be made available on a web site to disseminate information to other stock assessment teams, STAR panel reviewers, and other advisors to the process.
- Pay more attention to the use of priors in assessments.
- Continue to have SSC members chair STAR panels, but rotate the chair assignments through the stock assessment reviews.
- Formalize the roles of GMT and GAP representatives at STAR panels.
- Updated assessments should only be reviewed by the SSC.

SSC Reviews

- Stagger the SSC reviews (and Council adoption step) across more meetings.
- Improve the management advice in SSC statements recommending assessments. The GMT, GAP, and Council require more specific advice on how assessment results should be applied to management decision-making.
- Schedule Council debriefings with stock assessment lead authors and STAR chairs.
- Consider a joint SSC-GMT-GAP review rather than an SSC review in isolation.
- SSC members who chaired a STAR panel need to recuse themselves when voting to recommend or reject an assessment. Consider assigning an SSC member other than the one who chaired the STAR panel to lead the discussion on an assessment.

Terms of Reference

- Include a requirement for STAR panels to specify whether an assessment is sufficiently developed to do an update in the next cycle.
- Mandate two types of decision tables in assessments- one to address model uncertainty and to portray relative risk of adopting results of alternative models for management decision-making; and one to address statistical uncertainty within the base model.
- Mandate complete executive summaries and decision tables in pre-STAR draft assessments.
- Require an explicit section in each assessment responding to recommendations for improvement from previous STAR panels.
- Require a review of available information from Canadian and Alaskan assessments in each assessment (for stocks with a northerly trans-boundary distribution).
- Require inclusion of maps depicting the scope of the assessment in each assessment.
- Consider adopting a process where rules are established regarding how and who decides if an omission is critical enough to reject an assessment.
- Consider multi-species assessments and/or data reviews in the process.
- Mandate that SSC members who chaired a STAR panel need to recuse themselves when voting to recommend or reject an assessment.
- Adopt a final stock assessment Terms of Reference in April 2006, but defer adoption of the rebuilding analysis Terms of Reference until after MSA re-authorization, resolution of NS1 guidelines, and/or court rulings on rebuilding plans.

PFMC

02/03/06

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PRELIMINARY STOCK ASSESSMENT PRIORITIES FOR 2007

At the Council's request, the Northwest Fisheries Science Center (NWFSC) has prepared a draft schedule for conducting full and updated assessments, to help initiate Council discussion of future assessment priorities. A common theme at January's Council-sponsored review of the last stock assessment cycle was that fewer assessments, particularly full assessments, should be conducted in future cycles. If fewer assessments are to be conducted during each cycle, selection of species to be assessed in 2007 should include consideration of the implications for future assessment cycles. Table 1 summarizes the 2005 assessment activity and presents a possible schedule for full and updated assessments from 2007 to 2011. Based on discussion at the review workshop, we propose that full assessments be reviewed through the normal STAR panel process, with a goal that no more than 2 species will be reviewed by any panel. Attainment of this goal will, in turn, require that no more than 8-10 full be conducted each cycle. For updated assessments, where model structure is unchanged, we propose a more expedited review by the SSC only.

Several factors were considered in developing the schedule presented in Table 1. Most assessments of shelf species have utilized the NMFS Triennial shelf survey as an index of abundance. This survey was last conducted in 2004, by the NWFSC. It will not be continued in the future, due to the availability of annual shelf data since 2003 from the NWFSC shelf-slope trawl survey and the insufficiency of resources to conduct two bottom trawl surveys. No assessments currently include the shelf data from the NWFSC survey. Further, under the current Terms of Reference, new data series cannot be introduced as part of an updated assessment. The Table 1 schedule provides for full assessments of all these species by 2009, with higher 2007 priority for species that are under rebuilding plans. If the Terms of Reference can be modified or a protocol for incorporating shelf data from the NWFSC shelf-slope survey agreed upon at a workshop this year, it may be possible to conduct as updates some assessments that are designated as full in the table.

Another consideration for setting priorities is that previous assessments for a few species are now outdated. This group includes chilipepper (south of 40°10'), arrowtooth flounder, and the portion of the black rockfish stock off Washington. NOAA Fisheries guidance is that assessments older than 5 years are not considered current, and each of these species was last assessed prior to 2000. In addition to these species, the 5-year guideline is an important consideration for scheduling future assessments for all species. Finally, higher short-term priority for full assessments was given to species whose most recent assessment was conducted with modeling software other than Stock Synthesis 2 (SS2). Although use of SS2 is not required, it provides tools for enhanced exploration and description of parameter uncertainty, relative to many earlier platforms such as Stock Synthesis 1. Perhaps just as importantly, establishing a common platform for west coast assessments will improve the transparency, comparability, and portability of the models. Table 1 also includes first-time assessments for longnose skate and dogfish in 2007.

Based on discussions with the Southwest Fisheries Science Center and Washington Department of Fish and Wildlife, preliminary designations of lead responsibility for 2007 assessments are also indicated in Table 1.

Table 1.--Possible schedule for west coast groundfish assessments in 2007 and beyond

Species	2005 Assessment		Assessment cycle							3-cycle total
	Full / Update	Model	2007			2009		2011		
			Full	Update	Lead	Full	Update	Full	Update	
Number of assessments			9	6		9	9	9	9	
P. hake (Whiting)	2006 Full	SS2	Subject to international treaty process							
Bocaccio rockfish	Update	SS1	X		SWC		X		X	3
Canary rockfish	Full	SS2	X		NWC		X	X		3
Chilipepper rockfish	* 1998	SS1	X		SWC				X	2
Cowcod	Full	SS2		X	SWC		X	X		3
Widow rockfish	Full	ADMB		X	SWC	X			X	3
Yelloweye rockfish	Full (2006)	SS2		X	NWC		X		X	3
Yellowtail rockfish	Update	SS1				X				1
Lingcod	Full	SS2				X				1
Arrowtooth	* 1993	other	X		NWC				X	2
English sole	Full	SS2				X				1
Petrale sole	Full	SS2	X		NWC ?			X		2
Starry flounder	Full	SS2					X	X		2
Pacific ocean perch	Update	ADMB		X	NWC	X			X	3
Darkblotched rockfish	Full	SS2	X		NWC		X		X	3
Blackgill rockfish	Full	SS2		X	NWC			X		2
Shortspine thornyhead	Full	SS2					X	X		2
Longspine thornyhead	Full	SS2					X	X		2
Sablefish	Full	SS2		X	NWC	X			X	3
Dover sole	Full	SS2				X				1
Black rockfish	* 2003/1999	SS1	X		NWC				X	2
Cabazon	Full	SS2				X				1
Cal. Scorpionfish	Full	SS2						X		1
Gopher rockfish	Full	SS2					X	X		2
Kelp greenling	Full	SS2				X				1
Longnose skate	Unassessed		X		NWC					1
Dogfish	Unassessed		X		WDFW					1
Blue rockfish			?			?		?		0
Vermilion			?			?		?		
Sanddabs			?			?		?		
Splitnose			?			?		?		

Highlighted cells indicate species with assessments that 1) are outdated, 2) have not been updated to SS2, and/or 3) require inclusion of NWFSC shelf-slope survey data from shelf depths for there to be new abundance indices beyond 2004.

GROUND FISH STOCK ASSESSMENT AND REVIEW PROCESS FOR 2005-2006

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Introduction

The purpose of this document is to help the Council family and others understand the groundfish stock assessment review process (STAR). Parties involved are the National Marine Fisheries Service (NMFS); state agencies; the Council and its advisors, including the Scientific and Statistical Committee (SSC), Groundfish Management Team (GMT), Groundfish Advisory Subpanel (GAP), Council staff; and interested persons. The STAR process is a key element in an overall process designed to make timely use of new fishery and survey data, to analyze and understand these data as completely as possible, to provide opportunity for public comment, and -to assure that the results are as accurate and error-free as possible. The STAR process is designed to assist in balancing these somewhat conflicting goals of timeliness, completeness and openness.

STAR Goals and Objectives

The goals and objectives for the groundfish assessment and review process¹ are:

- a) Ensure that groundfish stock assessments provide the kinds and quality of information required by all members of the Council family.
- b) Satisfy the Magnuson-Stevens Sustainable Fisheries Act (SFA) and other legal requirements.
- c) Provide a well-defined, Council oriented process that helps make groundfish stock assessments the "best available" scientific information and facilitates use of the information by the Council. In this context, "well-defined" means with a detailed calendar, explicit responsibilities for all participants, and specified outcomes and reports.
- d) Emphasize external, independent review of groundfish stock assessment work.
- e) Increase understanding and acceptance of groundfish stock assessment and review work by all members of the Council family.
- f) Identify research needed to improve assessments, reviews, and fishery management in the future.
- g) Use assessment and review resources effectively and efficiently.

Shared Responsibilities

All parties have a stake in assuring adequate technical review of stock assessments. NMFS must determine that the best scientific advice has been used when it approves fishery management recommendations made by the Council. The Council uses advice from the SSC to determine whether the information on which it will base its recommendation is the "best available" scientific advice. Fishery managers and scientists providing technical documents to the Council for use in management need to assure that the work is technically correct. Program reviews, in-depth external reviews, and peer-reviewed scientific publications are used by federal and state agencies to provide quality assurance for the basic scientific methods used to produce stock assessments. However, the time-frame for this sort of review is not suited to the routine examination of assessments that are, generally, the primary basis for a harvest recommendation.

