

## GROUND FISH STOCK ASSESSMENT AND REVIEW PROCESS DURING 2001

Goals and Objectives .....	2
Shared Responsibilities.....	2
History .....	3
Federal Advisory Committee Act .....	5
Statement of Shared Responsibilities .....	5
Stock Assessment Priorities.....	6
Terms of Reference for Groundfish STAR Panels and Review Meetings .....	7
Suggested Template for STAR Panel Report.....	8
Terms of Reference for Groundfish STAT Teams .....	9
GMT Responsibilities .....	10
GAP Responsibilities.....	10
SSC and Council Staff Responsibilities .....	10
2001 Stock Assessment Review Calendar .....	12
Outline for Groundfish Stock Assessment Documents.....	13
Template for Executive Summary of Stock Status Prepared by STAT Teams .....	16

## Goals and Objectives

The goals and objectives for the **2001** groundfish assessment and review process<sup>†</sup> 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 Fishery Conservation and Management Act (Magnuson-Stevens Act 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

The purpose of this discussion document is to help planners and the Council family understand responsibilities for the groundfish stock assessment review process during **2001**. 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.

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 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 both involve costs, both monetary and time, which have not been calculated, but are likely substantial.

All parties have a stake in assuring adequate technical review. 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 technically sound. 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.

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<sup>†</sup> 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.

## History

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 ad-hoc 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.<sup>1</sup> 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.<sup>2</sup> 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.<sup>3</sup> 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

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

<sup>2</sup> 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.

<sup>3</sup>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.

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.<sup>4</sup> Participants concluded 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 the 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 STAT 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 STAT 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

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<sup>4</sup>Jacobson, L.D. (ed.). 1997. Comments, issues and suggestions arising from the groundfish stock assessment and review process during 1997. Report to the Pacific Fishery Management Council (Revised Supplemental Attachment B.9.b, November 1997).

to require additional values (e.g.,  $B_{msy}$ ) be tabulated and included in STAT 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.

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 the 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 also expects to provide recommendations for integrating rebuilding analyses and reviews into the STAR process for 2001. Pending the outcome of those recommendations, additional requirements and guidance may be incorporated in the terms of reference for 2001 and implemented during the 2001 STAR process.**

### **Federal Advisory Committee Act**

Sponsorship of the review process will remain with the Council in **2001** because the Federal Advisory Committee Act (FACA) constrains the ability of NMFS to establish advisory committees. FACA specifies a procedure for convening advisory committees, particularly when the committee will provide consensus recommendations to the federal government. Under FACA, advisory committees must be chartered by the Department of Commerce through a rather cumbersome process. and slow. The intent of FACA was to limit the number of advisory committees; ensure that advisory committees fairly represent affected parties; and insure that advisory committee meetings, discussions, and reports are carried out and prepared in full public view.

Under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the Council is exempt from FACA. The Magnuson-Stevens Act does, however, specify requirements for public notice, and open meetings similar to those under FACA.

### **Statement of Shared Responsibilities**

All parties share responsibilities in the STAR process for **2001**. The Council will continue to sponsor the process and involve its standing advisory committees, but it has little additional resources to contribute to coordination or costs. Therefore, costs for the STAR process will be shared by NMFS and the Council.

The Council has responsibility to make decisions and make policy choices about groundfish management based on the Fishery Management Plan for Pacific Coast Groundfish, the Magnuson-Stevens Act and other applicable law.

The Pacific Fishery Management Council will sponsor a review of groundfish stock assessments prepared in **2001** according to the interim protocols identified below. Sponsorship will involve consulting 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.

NMFS will work with the Council, other agencies, groups or interested persons that carry out assessment work to organize 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 coordinate these tasks with assistance from Council staff. NMFS will convene a pre-assessment meeting for STAT Teams, GAP representatives, and interested parties to discuss upcoming stock assessments, external reviews, and data.