The review of current stock assessments requires a routine, dedicated effort that simultaneously meets the needs of NMFS, the Council, and others. Leadership, in the context of the stock assessment review process for groundfish, means consulting with all interested parties to plan, prepare terms of reference, and develop a calendar of events and

¹ In this document, the term "stock assessment" includes activities, analyses, and management recommendations, beginning with data collection and continuing through to the development of management recommendations by the Groundfish Management Team and information presented to the Council as a basis for management decisions.

a list of deliverables. Coordination means organizing and carrying out review meetings, distributing documents in a timely fashion, and making sure that assessments and reviews are completed according to plan. Leadership and coordination involve costs, both monetary and time, which have not been calculated, but are likely substantial.

The Council and NMFS share primary responsibility to create and foster a successful STAR process. The Council will sponsor the process and involve its standing advisory committees, especially the Scientific and Statistical Committee. NMFS will provide a coordinator to oversee and facilitate the process. Together they will consult with all interested parties to plan, prepare terms of reference, and develop a calendar of events and a list of deliverables. NMFS and the Council will share fiscal and logistical responsibilities.

The STAR process is sponsored by the Council because the Federal Advisory Committee Act (FACA) limits the ability of NMFS to establish advisory committees. FACA specifies a procedure for convening advisory committees that provide consensus recommendations to the federal government. The intent of FACA was to limit the number of advisory committees, ensure that advisory committees fairly represent affected parties, and ensure that advisory committee meetings, discussions, and reports are carried out and prepared in full public view. Under FACA, advisory committees must be chartered by the Department of Commerce through a rather cumbersome process. However, the SFA exempts the Council from FACA *per se*, but requires public notice and open meetings similar to those under FACA.

NMFS Responsibilities

NMFS will work with the Council, other agencies, groups, or interested persons that carry out assessment work to organize Stock Assessment Teams (STAT Teams) and STAR Panels, and make sure that work is carried out in a timely fashion according to the calendar and terms of reference. NMFS will provide a [senior scientist to Stock Assessment eCoordinator](#) or to organize these tasks with assistance from Council staff. To initiate the assessment cycle, NMFS will convene [data and modeling workshops](#) ~~so that STAT teams to provide opportunities for assessment scientists~~ and interested parties (e.g., the GMT) ~~to ean-discuss important topics relating to upcoming stock assessments, external reviews, data sources, and modeling approaches.~~ To promote consistency, representatives from each STAT team are expected to attend ~~both the data and modeling these~~ workshops.

~~The SSC will appoint STAR Panel chairpersons. The NMFS Stock Assessment Coordinator will identify and select other STAR panelists following criteria for reviewer qualifications, nomination, and selection that are developed in consultation with the SSC. The SSC will appoint STAR Panel chairpersons, although the NMFS Stock Assessment eCoordinator will identify and select other STAR panelists following criteria for reviewer qualifications, nomination, and selection.~~ The public is welcome to nominate qualified reviewers. Following any modifications to the stock assessments resulting from STAR panel reviews and prior to ~~SSC review~~[distribution of the stock assessment documents and STAR panel reports to GMF](#), the [eStock Assessment Coordinator](#) will review the [Executive Summary](#) ~~stock assessments and panel reports~~ for consistency with the [Terms of Reference](#), ~~especially completeness of the stock assessment Executive Summary~~. Inconsistencies will be identified and the authors requested to make appropriate revisions in time for the ~~GMT-SSC~~ meeting at which ~~an assessment is reviewed~~[ABC and OY recommendations are developed](#).

Individuals (employed by NMFS, state agencies, or other entities) ~~that who~~ conduct [groundfish stock](#) assessments or [associated](#) technical work ~~in connection with groundfish stock assessments~~ are responsible for ensuring [that](#) their work is technically sound and complete. ~~The Council's review process is the principal means for review of complete stock assessments, although additional in-depth technical review of methods and data is desirable.~~ Stock assessments ~~conducted by NMFS, State agencies, or other entities~~ must be completed and reviewed in full accordance with the Terms of Reference (Appendices B and C) at the times specified in the calendar (Appendix A).

STAT Team Responsibilities

The STAT, consisting of one or more stock assessment scientists from NMFS, state agencies or academia, is responsible for conducting a complete and technically sound stock assessment that conforms to accepted standards of quality. The STAT will conduct its work and activities in accordance with the Terms of Reference for Groundfish STAT Teams. The final product of the STAT will be a stock assessment document that follows the outline specified in Appendix B: Outline for Groundfish Stock Assessment Documents.

GMT Responsibilities

The GMT is responsible for identifying and evaluating potential management actions based on the best available scientific information. In particular, the GMT makes ABC and OY recommendations to the Council based on estimated stock status, uncertainty about stock status, and socioeconomic and ecological factors. The GMT will use stock assessments, STAR Panel reports, and other information in making their recommendations. The GMT's preliminary ABC recommendation will be developed at a meeting that includes representatives from the SSC, STAT Teams, STAR Panels, and GAP. A representative(s) of the GMT will serve as a liaison to each STAR Panel, but will not serve as a member of the Panel. The GMT will not seek revision or additional review of the stock assessments after they have been reviewed by the STAR Panel. The GMT chair will communicate any unresolved issues to the SSC for consideration. Successful separation of scientific (i.e., STAT Team and STAR Panels) from management (i.e., GMT) work depends on stock assessment documents and STAR reviews being completed by the time the GMT meets to discuss preliminary ABC and OY levels. However, the GMT can request additional model projections, based on reviewed model scenarios, in order to develop a full evaluation of potential management actions.

GAP Responsibilities

The chair of the GAP will appoint a representative to track each stock assessment and attend the STAR Panel meeting. The GAP representative will participate in review discussions as an advisor to the STAR Panel, in the same capacity as the GMT advisor. It is especially important that the GAP representative be included in a discussion and review of all the data sources being used in the assessment, prior to development of the stock assessment model. It is the responsibility of the GAP representative to insure that industry concerns about the adequacy of data being used by the STAT team are expressed at an early stage in the process.

The GAP representative, along with STAT and SSC representatives, will attend the GMT meeting at which ABC recommendations are made. The GAP representative will also attend subsequent GMT, Council, and other necessary meetings where the assessment is discussed.

The GAP representative will provide appropriate data and advice to the STAR Panel and GMT and will report to the GAP on STAR Panel and GMT meeting proceedings.

SSC Responsibilities

The Scientific and Statistical Committee (SSC) will participate in the stock assessment review process and will provide the ~~GMT and Council~~ and its advisory bodies with technical advice related to the stock assessments and the review process. The SSC will assign one of its members to act as chairman of each STAR Panel. The STAR Panel chair will review the stock assessments and panel reports for consistency with the Terms of Reference. This member is not only expected to attend the assigned STAR Panel meeting, but also the GMT meeting at which ABC recommendations are made (should the need arise), and Council meetings when groundfish stock assessment agenda items are discussed (see calendar in Appendix A). Specifically, if requested, The SSC representative will present the STAR Panel report to the GMT if it requires assistance in interpreting the results of a stock assessment. In addition, the SSC representative on a STAR panel will present the Panel's report at SSC and Council meetings. However, to insure independence in the SSC's review of stock assessments and STAR Panel proceedings, members of the SSC, who are unaffiliated with the STAR Panel, whether as a member of a STAT team or as a panelist, will be assigned the roles of discussion lead and rapporteur.

The SSC representative will ~~also~~ communicate SSC comments or questions to the GMT and other Council advisory bodies. It is the SSC's responsibility to review and endorse any additional analytical work requested by the GMT after the stock assessments have been reviewed by the STAR Panels. In addition, the SSC will review and advise the GMT and Council on projected ABCs and OYs and, in addition, -

~~The SSC, during their normally scheduled meetings,~~ will serve as arbitrator to resolve disagreements between the

STAT Team, STAR Panel, or GMT. ~~The STAT Team and the STAR Panel may disagree on technical issues regarding an assessment. In this case, a complete stock assessment must include a point-by-point response by the STAT Team to each of the STAR Panel recommendations.~~

Council Staff Responsibilities

Council Staff will prepare meeting notices and distribute stock assessment documents, stock summaries, meeting minutes, and other appropriate documents. Council Staff will help NMFS and the state agencies in coordinating stock assessment meetings and events. Staff will also publish or maintain file copies of reports from each STAR Panel (containing items specified in the STAR Panel's term of reference), the outline for groundfish stock assessment documents, comments from external reviewers, SSC, GMT, and GAP, letters from the public, and any other relevant information. At a minimum, the stock assessments (STAT Team reports, STAR Panel reports, and stock summaries) should be published and distributed in the Council's annual SAFE document.

Stock Assessment Priorities

Stock assessments for West Coast groundfish are conducted periodically to assess abundance, trends, and appropriate harvest levels for these species. Assessments use statistical population models to analyze and integrate a variety of survey, fishery and biological data. Due to the large number of groundfish species that have never been assessed, it is the goal of the Council to increase substantially the number of assessed stocks. A constraint on reaching that objective, however, is that a multi-year management regime has recently been adopted, which limits assessment activities to odd years only (e.g., 2005). ~~Nonetheless, for the upcoming assessment cycle an ambitious list of 23 stocks will be evaluated, including at least five species that have never been assessed.~~

In establishing stock assessment priorities a number of factors are considered, including:

1. Assessments should take advantage of new information, especially indices of abundance from fishery-independent surveys.
2. Overfished stocks that are under rebuilding plans should be evaluated to ensure that progress towards achieving stock recovery is adequate. Guidelines for assessing adequacy of progress in rebuilding of overfished stocks are currently being developed through a Council-based process, which when complete, will result in a revision to the SSC's Terms of Reference for Groundfish Rebuilding Analyses.²
3. In general no more than 2-3 full assessments (preferably 2) will be reviewed by a STAR Panel, ~~although~~ in exceptional circumstances this number may be exceeded, if in consultation the SSC and NMFS sStock aAssessment eCoordinator conclude that it is advisable and/or necessary to do so.
4. The SSC encourages attempts to study previously un-assessed stocks, but recognizes that often such efforts will not produce a comprehensive understanding of population dynamics. Even so, updates or reports that fall short of a full assessment are still desirable; in order to summarize whatever information exists that may be useful to the Council in making management decisions.
5. Any stock assessment that is considered for use in management should be submitted through normal Council channels and reviewed at STAR Panel meetings.
6. The proposed stocks for assessment should be discussed by the Council at least a year in advance to allow sufficient time for assembly of relevant assessment data and for arrangement of STAR panels.

Terms of Reference for STAR Panels and Their Meetings

The principal responsibilityies of the STAR Panel ~~is are to carry out these terms of reference according to the calendar for groundfish assessments~~ review stock assessment documents, data inputs, analytical models, and to provide complete STAR Panel reports for all reviewed species. Most groundfish stocks are assessed infrequently and each assessment and review should result in useful advice to the Council. The STAR Panel's work includes:

1. reviewing draft stock assessment documents and any other pertinent information (e.g.; previous assessments and STAR Panel reports, if available);
2. working with STAT Teams to ensure assessments are reviewed as needed;
3. documenting meeting discussions; and
4. reviewing ~~summaries of revised~~ stock assessment documents before they are forwarded to the SSCstatus (prepared by STAT Teams) for inclusion in the SAFE document.

STAR Panels ~~normally~~ include a chairman, at least one "external" member (i.e., outside of the Council family and

²SSC Terms of Reference for Groundfish Rebuilding Analyses (Final Draft). Exhibit F.7, Supplemental SSC Terms of Reference, April 2001. Available from the PFMC, 7700 NE Ambassador Place, Suite 200, Portland, OR, 97220-1384, (503) 820-2280.

not involved in management or assessment of West Coast groundfish), and one SSC member. The total number of STAR members (including the chair and external reviewer) should be at least “n+1” where n is the number of stock assessments. In addition to Panel members, STAR meetings will include GMT and GAP advisory representatives with responsibilities ~~laid out~~ described in their terms of reference. *(Formalize the role of the GMT and GAP here?)* STAR Panels normally meet for one week.

~~The number of assessments reviewed by a STAR Panel should not exceed two except in unusual circumstances (see item 3 above).~~

The STAR Panel is responsible for determining if a stock assessment document is sufficiently complete according to Appendix B: Outline for Groundfish Stock Assessments. It is the Panel’s responsibility to identify assessments that cannot be reviewed or completed for any reason. The Panel’s decision that an assessment is complete should be made by consensus. If a Panel cannot reach agreement, then the nature of the disagreement must be described in the Panel’s report. Moreover, if a full stock assessment is deemed to have become routine and/or has stabilized its approach to data analysis and modeling, the STAR panel should ~~certify~~make a recommendation that the assessment is eligible to be considered as an update (see below) during the next stock assessment cycle.

For some species the data will be insufficient to calculate reliable estimates of F_{msy} (or its proxy), B_{msy} (or its proxy), ending biomass or unfished biomass, etc. Results of these data-poor assessments typically will not meet the requirements of a full assessment and, in those instances, each STAR Panel should consider what inferences can be drawn from the analysis presented by the STAT Team. The panel should review the reliability and appropriateness of any methods used to draw conclusions about stock status and exploitation potential and either recommend or reject the analysis on the basis of its ability to introduce useful information into the management process.

The STAR Panel’s terms of reference solely concern technical aspects of the stock assessment. It is therefore important that the panel should strive for a risk neutral perspective in its reports and deliberations. Assessment results based on model scenarios that have a flawed technical basis, or are implausible on other grounds, should be identified by the panel and excluded from the set upon which management ~~advise~~advice is to be developed. It is recognized that some of these implausible results may need to be reported in the STAT Team document in order to better define the scope of the accepted model results. The STAR panel should comment on the degree to which the accepted model scenarios describe and quantify the major sources of uncertainty, and the degree to which the probabilities associated with these scenarios are technically sound. The STAR panel may also provide qualitative comments on the probability of various model results, especially if the panel does not believe that the probability distributions calculated by the STAT capture all major sources of uncertainty.

Recommendations and requests to the STAT Team for additional or revised analyses must be clear, explicit and in writing. A written summary of discussion on significant technical points and lists of all STAR Panel recommendations and requests to the STAT Team are required in the STAR Panel’s report. This should be completed (at least in draft form) prior to the end of the meeting. It is the chair and Panel’s responsibility to carry out any follow-up review work that is required.

The primary goal of the STAR Panel is to complete a detailed evaluation of the results of a stock assessment, which puts the Panel in a good position to advance the best available scientific information to the Council. Under ideal circumstances, the STAT Team and 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 managers. A useful way of accomplishing this objective is to bracket the base model along what is deemed to be the dominant dimension of uncertainty (e.g., spawner-recruit steepness, natural mortality rate, survey catchability, year-class strength, etc.). Once a base model has been bracketed on either side by alternative model scenarios, which capture the overall degree of uncertainty in the assessment, a 2-way decision table analysis (states-of-nature versus management action) is the preferred way to present the repercussions of uncertainty to management. Bracketing of assessment results could be accomplished in a variety of ways, including ambiguity in the data, statistical precision, or model specification uncertainty, but as a matter of practice the STAR Panel should strive to identify a single preferred model when possible, so that averaging of extremes doesn’t become the *de facto* choice of management.

To the extent possible additional analyses required in the stock assessment should be completed during the STAR Panel meeting. It is the obligation of the STAR Panel chairperson, in consultation with other Panel members, to prioritize requests for additional STAT Team analysis. If follow-up work by the STAT Team is required after the review meeting, then it is the Panel’s responsibility to track STAT Team progress. In particular, the chair is

responsible for communicating with all Panel members (by phone, e-mail, or any convenient means) to determine if the revised stock assessment and documents are complete and ready to be used by managers in the Council family. If stock assessments and reviews are not complete at the end of the STAR Panel meeting, then the work must be completed prior to the GMT meeting where the assessments and preliminary ABC levels are discussed.

The STAR Panel, STAT Team, and all interested parties are legitimate meeting participants that must be accommodated in discussions. It is the STAR Panel chair's responsibility to manage discussions and public comment so that work can be completed.

STAT Teams and STAR Panels are likely to disagree on certain technical issues. If the STAR Panel and STAT Team disagree, the STAR Panel must document the areas of disagreement in its report. The STAR Panel may also request additional analysis based on an alternative approach. However, the STAR Panel's primary duty is to conduct a peer review of the assessment that is presented. In the course of this review, the Panel may ask for a reasonable number of sensitivity runs, additional details of existing assessments, or similar items from the STAT team. However, the STAR Panel is not authorized to conduct an alternative assessment representing its own views that are distinct from those of the STAT Team, nor can it impose an alternative assessment on the Team. Rather, if the Panel finds that an assessment is inadequate, it should document and report that opinion and, in addition, suggest remedial measures that could be taken by the STAT team to rectify whatever perceived shortcomings may exist. Where fundamental differences of opinion remain between the STAR Panel and STAT Team, which cannot be resolved by mutual discussion, the SSC will review the dispute and will issue its own recommendation.

The SSC representative on the STAR Panel is expected to attend GMT and Council meetings where stock assessments and harvest projections are discussed to explain the reviews and provide other technical information and advice. The chair is responsible for providing Council staff with a camera ready and suitable electronic version of the Panel's report for inclusion in the annual SAFE report.

Suggested Template for STAR Panel Report

1. Minutes of the STAR Panel meeting containing
 - A. Name and affiliation of STAR Panel members; and
 - B. List of analyses requested by the STAR Panel, [the rationale for each request, and brief summary of the STAT response to the request.](#)
2. Comments on the technical merits and/or deficiencies in the assessment and recommendations for remedies.
3. Explanation of areas of disagreement regarding STAR Panel recommendations:
 - A. ~~_____A~~ among STAR Panel members (majority and minority reports), and
 - B. ~~_____B~~ between the STAR Panel and STAT Team
4. Unresolved problems and major uncertainties, e.g.; any special issues that complicate scientific assessment, questions about the best model scenario.
5. Prioritized recommendations for future research and data collection

Terms of Reference for Groundfish STAT Teams

The STAT Team will carry out its work according to these terms of reference and the calendar for groundfish stock assessments.

~~Each STAT Team will appoint a representative who will attend any data and modeling. All relevant stock assessment workshops should be attended by all STAT team members. The STAT Team is obliged to keep the STAR Panel GAP representative informed of the specific data being used in the stock assessment and to be prepared to respond to concerns about the data that might be raised.~~ STAT Teams are encouraged to also organize independent meetings with industry and interested parties to discuss issues, questions, and data.

Each STAT Team will appoint a representative to coordinate work with the STAR Panel. ~~and Barring exceptional circumstances, all STAT team members should~~ attend the STAR Panel meeting.

Each STAT Team ~~conducting a full assessment~~ will appoint a representative who will ~~be available to~~ attend the ~~GMT meeting and~~ Council meeting where ~~the SSC is scheduled to review the assessment. preliminary acceptable biological catch (ABC) and optimum yield (OY) levels are discussed.~~ In addition, a representative of the STAT Team should ~~be available to~~ attend the GMT and Council meetings where ~~final preliminary~~ ABC and OY levels are discussed, ~~if requested or necessary.~~ ~~At these meetings, the STAT Team member shall be available to answer questions about the STAT Team report.~~

The STAT Team is responsible for preparing three versions of the stock assessment document: 1) a “draft” for discussion at the stock assessment review meeting; 2) a revised “complete draft” for distribution to the ~~GMT, SSC, GAP, and~~ Council ~~and advisory bodies~~ for discussions about preliminary ABC and OY levels; 3) a “final” version ~~to be~~ published in the SAFE report. Other than ~~changes~~ authorized ~~changes by the SSC~~, only editorial and other minor ~~changes alterations~~ should be made between the “complete draft” and “final” versions. The STAT Team will ~~provide distribute~~ “draft” assessment documents to the ~~Stock Assessment Coordinator, who will distribute them to the~~ STAR Panel, Council, and GMT and GAP representatives at least two weeks prior to the STAR Panel meeting.