The Stock Assessment coordinator, in consultation with the SSC, will select STAR Panel chairs, and will coordinate the selection of external reviewers 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 distribution to the stock assessment documents and STAR panel reports for the August GMT meeting, the coordinator will review the stock assessments and panel reports for consistency with the terms of reference, especially completeness. Inconsistencies will be identified and the authors requested to make appropriate revisions in time to meet the deadline for distributing documents for the August GMT meeting.**

Individuals (employed by NMFS, state agencies, or other entities) that conduct assessments or technical work in connection with groundfish stock assessments are responsible for ensuring 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, including completion and submission of all documents at times specified in the calendar.**

Council staff will publish and distribute meeting notices, stock assessment documents, stock summaries, meeting minutes, and other appropriate documents. Council staff will help NMFS and agencies coordinate meetings and events.

The SSC will participate in the STAR process and provide the Council with technical advice related to the stock assessments and the review process.

The GMT will appoint representatives to track each stock assessment. These representatives will attend STAR Panel meetings, and participate in review discussions. The GMT will provide the Council with advice on management of groundfish stocks based on stock assessments and other available information.

The GAP will appoint representatives to track each stock assessment. These representatives will attend STAR Panel meetings and participate in review discussions.

### **Stock Assessment Priorities**

Stock assessments for West Coast groundfish are conducted periodically to determine appropriate harvest levels. Assessments rely upon a combination of NMFS survey data and state fishery monitoring data. To the extent possible, other fishery dependent data are also used.

Under the stock assessment process initiated in 1997, the time involved in soliciting data and preparing and reviewing stock assessments has increased substantially. Using STAT Teams and STAR Panels has also required participation by a larger number of people. Annually, the Council establishes priorities for conducting stock assessments. These priorities should be discussed at the Council's June meeting to allow sufficient time for collection of assessment data. The principles used to set priorities are:

- 1) At the November Council meeting, the species to be assessed will be finalized, which should provide adequate time for Panel arrangements. Any assessment identified after that time may not be included in the STAR process.
- 2) Generally, no more than 2 assessments will be reviewed by a STAR Panel.
- 3) Until greater fiscal and personnel support is obtained, assessments (except for Pacific whiting), generally, normally will be conducted only once every three years.
- 4) Assessments will be scheduled to take advantage of new data, especially survey data.
- 5) Assessments may be conducted more frequently than once every three years if –
  - A) new data, including fishery dependent and anecdotal data indicating unforeseen increases or decreases in stock size, are brought to the attention of the Council;
  - B) the Council believes that the results of a stock assessment are sufficiently in dispute to warrant a re-assessment the following year; or
  - C) a fishery for a species, stock, or stock complex has rapidly developed and that species, stock, or stock complex has not been assessed recently.
- 6) An update or report that falls short of a full assessment may be prepared for a species, stock, or stock complex to provide information helpful to the Council in making management decisions.
- 7) Any stock assessment submitted by the public should be submitted through normal Council channels and reviewed at STAR Panel meetings.

Based on the preceding principles, and taking into account testimony presented at the June, September, and November 1999 Council meetings, the following list of stock assessments are planned for 2000:

**Stocks to be Assessed in 2001**

**Sablefish**

**Shortspine Thornyhead**

**Dover Sole**

**Remaining Rockfishes, including yelloweye and black rockfish (in the south).**

**Terms of Reference for Groundfish STAR Panels and Review Meetings**

Composition: STAR Panels normally include a chair, at least one “external” member (i.e.; outside the Council family and not involved in management or assessment of West Coast groundfish), and one SSC member. The total number of STAR members should be at least “n+2” where n is the number of stock assessments and “2” counts the chair and external reviewer. In addition to Panel members, STAR meetings will include GMT and GAP advisory representatives with responsibilities laid out in their terms of reference. STAR Panels normally meet for one week. The number of assessments reviewed per Panel should not exceed two.

The principal responsibility of the STAR Panel is to carry out these terms of reference according to the calendar for groundfish assessments.