The STAT Team is responsible for bringing computerized data and working assessment models to the review meeting in a form that can be analyzed on site. STAT Teams should take the initiative in building and selecting candidate models and should have several complete models ready to present to the STAR Panel and be prepared to discuss the merits of each. ~~The STAT should not expect the STAR Panel to develop a new Base model during a STAR Panel meeting.~~

~~In most cases, the~~ The STAT Team ~~is responsible for producing a~~ ~~should produce a~~ complete draft of the assessment ~~by within three weeks of~~ the end of the STAR Panel meeting, ~~including any internal agency review.~~ In ~~the any~~ event, ~~that a the STAT Team must finalize the assessment document complete draft is not completed, the Team is responsible for completing the work to the satisfaction of the STAR Panel as soon as possible, but within at least one week before the GMT briefing book deadline for the Council meeting at which meets to discuss the results of the assessment is scheduled for review.~~

The STAT Team and the STAR Panel may disagree on technical issues regarding an assessment, but a complete stock assessment must include a point-by-point response by the STAT Team to each of the STAR Panel’s recommendations. Estimates and projections representing all sides of the disagreement need to be presented ~~to,~~ reviewed ~~by,~~ and commented ~~upon on~~ by the SSC.

For stocks ~~which that~~ are projected to fall below overfished thresholds, the STAT Team must complete a rebuilding analysis according to the SSC’s Terms of Reference for Groundfish Rebuilding Analyses ~~(see footnote 2).~~ It is recommended that this analysis be conducted using the rebuilding software developed by Dr. Andre Punt (apunt@u.washington.edu). ~~However, authors are also encouraged to present alternative approaches (where appropriate), along with clear justification for why the alternative may be an improvement over the approach described in the SSC’s Terms of Reference.~~ The STAT Team is also responsible for preparing a document that summarizes the results of the rebuilding analysis.

Electronic versions of final assessment documents, rebuilding analyses, parameter files, data files, and key output files will be sent ~~by the STAT Teams~~ to the Stock Assessment Coordinator for inclusion in a stock assessment archive. ~~Any tabular data that are inserted into the final documents in and object format should also be submitted in~~

[alternative forms \(e.g., spreadsheets\), which allow selection of individual data elements.](#)

Terms of Reference for Stock Assessment Updates

The STAR process is designed to provide a comprehensive, independent review of a stock assessment. In other situations a less comprehensive review of assessment results is desirable, particularly in situations where a “model” has already been critically examined and the objective is to simply update the model by incorporating the most recent data. In this context a model refers not only to the population dynamics model *per se*, but to the particular data sources that are used as inputs to the model, the statistical framework for fitting the data, and the analytical treatment of model outputs used in providing management advice, including reference points, the allowable biological catch (ABC) and optimum yield (OY). These terms of reference establish a procedure for a limited but still rigorous review for stock assessment models that fall into this latter category. However, it is recognized that what in theory may seem to be a simple update, may in practice result in a situation that is impossible to resolve in an abbreviated process. In these cases, it may not be possible to update the assessment – rather the assessment may need to be revised in the next full assessment review cycle.

Qualification

The Scientific and Statistical Committee (SSC) will determine whether a stock assessment qualifies as an update under these terms of reference. Certification by a STAR Panel that a full assessment is eligible to become an update will be a principal criterion in this determination. To qualify, a stock assessment must carry forward its fundamental structure from a model that was previously reviewed and endorsed by a full STAR panel. In practice this means similarity in: (a) the particular sources of data used, (b) the analytical methods used to summarize data prior to input to the model, (c) the software used in programming the assessment, (d) the assumptions and structure of the population dynamics model underlying the stock assessment, (e) the statistical framework for fitting the model to the data and determining goodness of fit, (f) the procedure for weighting of the various data components, and (g) the analytical treatment of model outputs in determining management reference points, including F_{msy} , B_{msy} , and B_0 . A stock assessment update is appropriate in situations where no significant change in these 7 factors has occurred, other than extending time series of data elements within particular data components used by the model, e.g., adding information from a recently completed survey and an update of landings. In practice there will always be valid reasons for altering a model, as defined in this broad context, although, in the interests of stability, such changes should be resisted as much as possible. Instead, significant alterations should be addressed in the next subsequent full assessment and review. In principle, an update is reserved for stock assessments that maintain fidelity to an accepted modeling framework, but the SSC does not wish to prescribe in advance what particular changes may or may not be implemented. Such a determination will need to be made on a case by case basis.

Composition of the Review Panel

The groundfish subcommittee of the SSC will conduct the review of a stock assessment update. A lead reviewer for each updated assessment will be designated by the chairman of the groundfish subcommittee from among its membership, and it will be the lead reviewer’s responsibility to ensure the review is completed properly and that a written report of the proceedings is produced. Other members of the subcommittee will participate in the review to the extent possible, i.e., input from all members will not be required to finalize a report. In addition, the groundfish management team (GMT) and the groundfish advisory panel (GAP) will designate one person each to participate in the review.

Review Format

All stock assessment updates will be reviewed during a single meeting of the SSC Groundfish Subcommittee scheduled early in the assessment cycle. This meeting may precede or follow a normally scheduled SSC meeting. The review process will be as follows. The STAT team preparing the update will distribute the updated stock assessment to the review panelists at least two prior to the review meeting. In addition, Council staff will provide panelists with a copy of the last stock assessment reviewed under the full STAR process, as well as the previous STAR panel report. Notice of the meeting will be published in the *Federal Register* (generally, 23 days in advance of the meeting) and a Meeting Notice will be distributed (generally, 14 days in advance). Review of stock assessment updates is not expected to require analytical requests or model runs during the meeting, although large or unexpected changes in model results may necessitate some model exploration. The review will focus on two crucial

questions: (1) has the assessment complied with the terms of reference for stock assessment updates and (2) are new input data and model results sufficiently consistent with previous data and results that the updated assessment can form the basis of Council decision-making.

STAT Team Deliverables

Since there will be limited opportunities for revision during the review meeting, it is the STAT team's responsibility to provide the Panel with a completed update at least two weeks prior to the meeting. To streamline the process, the team can reference whatever material it chooses, which was presented in the previous stock assessment (e.g., a description of methods, data sources, stock structure, etc.). However, it is essential that any new information being incorporated into the assessment be presented in enough detail, so that the review panel can determine whether the update satisfactorily meets the Council's requirement to use the best available scientific information. Of particular importance will be a retrospective analysis showing the performance of the model with and without the updated data streams. Likewise, a decision table that highlights the consequences of mis-management under alternative states of nature would be useful to the Council in adopting annual specifications. Similarly, if any minor changes to the "model" structure are adopted, above and beyond updating specific data streams, a sensitivity analysis to those changes will be required.

In addition to documenting changes in the performance of the model, the STAT team will be required to present key assessment outputs in tabular form. Specifically, the STAT team's final update document should include the following:

- Title page and list of preparers
- Executive Summary (see Appendix C)
- Introduction
- Documentation of updated data sources
- Short description of overall model structure
- Base-run results (largely tabular and graphical)
- Uncertainty analysis, including retrospective analysis, decision table, etc.
- 10 year harvest projections under the default harvest policy

Review Panel Report

The stock assessment review panel will issue a report that will include the following items:

- Name and affiliation of panelists
- Comments on the technical merits and/or deficiencies of the update
- Explanation of areas of disagreement among panelists and between the panel and STAT team
- Recommendation regarding the adequacy of the updated assessment for use in management

Appendix A: 20057-20068 Stock Assessment Review Calendar

TO BE DETERMINED

Include drop dead dates for inclusion of all significant data elements

Include a post-STAR debriefing where STAT teams present their findings to GMT, GAP, and the Council – how is this meeting organized?

When do STAT Teams provide GAP representatives with stock assessment data?

- ~~July 26-30, 2004 — Data Workshop (AFSC, Seattle)~~
- ~~Oct. 25-29, 2004 — Modeling Workshop (NWFSC, Seattle)~~
- ~~Nov. 1-5, 2004 — PFMC adoption of Stock Assessment Terms of Reference (Portland)~~
- ~~Feb. 1-3, 2005 — STAR Panel #1: Pacific whiting~~
- ~~April 18-22, 2005 — STAR Panel #2: English sole, petrale sole, starry flounder~~
- ~~May 9-13, 2005 — STAR Panel #3: California scorpionfish, gopher rockfish, vermilion rockfish, cowweed~~
- ~~May 16-20, 2005 — STAR Panel #4: Pacific ocean perch, darkblotched rockfish, cabezon~~
- ~~June 20-24, 2005 — STAR Panel #5: sablefish, Dover sole, longspine thornyhead, shortspine thornyhead~~
- ~~Aug. 1-5, 2005 — STAR Panel #6: widow rockfish, bocaccio, blackgill rockfish, kelp greenling~~
- ~~Aug. 15-19, 2005 — STAR Panel #7: lingcod, canary rockfish, yelloweye rockfish, yellowtail rockfish~~
- ~~Sept.-Oct., 2005 — Mop-up STAR Panel (if needed)~~
- ~~Sept., 2005 — GMT meeting~~
- ~~Sept. 18-23, 2005 — PFMC preliminary adoption of ABCs and OYs (Portland)~~
- ~~Nov. 1-4, 2005 — PFMC continued adoption of ABCs and OYs (San Diego)~~
- ~~April 3-7, 2006 — PFMC preliminary adoption of management measures for 2007-2008 (California)~~
- ~~June 12-16, 2006 — PFMC final adoption of management measures for 2007-2008 (???)~~

Appendix B: Outline for Groundfish Stock Assessment Documents

This is an outline of items that should be included in stock assessment reports for groundfish managed by the Pacific Fishery Management Council. The outline is a working document meant to provide assessment authors with flexible guidelines about how to organize and communicate their work. All items listed in the outline may not be appropriate or available for each assessment. In the interest of clarity and uniformity of presentation, stock assessment authors and reviewers are encouraged (but not required) to use the same organization and section names as in the outline. It is important that time trends of catch, abundance, harvest rates, recruitment and other key quantities be presented in tabular form to facilitate full understanding and ~~follow-up~~ follow-up work.

- A. Title page and list of preparers – the names and affiliations of the stock assessment team (STAT) either alphabetically or as first and secondary authors
- B. Executive Summary (see attached template and example in Appendices C and D). This also serves as the STAT summary included in the SAFE.
- C. Introduction
 1. Scientific name, distribution, the basis for the choice of stock structure, including regional differences in life history or other biological characteristics that should form the basis of management units.
 2. Important features of life history that affect management (e.g., migration, sexual dimorphism, bathymetric demography)
 3. Important features of current fishery and relevant history of fishery
 4. Management history (e.g., changes in mesh sizes, trip limits, optimum yields)
 5. Management performance – a table or tables comparing acceptable biological catches, optimum yields, landings, and catch (i.e., landings plus discard) for each area and year

B. D. Assessment

~~14.~~ 1. —Data

- a. Landings by year and fishery, historical catch estimates, discards (generally specified as a percentage of total catch in weight and in units of mt), catch-at-age, weight-at-age, abundance indices (typically survey and CPUE data), data used to estimate biological parameters (e.g.; growth rates, maturity schedules, and natural mortality) with coefficients of variation (CVs) or variances if available. Include complete tables and figures and date of extraction.
- b. Sample size information for length and age composition data by area, year, gear, market category, etc., including both the number of trips and fish sampled.

~~15.~~ 2. —History of modeling approaches used for this stock – changes between current and previous assessment models

- a. Response to STAR Panel recommendations from the most recent previous assessment.

~~16.~~ 3. —Model description

- ~~a.~~ a. Complete description of any new modeling approaches.
- ~~b.~~ b. Definitions of fleets and areas.
- c. Assessment program with last revision date (i.e., date executable program file was compiled).
- d. List and description of all likelihood components in the model.
- e. Constraints on parameters, selectivity assumptions, natural mortality, assumed level of age reader agreement or assumed ageing error (if applicable), and other assumed parameters.
- f. Description of stock-recruitment constraints or components.
- g. Description of how the first year that is included in the model was selected and how the population state at the time is defined (e.g., B_0 , stable age structure, etc.).
- h. Critical assumptions and consequences of assumption failures.

~~17.~~ 4. —Model selection and evaluation

- ~~a.~~ a. Evidence of search for balance between model realism and parsimony.
- b. Use nested models where possible (e.g.; asymptotic vs. domed selectivities, constant vs. -time _____-varying selectivities).
- ~~c.~~ c. Do parameter estimates make sense, are they credible? Summary of alternate model configurations that were tried but rejected.
- d. Likelihood profile for the base-run configuration over one or more key parameters (e.g., M , h , Q) to show consistency among input data sources.

- e. Residual analysis (e.g.; residual plots, time series plots of observed and predicted values, or other approach).
 - ~~e.~~ f. Convergence status and convergence criteria for the base-run model.
 - ~~f.~~ g. Randomization run results or other evidence of search for global best estimates.
 - h. Evaluation of model parameters. Do they make sense? Are they credible?
 - i. Are model results consistent with assessments of the same species in Canada and Alaska? Are parameter estimates (e.g., survey catchability) consistent with estimates for related stocks?
5. Point-by-point response to the STAR Panel recommendations.
- ~~48.~~ 6. Base-run(s) results
- a. Table listing all explicit parameters in the stock assessment model used for base runs, their purpose (e.g.; recruitment parameter, selectivity parameter) and whether or not the parameter was actually estimated in the stock assessment model.
 - ~~b.~~ b. Population numbers at age \times sex (where M is sex-specific) \times year.
 - c. Time-series of total and spawning biomass, depletion relative to B_0 , recruitment and fishing mortality or exploitation rate estimates (table and figures).
 - ~~d.~~ d. Mortality estimates (if not included elsewhere).
 - ~~e.~~ e. Stock-recruitment relationship.
7. Uncertainty and sensitivity analyses. The best approach for describing uncertainty and the range of probable biomass estimates in groundfish assessments may depend on the situation. Important factors to consider include:
- a. Parameter uncertainty (variance estimation conditioned on a given model, estimation framework, data set choice, and weighting scheme), including likelihood profiles of important assessment parameters (e.g., natural mortality). This also includes expressing uncertainty in derived outputs of the model and estimating CVs by an appropriate methods (e.g., bootstrap, asymptotic methods, Bayesian approaches, or MCMC).
 - b. Sensitivity to data set choice and weighting schemes (e.g., emphasis or λ factors), which may also include a consideration of recent patterns in recruitment.
 - ~~e.~~ c. Sensitivity to assumptions about model structure, i.e., model specification uncertainty.
 - d. Retrospective analysis, where the model is fitted to a series of shortened input data sets, with the most recent years of input data being dropped.
 - ~~e.~~ e. Historical analysis (plot of actual estimates from current and previous assessments).
 - ~~f.~~ Decision table analysis.
 - ~~g.~~ f. Subjective appraisal of the magnitude and sources of uncertainty.
 - g. If a range of model runs is used to characterize uncertainty it is important to provide some qualitative or quantitative information about relative probability of each.
 - h. If possible, ranges depicting uncertainty should include at least three runs: (a) one judged most probable; (b) at least one that depicts the range of uncertainty in the direction of lower current biomass levels; and (c) one that depicts the range of uncertainty in the direction of higher current biomass levels. The entire range of uncertainty should be carried through stock projections and decision table analyses.
 - i. Risk plots (Mohn suggestion)

~~E.~~ E. Rebuilding parameters –

- 1. Determine B_0 as the product of spawningers per recruit (SPR) in unfished state multiplied by the average recruitment expected while the stock is unfished. This typically is estimated as the average recruitment during early years of fishery. According to the 1999 SAFE report (PFMC 1999, p. 24)³, ~~t~~ The values for spawners are preferably measured as total population egg production, but female spawning biomass is a common proxy.

³Pacific Fishery Management Council. 1999. Status of the Pacific Coast Groundfish Fishery Through 1998 and Recommended Biological Catches for 2000: Stock Assessment and Fishery Evaluation. (Document prepared for the Council and its advisory entities.) Pacific Fishery Management Council, 2130 SW Fifth Avenue, Suite, 224, Portland, Oregon 97201.

- ~~15.~~ 2. $B_{msy} = 0.4 B_o$;
- ~~16.~~ 3. Mean generation time; and
4. Forward projection using a Monte Carlo re-sampling of recruitments expected to occur as the stock rebuilds, where future recruitments typically are taken from the recent time series of estimated recruitments or recruits per spawner. Alternatively, if a credible stock-recruitment relationship can be estimated, it could be used to project population growth. Either approach can be conducted using the Punt rebuilding software (see above).

D. F. Reference Points (biomass and exploitation rate)

E.G. Harvest projections and decision tables

1. Harvest projections and decision tables (i.e., a matrix of states of nature versus management action) should cover the plausible range of uncertainty about current biomass and the full range of candidate fishing mortality targets used for the stock or requested by the GMT. These should at least include calculation of the ABC based on F_{msy} (or its proxy) and the OY that is implied under the Council's 40:10 harvest policy. Ideally, the alternatives described in the decision table will be drawn from a probability distribution which describes the pattern of uncertainty regarding the status of the stock and the consequences of alternative future management actions. Where alternatives are not formally associated with a probability distribution, the document needs to present sufficient information to guide assignment of approximate probabilities to each alternative.
2. Information presented should include biomass and yield projections of ABC and OY for ten years into the future, beginning with the first year for which management action could be based upon the assessment.

H. Research needs (prioritized).

I. Acknowledgments-include STAR Panel members and affiliations as well as names and affiliations of persons who contributed data, advice or information but were not part of the assessment team.

J. Literature cited.

K. An appendix with the cComplete parameter and data in the native code of the stock assessment program.

Appendix C: Template for Executive Summary Prepared by STAT Teams

Stock: species/area, [including an evaluation of any potential biological basis for regional management](#)

Catches: trends and current levels-include table for last ten years and graph with long term data

Data and assessment: date of last assessment, type of assessment model, data available, new information, and information lacking

Unresolved problems and major uncertainties: any special issues that complicate scientific assessment, questions about the best model scenario, etc.

Reference points: management targets and definition of overfishing

Stock biomass: trends and current levels relative to virgin or historic levels, description of uncertainty-include table for last 10 years and graph with long term estimates

Recruitment: trends and current levels relative to virgin or historic levels-include table for last 10 years and graph with long term estimates

Exploitation status: exploitation rates (i.e., total catch divided by exploitable biomass) – include a table with the last 10 years of data and a graph showing the trend in fishing mortality relative to the target (y-axis) plotted against the trend in biomass relative to the target (x-axis).

Management performance: catches in comparison to ABC and OY values for the most recent 10 years (when available), overfishing levels, actual catch and discard.