The goal of the STAR Panel meeting is to review assessments for stocks according to these terms of reference. This work (described in detail below) includes:

- reviewing draft stock assessment documents and any other pertinent information (e.g.; STAR Panel reviews of previous assessments and previous assessments, if available);
- working with STAT Teams to ensure assessments are reviewed as needed;
- documenting meeting discussions; and
- reviewing summaries of stock status (prepared by STAT Teams) for in the SAFE document.

Most groundfish stocks are assessed infrequently (every three years) and each assessment and review should result in useful advice to the Council. It is the STAR Panel's responsibility to identify assessments that cannot be reviewed or completed for any reason.

The STAR Panel's terms of reference concern technical aspects of stock assessment work. The STAR Panel should strive for a risk neutral approach in its reports and deliberations. The full range of uncertainty should be reflected in complete stock assessments and the reports prepared by STAR Panels. The STAR Panel should identify scenarios that are unlikely or have a flawed technical basis.

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.

Panel members are responsible for determining if a stock assessment document is sufficiently complete according to the "Outline for Groundfish Stock Assessments."

STAT Teams and STAR Panels may disagree on 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 request additional analysis based on alternative approaches. It is expected that the STAT Team will make a good faith effort to complete these analyses.

The STAR 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.

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 a 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.

Additional analyses required in the stock assessment should be completed during the STAR Panel meeting. 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 meeting 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 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.

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 recommendations. Estimates and projections representing all sides of the disagreement need to be presented, reviewed, and commented on by the SSC.

### **Suggested Template for STAR Panel Report**

- 1) Minutes of the STAR Panel meeting containing:
  - Name and affiliation of STAR Panel members; and

- List of analyses requested by the STAR Panel.
- 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 1) among STAR Panel members (majority and minority reports), and 2) 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 the pre-assessment planning meeting, if one is held. 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 attend the STAR Panel meeting.

Each STAT Team will appoint a representative who will attend the GMT meeting (usually in August) and Council meeting (usually in September) where preliminary acceptable biological catch (ABC) and optimum yield (OY) levels are discussed. In addition, a representative of the STAT Team should attend the GMT (usually September or October) and Council meeting (usually November) where final 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 for discussions about preliminary ABC and OY levels; 3) a “final” version published in the SAFE report. Other than authorized changes, only editorial and other minor changes should be made between the “complete draft” and “final” versions. The STAT Team will distribute “draft” assessment documents 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. If possible, the STAT Team should have several complete models and be prepared to justify model recommendations.

The STAT Team is responsible for producing the complete draft by the end of the STAR Panel meeting. In the event that the complete draft is not completed, the Team is responsible for completing the work as soon as possible and to the satisfaction of the STAR Panel at least one week before the GMT meeting.

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 recommendations. Estimates and projections representing all sides of the disagreement need to be presented, reviewed, and commented on by the SSC.

For new stocks which are projected by the STAT Team to fall below overfishing thresholds, the STAT Teams need to estimate the baseline rebuilding parameters, specifically:

- determine  $B_0$  as the product of SPR in unfished state multiplied by the average recruitment during early years of fishery;
- recruitment during the earliest part of the record for the stock;
- $B_{msy} = 0.4 B_0$ ;
- mean generation time; and
- a forward projection using recruitment based on Monte Carlo sampling from a recent time series of recruitment estimates.

According to 1999 SAFE report (PFMC 1999, p. 24)<sup>5</sup>, the values for unfished biomass size are preferably measured as unfished spawning potential.

In addition to providing the baseline calculations, authors are encouraged to present alternative approaches (where appropriate), along with clear justification for why the alternatives may be an improvement over the baseline approach.

### **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 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 ABC 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 at its September meeting. 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. GAP representatives will be appointed at the GAP meeting in March.

The GAP representative will attend the STAR Panel meeting where the assessment of his / her species is reviewed. The GAP representative will participate in review discussions as an advisor to the STAR Panel, in the same capacity as the GMT advisor.

The GAP representative will attend the August GMT meeting along with STAR, STAT, and SSC representatives and will attend subsequent GMT, Council, and other necessary meetings where the assessment of his / her species 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.