Forecasts: ten-year forecasts of catch, [summary biomass](#), [spawning biomass](#), and depletion

Decision table: [projected yields \(ABC and OY\), spawning biomass, and stock depletion levels for each year](#)

Research and data needs: [identify information gaps that seriously impede the stock assessment](#)

Rebuilding Projections: principal results from rebuilding analysis if the stock is overfished

[Summary Table: as detailed in the attached spreadsheet](#)

Appendix D: Example a Complete Stock Assessment Executive Summary

Will update with the Executive Summary from the latest round of assessments (Stacey Miller to provide)

Executive Summary

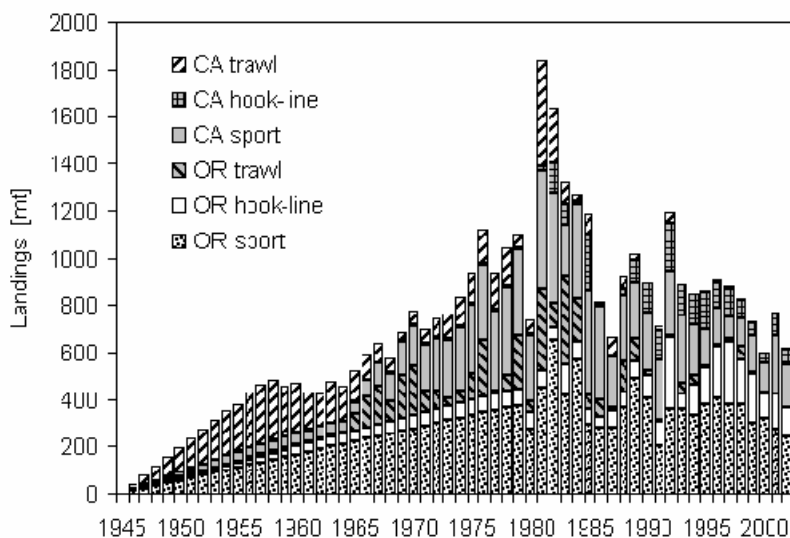
Stock:— This assessment pertains to the black rockfish (*Sebastes melanops*) population resident in waters located off northern California and Oregon, including the region between Cape Falcon and the Columbia River. Genetic information is presented that indicates black rockfish within that area represent a single homogeneous unit. A separate analysis of black rockfish off the coast of Washington and Oregon north of Cape Falcon was conducted by Wallace *et al.* (1999).

Catches:— Catches of black rockfish from Oregon and California were classified into 6 distinct fisheries, i.e., the recreational, commercial hook and line, and trawl sectors from each State. Since 1978, when consistent catch reporting systems began, landings have ranged from 602–1,836 mt. From 1978–2002 recreational catches have been reasonably consistent and have predominated. Concurrently, hook and line landings have increased as trawl landings have decreased. For this assessment, catches from 1945–77 were estimated from fragmented data and were ramped up by linear interpolation to known values in 1978. Discard rates of black rockfish are thought to be negligible, so the catch was assumed equal to the landings.

Recent black rockfish catch statistics [mt] by fishery

Year	Oregon			California			Total
	Sport	Hook	Trawl	Sport	Hook	Trawl	
1993	360.8	65.7	43.7	284.0	129.1	2.2	885.5
1994	330.0	131.2	43.4	210.0	130.9	1.1	846.6
1995	377.4	158.5	4.3	158.0	156.9	2.7	857.8
1996	401.3	225.6	7.7	154.0	103.4	10.5	902.5
1997	375.9	267.6	17.1	91.0	112.8	14.1	878.5
1998	375.2	191.6	58.6	117.0	78.6	6.3	827.3
1999	301.6	207.7	2.3	162.0	49.0	3.9	726.5
2000	320.7	105.6	0.6	129.0	43.7	2.3	601.9
2001	275.4	146.2	0.2	248.0	96.6	2.1	768.5
2002	241.6	125.2	1.2	179.7	67.0	2.0	616.7

Data and Assessment:— A variety of data sources was used in this assessment including: (1) recreational landings, age, and size composition data from the Oregon Department of Fish and Wildlife (ODF&W), (2)



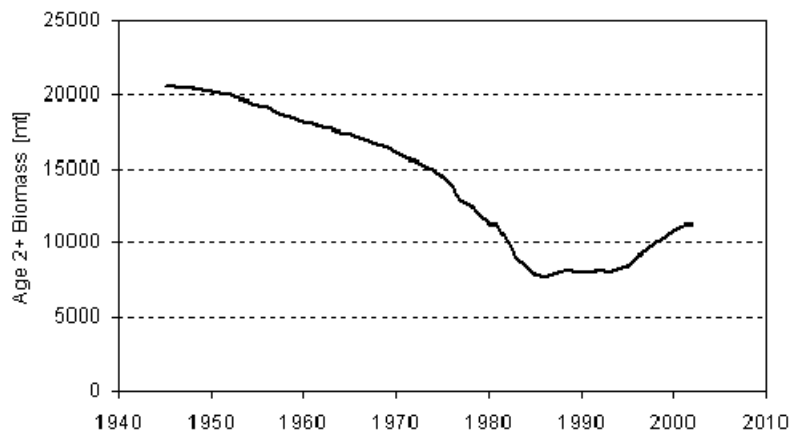
recreational landings (all California and Oregon shore based modes) from the RECFIN data base, (3) Oregon commercial landings (trawl and hook and line) from the PACFIN data base, (4) size compositions for the commercial fisheries in Oregon from ODF&W, (5) California commercial landings and length compositions from

the CALCOM database, (6) a recreational catch per unit effort (CPUE) statistic developed from information provided by ODF&W, (7) recreational CPUE statistics for each State derived from the RECFIN data base, and (8) a recreational CPUE statistic developed from the CDF&G central California CPFV data base. These multiple data sources were combined in a maximum likelihood statistical setting using the length based version of the Stock Synthesis Model (Methot 1990, 2000).

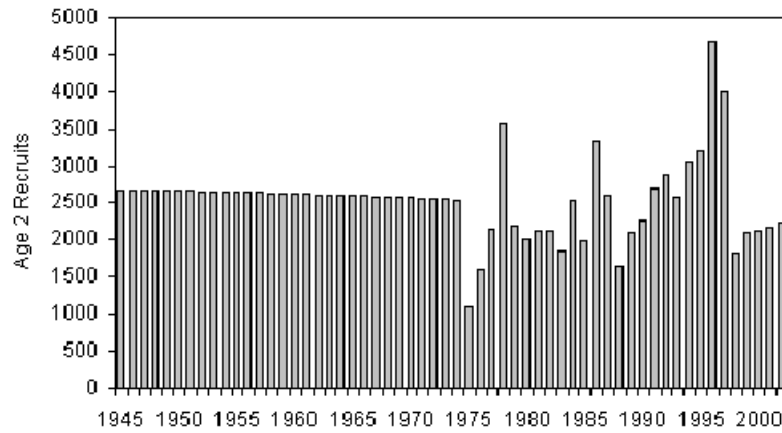
Unresolved Problems and Major Uncertainties:—The major sources of uncertainty in this stock assessment include: (1) the amount of historical landings that occurred prior to the 1978, (2) the assumed natural mortality rate, and (3) the steepness of the spawner recruit curve.

Reference Points:—Based on the Pacific Fishery Management Council's current default harvest rate policy for *Sebastes*, the target harvest rate for black rockfish is $F_{50\%}$. Given the life history of the species, and the prevailing mix of fisheries in 2002 (predominately recreational with some commercial hook and line catches), this corresponds to an exploitation rate of about 7.7%. Moreover, the Council's current target biomass level for exploited groundfish stocks is $B_{40\%}$, i.e., the spawning output of the stock is reduced to 40% of that expected in the absence of fishing. For black rockfish that corresponds to spawning output of 1.258×10^9 larvae.

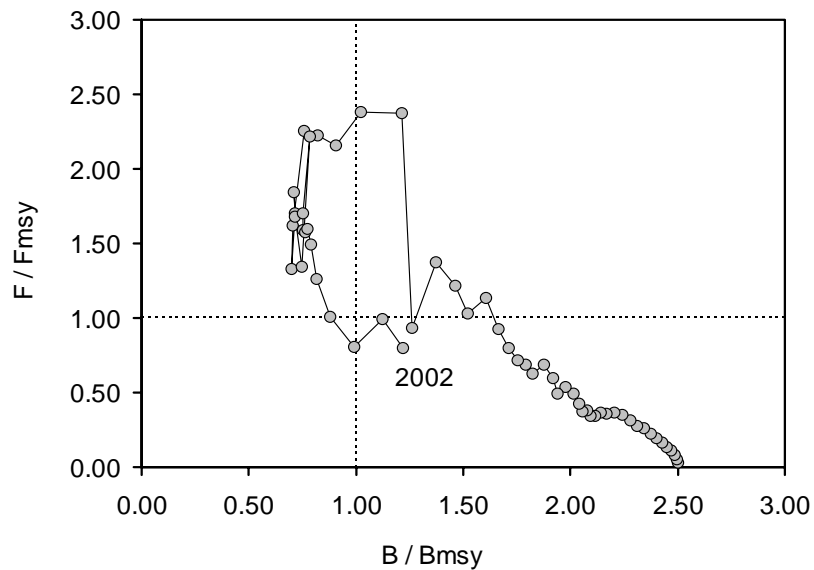
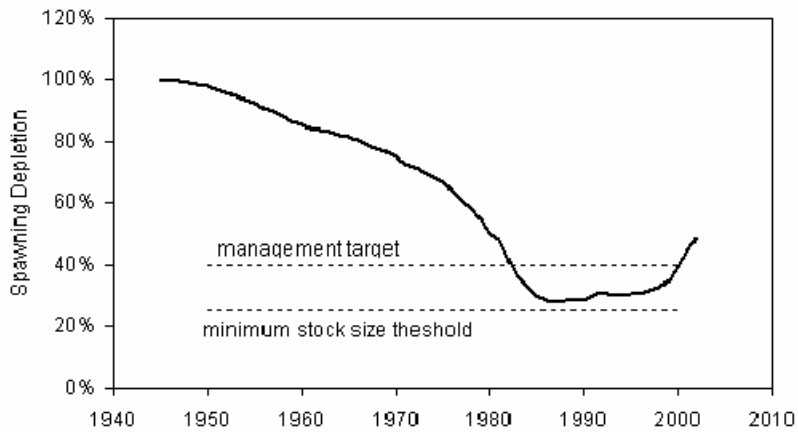
Stock Biomass:—The biomass of age 2+ black rockfish underwent a significant decline from a high of 20,510 mt in 1945 to a low of 7,702 mt in 1986, representing a 62% decline. Since that time, however, the stock has increased and is currently estimated to be 11,232 mt. Most of the population's growth occurred after 1995, due to several large recruitment events, including especially the 1994 and 1995 year classes.



Recruitment:—In the assessment recruitment was treated as a blend of deterministic values (i.e., 1945–1974 & 1999–2002) and stochastic values (i.e., 1975–1998). The Beverton-Holt steepness parameter (h) was fixed at a value of 0.65, based upon a profile of goodness of fit and results from a prior meta analysis of rockfish productivity. During the 1975–1998 period there was a significant increasing trend in recruitment, even as spawning output declined. That trend culminated with the recruitment of the 1994 and 1995 year classes, which were about twice as large as expected, based on the predicted value from the spawner recruit curve.



Exploitation Status: The northern California-Oregon stock of black rockfish is healthy, with 2002 spawning output estimated to be 49% of the unexploited spawning level. This places the stock well above the management target level of $B_{40\%}$. Likewise, age 2+ biomass in 2002 is estimated to be 11,232 mt, which is 55% of that expected in the absence of fishing. In addition, since 1998 the fishing mortality rate has declined to the point where it is now less than the F_{msy} proxy in 2002 (i.e., $F_{50\%}$).



Management Performance:—Black rockfish in the southern area (Eureka & Monterey INPFC areas) have historically been managed as part of the “Other Rockfish” category, with no explicit ABC or OY designated. For 2001 the ABC of all species within that group was 2,702 mt. In contrast, in the northern area (Vancouver & Columbia INPFC areas) black rockfish is managed within the “Remaining Rockfish” category, with a designated 2001 ABC of 1,115 mt.

Forecasts: A forecast of stock abundance and yield was developed under the base model. In this projection there was no 40:10 reduction in OY from the calculated ABC because the stock is estimated to be above the management target ($B_{40\%}$) and annual yields were calculated using an $F_{50\%}$ exploitation rate (see above). Results are shown in the following table:

Year	Age 2+	Spawning	Recruits	ABC Exploitation	Yield [mt]	
	Biomass	Output		Rate	ABC	= OY
2003	41,342	1.63E+09	2,307	7.60%	802	802
2004	41,217	1.66E+09	2,353	7.45%	775	775
2005	41,082	1.65E+09	2,386	7.34%	753	753
2006	40,938	1.62E+09	2,394	7.29%	736	736
2007	40,802	1.57E+09	2,392	7.28%	725	725
2008	40,700	1.53E+09	2,384	7.29%	719	719
2009	40,624	1.50E+09	2,366	7.30%	715	715
2010	40558	1.48E+09	2,354	7.32%	713	713
2011	40505	1.47E+09	2,343	7.34%	711	711
2012	40459	1.46E+09	2,335	7.35%	708	708

Decision Table: The amount of historical catch prior to 1978 was considered a major source of uncertainty in this assessment. Although some catch estimates were available prior to that time, which were not inconsequential, no continuous time series of catches from the sport and trawl fisheries in Oregon and California could be identified. Therefore, the catch record was assumed to begin in 1945, with no historical catches prior to that year. Catches were then made to ramp up to 1978, using whatever external data were available and linear interpolations to fill missing values. To bracket uncertainty in these catches and their effect on the management system: (1) high and low catch scenarios were created, (2) the base assessment model was refitted to each series, and (3) 10 year yield projections run. Results show that if historical catches were lower than in the base model the calculated OY (= ABC) is reduced. Conversely, if historical catches were higher than modeled the OY would be higher. For purposes of comparison, total catches for 2000, 2001, and 2002 were 602, 768, and 617 mt, respectively.

Year	Low Catch Scenario		Base Model		High Catch Scenario	
	OY [mt]	Depletion	OY [mt]	Depletion	OY [mt]	Depletion
2003	757	54.2%	802	51.9%	886	48.1%
2004	729	54.9%	775	52.7%	861	49.0%
2005	706	54.5%	753	52.5%	842	48.9%
2006	688	53.3%	736	51.4%	828	48.2%
2007	676	51.7%	725	50.0%	820	47.1%
2008	668	50.3%	719	48.8%	817	46.2%
2009	663	49.2%	715	47.9%	816	45.6%
2010	660	48.3%	713	47.2%	816	45.1%
2011	657	47.7%	711	46.7%	816	44.9%
2012	654	47.2%	708	46.3%	816	44.7%

Research and Data Needs: The black rockfish review panel identified certain gaps in the available information that hindered the stock assessment. These were: (1) a fishery independent survey should be developed to monitor

changes in black rockfish population abundance, (2) the California CPFV data set should be more thoroughly investigated to ascertain whether or not serial depletion of fishing sites has artificially kept catch rates high [see Appendix 1], (3) a standard approach to historical catch reconstructions should be developed, (4) the possibility of time-varying growth should be investigated, and (5) the calculation of the RECFIN catch per unit effort statistic should be more thoroughly analyzed and verified.

Appendix E: History of STAR process

In 1995 and earlier years, stock assessments were examined at a very early stage during *ad hoc* stock assessment review meetings (one per year). SSC and GMT members often participated in these meetings and provided additional review of completed stock assessments during regular Council meetings. There were no terms of reference or meeting reports from the *ad hoc* meetings. NMFS provided leadership and coordination by setting up meetings. Each agency or Council paid their own travel costs. Council staff distributed meeting announcements and some background documents. The Council paid for publication of assessments as appendices to the annual Stock Assessment and Fishery Evaluation (SAFE) document.

A key event occurred in July 1995 when NMFS convened an independent, external review of West Coast groundfish assessments.¹ The report concluded that: 1) uncertainties associated with assessment advice were understated; 2) technical review of groundfish assessments should be more structured and involve more outside peers; and 3) the distinction between scientific advice and management decisions was blurred. Work to develop a process to review groundfish stock assessments was aimed at resolving these problems.

For 1996, the groundfish stock assessment review process was expanded to include: 1) terms of reference for the review meeting; 2) an outline for the contents of stock assessments; 3) external anonymous reviews of previous assessments; and 4) a review meeting report.² Plans were developed during March and April Council meetings and NMFS convened a week long review meeting in Newport, Oregon where preliminary groundfish stock assessments were discussed. The expanded process itself was reviewed by the Council family at an evaluation meeting at the end of the year. Leadership and planning responsibilities were shared by the SSC Groundfish Subcommittee, NMFS, GMT, GAP, and persons who participated in planning discussions during the March and April Council meetings. There was no formal coordination except for the review meeting terms of reference, organization of the review meeting by NMFS, and as provided by Council staff for publication of documents. Costs were shared as in previous years.

The review process for 1997 was further expanded based on a planning meeting in December 1996.³ It was agreed that agencies (including NMFS and state agencies) conducting stock assessments were responsible for making sure assessments were technically sound and adequately reviewed. A Council-oriented review process was developed that included agencies, the GMT, GAP, and other interested members of the Council family. The process was jointly funded by the Council and NMFS, with NMFS hosting the Stock Assessment Review (STAR) Panel meetings and paying the travel expenses of the external reviewers, and the Council paying for travel expenses of the GAP representative and non-federal GMT and SSC members.

The process for 1997 included: 1) goals and objectives; 2) three STAR Panels, including external membership; 3) terms of reference for STAR Panels; 4) terms of reference for Stock Assessment (STAT) Teams; 5) a refined outline for stock assessments; 6) external anonymous reviews; 7) a clearer distinction between science and management; and 8) a calendar of events with clear deliverables, dates and well defined responsibilities. For the first time, STAR Panels and STAT Teams were asked to provide “decision table” analyses of the effects of uncertain management actions and to provide information required by the GMT in choosing harvest strategies. In addition, STAR Panels were asked to prepare “Stock Summaries” that described the essential elements of stock assessment results in a concise, simple format.

At the end of 1997, participants met to discuss events and make recommendations for 1998.⁴ Participants concluded

¹Anon. 1995. West coast groundfish assessments review, August 4, 1995. Pacific Fishery Management Council. Portland, OR.

² Brodziak, J., R. Conser, L. Jacobson, T. Jagielo, and G. Sylvia. 1996. Groundfish stock assessment review meeting - June 3-7, 1996 in Newport, Oregon. *In*: Status of the Pacific coast groundfish fishery through 1996 and recommended acceptable biological catches for 1997. Pacific Fisheries Management Council. Portland, OR.

³ Meeting Report, Proposals and Plans for Groundfish Stock Assessment and Reviews During 1997 (May 8, 1997). Pacific Fishery Management Council, 2130 SW Fifth Avenue, Suite 224, Portland, OR 97201.

⁴Jacobson, L.D. (ed.). 1997. Comments, issues and suggestions arising from the groundfish stock assessment

that objectives were, to varying degrees, achieved during 1997. A notable shortfall was in “increasing acceptance and understanding by all members of the Council family.” The most significant issues seemed to be the nature of the STAR Panels’ responsibilities, communicating uncertainty to decision makers, workload, and inexperience in conducting the review process.