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<sup>5</sup>Pacific 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.

## **SSC and Council Staff Responsibilities**

### Scientific and Statistical Committee

The SSC will participate in the stock assessment review process and provide the GMT and Council with technical advice related to the stock assessments and the review process. The SSC will assign one member from its Groundfish Subcommittee to each STAR Panel. This member is expected to attend the assigned STAR Panel meeting, the August and October GMT meeting, and the September and November Council meetings when groundfish stock assessment agenda items are discussed. As in previous years, the SSC representative on the STAR Panel will present the STAR Panel report at GMT and Council meetings. The SSC representative will also present the STAR Panel report to the SSC at its September meeting and communicate SSC comments or questions to the GMT and STAR Panel chair. The SSC, during their normally scheduled meetings, will also serve as arbitrator to resolve disagreements between the STAT Team, STAR Panel, or GMT. The SSC will review any additional analytical work on any of the stock assessments required or carried out 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.

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 recommendations. Estimates and projections representing all sides of the disagreement need to be presented, reviewed, and commented on by the SSC.

### Council Staff

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. Once the Council's final ABCs, OYs, and management measures have been implemented, the Staff will publish an addendum to the SAFE documenting these final values.

## 2001 Stock Assessment Review Calendar

Mar. 5-9	PFMC Meeting (Portland)
<b>Mar 21-22</b>	<b>Pre-Assessment Workshop (Portland)</b>
Apr 2-6	PFMC Meeting (Sacramento)
May 8	Stock assessment documents for remaining rockfish due at PFMC office for distribution
Jun 4-7	GMT meeting (Seattle)
Jun 11	Stock assessment documents for black rockfish (southern area), yelloweye rockfish, and the new method for data poor species due at NWFSC office for distribution.
Jun 11-15	PFMC Meeting (San Francisco)
Jun 25	Stock assessment documents for Dover sole, sablefish, & shortspine thornyhead due at PFMC office for distribution
<b>June 25-29</b>	<b>STAR Panel meeting for rockfish (Santa Cruz)</b>
<b>July 9-16</b>	<b>STAR Panel meeting for Dover sole and shortspine thornyhead (considered on July 9-12) and sablefish (considered on July 13-16) (Newport)</b>
Jul 27	Final stock assessment documents due at PFMC office
Aug 3	PFMC distributes final stock assessment documents
Aug. 6-10	GMT meeting. SSC groundfish subcommittee will also meet to review assessments and panel reports. (Location to be determined)
Sep 10-14	PFMC meeting (Portland)
Sep. 24-28	GMT meeting (Santa Cruz)
Oct 29-Nov 2	PFMC meeting (San Francisco)

## Outline for Groundfish Stock Assessment Documents

This is an outline of items that should be included in stock assessment and fishery evaluation (SAFE) 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.

This outline for 2000 includes suggestions from many parties and is based on a similar outline used for groundfish stock assessment cycles in previous years.

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### OUTLINE FOR GROUND FISH STOCK ASSESSMENT DOCUMENTS

- 1) Title page and list of preparers – the names and affiliations of the stock assessment team (STAT) either alphabetically or as first and secondary authors
- 2) Executive Summary (see attached template)
- 3) Introduction
  - Scientific name, distribution, stock structure, management units
  - Important features of life history that affect management (e.g.; migration, sexual dimorphism, bathymetric demography)
  - Important features of current fishery and relevant history of fishery
  - Management history (e.g. changes in mesh sizes, trip limits, optimum yields)
  - 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
- 4) Assessment
  - Data
    - i) Landings by year and fishery, discards (generally specified as a percentage of total catch in weight and in units of mt), catch-at-age, weight-at-age, survey and CPUE data, data used to estimate biological parameters (e.g.; growth rates, maturity schedules, and natural mortality) with coefficients of variances (CVs) or variances if available.
    - ii) Include complete tables and figures if practical.
    - iii) Sample size information for length and age composition data by area, year, gear, market category, etc.
  - History of modeling approaches used for this stock – changes between current and previous assessment models