In retrospect, there was no formal coordination and leadership except for the terms of reference and the calendar. As in previous years, Council staff coordinated distribution of meeting announcements and distribution of documents. Costs increased substantially due to travel for external experts, increased number of review meetings (three instead of one), and distribution of larger and additional reports. NMFS paid travel and other costs for external members of STAR Panels. Other costs were distributed as in 1996. It was not possible for the Council to copy and distribute all of the stock assessments because of limited funds.

In 1998, the stock assessment process was similar to that in 1997, including the 8 elements listed above. In November, a joint session of the SSC, GMT, and GAP was held to review events in 1998 and make recommendations for 1999. Several topics were discussed, including policy issues related to the 1998 terms of reference and operational issues related to how the terms of reference were implemented in 1998. This meeting produced a list of recommended changes for 1999, including:

- increasing the SSC's involvement in the process;
- clarify/modify the participant roles;
- limit the number of assessments, especially the difficulty caused by the late addition of assessments (e.g., sablefish and shortspine thornyhead in 1998);
- increase the involvement of external participants;
- timeliness in completing and submitting assessments; and
- duration of STAR Panel meetings, and the time required to adequately reviewing assessments.

Accordingly, the terms of reference were amended to include a cut-off date of November by which anyone proposing to present an assessment for review in the following year must notify the stock assessment coordinator. This change will ensure there is adequate time for formation and planning of STAR Panel meetings. The terms of reference were also changed to clarify the SSC’s role in the process as "editor" and "arbiter;" the SSC will hear reports from all STAR Panels at its September meeting and will be involved in any unresolved issues between the STAR Teams, STAR Panels, or the GMT. Other issues were raised that had no quick solutions, such as how to incorporate socioeconomic information into the process, and how to present the decision tables to GMT and Council members.

Other than the changes noted above, the 1999 STAR process was similar to 1997 and 1998. As in previous years, a joint meeting of the SSC, GAP, and GMT was convened to review and evaluate the stock assessment process and to recommend modifications for 2000. There were relatively few concerns about the process in 1999, and they centered mainly around the difficulty of recruiting sufficient (external and internal) reviewers. Participants did not recommend departing from the current terms of reference regarding STAR panel composition, although they seemed to regard it more as a goal than a strict requirement. A notable continuing concern was the timeliness of STAR team reports prior to the STAR panel meetings.

Requirements for stock rebuilding analyses and monitoring of rebuilding progress and their relationship to the STAR process were also discussed. The group agreed that the terms of reference should be modified to require additional values (e.g., B_{msy}) be tabulated and included in STAR Team report related to an overfished species. There was general agreement that the STAR process should be used to review assessments of overfished species, which are still likely to be on a 3-year cycle. However, the STAR process is not the appropriate process for the "monitoring" reports (required every 2 years), when they are out of phase with the assessment cycle.

and review process during 1997. Report to the Pacific Fishery Management Council (Revised Supplemental Attachment B.9.b, November 1997).

Additionally, it was agreed that certain additional values should be consistently tabulated in the STAT team report in order to build a long-term computerized database of key parameters. The group noted that this would not impose additional work for the STAT team, but would simply require these values to be reported consistently.

The 2000 STAR process was reviewed during a joint meeting of the GAP, GMT, and SSC at the November 2000 meeting. There were relatively few recommendations for improvement to the terms of reference for 2001, although concerns about the long-term future for the STAR process were raised. It was agreed that the future of the STAR process would be evaluated during 2001, but the STAR process in 2001 would proceed similarly to past years. For the 2001 STAR process, participants at the review meeting recommended that greater efforts be made to produce and distribute documents in a timely manner and to assure their completeness and consistency with the terms of reference. In addition, the SSC agreed that its groundfish subcommittee would meet in concert with the GMT during the August 2001 meeting to identify issues, if any, with the assessments or STAR panel reviews that may require additional consideration by the SSC.

At the March 2001 PFMC meeting, the SSC provided recommendations for integrating rebuilding analyses and reviews into the STAR process for 2001.

Appendix F: Terms of Reference for Expedited Stock Assessment Updates

—While the ordinary STAR process is designed to provide a general framework for obtaining a comprehensive, independent review of a stock assessment, in other situations a less rigorous review of assessment results is desirable. This is especially true in situations where a “model” has already been critically examined and the objective is to simply update the model by incorporating the most recent data. In this context a model refers not only to the population dynamics model *per se*, but to the particular data sources that are used as inputs to the model, the statistical framework for fitting the data, and the analytical treatment of model outputs used in providing management advice, including reference points, the allowable biological catch (ABC) and optimum yield (OY). When this type of situation occurs, it is an inefficient use of scarce personnel resources to assemble a full STAR Panel for a whole week to evaluate an accepted modeling framework. These terms of reference establish a procedure that can accommodate an abbreviated form of review for stock assessment models that fall into this latter category. However, it is recognized that what in theory may seem to be a simple update, may in practice result in a situation that is impossible to resolve in an abbreviated process. In these cases, it may not be possible to update the assessment — rather the assessment may need to be revised in the next full assessment review cycle.

Qualification

—The Scientific and Statistical Committee (SSC) will determine when a stock assessment qualifies for an expedited update under these terms of reference. To qualify, a stock assessment must carry forward its fundamental structure from a model that was previously reviewed and endorsed by a full STAR panel. In practice this means similarity in: (a) the particular sources of data used, (b) the analytical methods used to summarize data prior to input to the model, (c) the software used in programming the assessment, (d) the assumptions and structure of the population dynamics model underlying the stock assessment, (e) the statistical framework for fitting the model to the data and determining goodness of fit, (f) the procedure for weighting of the various data components, and (g) the analytical treatment of model outputs in determining management reference points, including F_{msy} , B_{msy} , and B_0 . It is the SSC's intention to employ an expedited stock assessment update in situations where no significant change in these 7 factors has occurred, other than extending time series of data elements within particular data components used by the model, e.g., adding information from a recently completed survey with an update of landings. In practice there will always be valid reasons for altering a model, as defined in this broad context, although, in the interests of stability, such changes should be resisted when possible. Instead, significant alterations should be addressed in the next subsequent full assessment and review. In principle, an expedited update is reserved for stock assessments that maintain fidelity to an accepted modeling framework, but the SSC does not wish to prescribe in advance what particular changes may or may not be implemented. Such a determination will need to be made on a case by case basis.

Composition of the Review Panel

—Unless an updated assessment is reviewed during a regular STAR Panel, the groundfish subcommittee of the SSC will conduct the review of an expedited stock assessment update. A review panel chairman will be designated by the chairman of the groundfish subcommittee from among its membership and it will be the panel chairman's responsibility to ensure the review is completed properly and that a written report of the proceedings is produced. Other members of the subcommittee will participate in the review to the extent possible, i.e., input from all members will not be required to finalize a report. In addition, the groundfish management team (GMT) and the groundfish advisory panel (GAP) will designate one person each to participate in the review, although the GMT and GAP panelists will serve in an advisory capacity only.

Review Format

—Typically, a physical meeting will not be required to complete an expedited review of an updated stock assessment, but usually one would be the most efficient way to conduct the review. Rather, if a meeting is not held, materials can be distributed electronically. STAT and panel representatives will

largely be expected to interact by email and telephone. A conference call will be held to facilitate public participation in the review.

—The review process will be as follows. Initially, the STAT team that is preparing the stock assessment update will distribute to the review panelists a document that summarizes the team's findings. In addition, Council staff will provide panelists with a copy of the last stock assessment reviewed under the full STAR process, as well as the previous STAR panel report. Each panelist will carefully review the materials provided. A conference call will be arranged by the panel chairman, which will provide an opportunity to discuss and clarify issues arising during the review, as well as provide for public participation. Notice of the conference call and a list of public listening stations will be published in the *Federal Register* (generally, 23 days in advance of the conference call) and a Meeting Notice will be distributed (generally, 14 days in advance). A dialogue will ensue among the panelists and the STAT team over a period of time that generally should not exceed one week. Interested members of the public may request access to the discussions (typically email), which would be the facilitated of Council staff. Upon completion of the interactive phase of the review, the panel chairman may, if necessary, convene a second conference call to reach a consensus among panel members and will draft a report of the panel's findings regarding the updated assessment. The whole process should be scheduled to occur within a two week period and the STAT team and panelists should be prepared to complete their work within that time frame. It will be the chairman's responsibility to insure that the review is completed in a timely manner.

STAT Team Deliverables

—It is the STAT team's responsibility to provide a description of the updated stock assessment to the panel at the beginning of the review. To streamline the process, the team can reference whatever material it chooses, which was presented in the previous stock assessment (e.g., a description of methods, data sources, stock structure, etc.). However, it is essential that any new information being incorporated into the assessment be presented in enough detail, so that the review panel can determine whether the update satisfactorily meets the Council's requirement to use the best available scientific information. Of particular importance will be a retrospective analysis showing the performance of the model with and without the updated data streams. Likewise, a decision table that highlights the consequences of mis-management under alternative states of nature would be useful to the Council in adopting annual specifications. Similarly, if any minor changes to the "model" structure are adopted, above and beyond updating specific data streams, a sensitivity analysis to those changes may be required.

—In addition to documenting changes in the performance of the model, the STAT team will be required to present key assessment outputs in tabular form. Specifically, the STAT team's final update document should include the following:

- Title page and list of preparers
- Executive Summary (see Appendix C)
- Introduction
- Documentation of updated data sources
- Short description of overall model structure
- Base-run results (largely tabular and graphical)
- Uncertainty analysis, including retrospective analysis, decision table, etc.
- 10-year harvest projections under the default harvest policy

Review Panel Report

—The expedited stock assessment review panel will issue a report that will include the following items:

- Name and affiliation of panelists
- Comments on the technical merits and/or deficiencies of the update
- Explanation of areas of disagreement among panelists and between the panel and STAT team
- Recommendation regarding the adequacy of the updated assessment for use in management