- Model description
  - i) Assessment program with last revision date (i.e.; date executable program file was compiled).
  - ii) List and description of all likelihood components in the model.
  - iii) Constraints on parameters, selectivity assumptions, natural mortality, assumed level of age reader agreement or assumed ageing error (if applicable), and other assumed parameters.
  - iv) Description of stock-recruitment constraint or components.
  - v) Critical assumptions and consequences of assumption failures.
  - vi) Convergence criteria.
  - vii) Treatment of discards (specified as a percentage of total catch in weight and in units of mt).
  - viii) Complete description of any new modeling approaches.
- Model selection and evaluation
  - i) Evidence of search for balance between realistic (but possibly over-parameterized) and simpler (but not realistic) models –
    - Use hierarchical approach where possible (e.g.; asymptotic vs. domed selectivities, constant vs. time varying selectivities).
  - ii) Residual analysis (e.g.; residual plots, time series plots of observed and predicted values, or other approach).
  - iii) Convergence status and convergence criteria for “base-run(s)” –
    - Randomization run results or other evidence of search for global best estimates.
  - iv) Do parameter estimates make sense, are they credible?
  - v) Table listing all 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.
- Base-run(s) results
  - i) Time-series of total and spawning biomass, recruitment and fishing mortality or exploitation rate estimates (table and figures).
  - ii) Selectivity estimates (if not included elsewhere).
  - iii) Stock-recruitment relationship.
- Uncertainty and sensitivity analyses
  - i) Sensitivity analyses (tables or figures) that show ending biomass levels or likelihood component values obtained while systematically varying emphasis factors for each type of data in the model.
    - Likelihood profiles for parameters or biomass levels may also be used.

- ii) The best approach for describing uncertainty and range of probable biomass estimates in groundfish assessments may depend on the situation. Approaches used previously are:
    - CVs for biomass estimated by bootstrap, implicit autodifferentiation, or the delta method;
    - Subjective appraisal of magnitude and sources of uncertainty;
    - Comparison of alternate models;
    - Comparison of alternate assumptions about recent recruitment.
  - iii) If a range of model runs (e.g.; based on CV's or alternate assumptions about model structure or recruitment) is used to depict uncertainty, then it is important that some qualitative or quantitative information about relative probability be included. If no statements about relative probability can be made, then it is important to state that all scenarios (or all scenarios between the bounds depicted by the runs) are equally likely.
  - iv) 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.
  - v) retrospective analysis (retrospective bias in base model or models for each area).
  - vi) historic analysis (plot of actual estimates from current and previous assessments for each area).
  - vii) Simulation results (if available).
- 5) Rebuilding parameters –
- Determine  $B_0$  as the product of SPR in unfished state multiplied by the average recruitment during early years of fishery;
  - Recruitment during the earliest part of the record for the stock;
  - $B_{msy} = 0.4 B_0$ ;
  - Mean generation time; and
  - A forward projection using recruitment based on Monte Carlo sampling from a recent time-series of recruitment estimates.
- 6) Target fishing mortality rates (if changes are proposed).
- 7) Harvest projections and decision tables –
- Harvest projections and decision tables should cover full range of uncertainty about current biomass and full range of candidate fishing mortality targets used for the stock or requested by the GMT; and
  - Information presented should include three year biomass and yield projections.
- 8) Management recommendations.
- 9) Research needs (prioritized).

- 10) 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.
- 11) Literature cited.
- 12) Tables and figures.
- 13) Complete parameter files **and results** for base runs.

### **Template for Executive Summary of Stock Status Prepared by STAT Teams**

Stock: species/area

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 table for last 10 years and graph with long term estimates.

Management performance: ABC and OY estimates, overfishing levels, actual catch and discard

Forecasts: normally three-year forecasts of catch and biomass

Decision table: (if available)

Recommendations: research and data collection needs

Sources of additional information: cite STAR Panel report, assessment documents, and other sources