Report of a National Workshop on Developing Best Practices for SSCs

Honolulu, Hawaii - November 12-14, 2008

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Cover photo: A freshly caught Opah (*Lampris guttatus*), also known as moonfish, awaits sale at the Honolulu fish auction in November. Opah is a large pelagic species (weighing up to 200 pounds) that is caught along with tunas and billfish in the pelagic longline fishery. The flesh is orange to red and is served as sashimi or broiled "catch of the day" in Hawaii.

First National Meeting of the Regional Fishery Management Councils' Scientific and Statistical Committees

Hosted by the
Western Pacific Regional Fishery Management Council
November 12-14th, 2008

Report of a National Workshop on Developing Best Practices for SSCs

David Witherell and Paul Dalzell, Editors

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Executive Summary

In 2006, the Magnuson Stevens Act (MSA) was revised to require that each regional fishery management council's Scientific and Statistical Committee (SSC) provide its Council ongoing scientific advice for fishery management decisions, including recommendations for acceptable biological catch (ABC), and other advice regarding fisheries sustainability. In 2008, NMFS provided funding to the Western Pacific Regional Fishery Management Council (WPFMC) to host a national SSC workshop, which was held November 12-14, 2008.

The workshop provided an opportunity for representatives from the eight regional council's SSC to compare notes and seek ways to improve SSC process and advice. Two major topics were discussed in detail: 1) SSC operating procedures, and 2) the role of SSCs in the peer review process and setting catch limits.

The workshop revealed that there is substantial diversity among the SSCs in their operating procedures and their practices relative to peer review. The differences reflect their geographic and socioeconomic diversity and the range of fishery data available among the regions. The general consensus was that a uniform SSC process is not practical given these differences. Sharing experiences and viewpoints, however, provided participants with ideas that might improve the process of their own SSC, as well as food for thought on possible ways to address issues and challenges faced by SSCs.

There was general consensus on several topics:

- Participants all agreed that accurate catch data need to be collected for all fisheries across the country. SSC participants noted that it may be impossible to develop catch limits, as required in the National Standard 1 guidelines without accurate catch data. In particular, catch data are lacking for many fisheries in the Western Pacific and Caribbean regions.

- Participants agreed that increases in SSC responsibilities necessitate increases in Council funding, and requires additional funding for data collection and assessments.

- Participants also agreed that the SSCs should be the final arbiter regarding what constitutes the best available scientific information used by Councils for fishery management decisions.

- Lastly, participants agreed that a second workshop should be convened before 2010, which is the deadline for annual catch limits to be set for all fisheries in federal waters that are experiencing overfishing or are overfished. The next meeting could focus on the technical aspects of establishing appropriate catch limits.

Preface

The Magnuson Stevens Fishery Conservation and Management Act (MSA) requires that each regional fishery management council maintain and utilize its Scientific and Statistical Committee (SSC) to assist in the development, collection, evaluation, and peer review of information relevant to the development and amendment of fishery management plans. The MSA also mandates that each SSC shall provide its Council ongoing scientific advice for fishery management decisions, including recommendations for acceptable biological catch (ABC), preventing overfishing, maximum sustainable yield, and achieving rebuilding targets, and reports on stock status and health, bycatch, habitat status, social and economic impacts of management measures, and sustainability of fishing practices.

Some councils have a long history of using their SSCs to provide recommendations on ABC limits and peer review of analytical documents for FMP/regulatory amendments; for other councils this is a new requirement. Some SSCs also function as the scientific peer review process required by the Information Quality Act (PL 106-554). In addition, a proposed rule on implementing National Standard 1 was recently published, and once finalized, will provide guidance for all SSCs with respect to establishing fishing levels that prevent overfishing.

The Managing Our Nations Fisheries II conference held in 2005, recommended that national SSC meetings be held so that members from different regions could discuss best practices and seek to identify analytical and research needs (Witherell 2005). Given the new requirements of MSA and the proposed guidelines for annual catch limits (ACLs), NMFS provided funding to the Western Pacific Regional Fishery Management Council (WPFMC) to host a national SSC workshop, which was held November 12-14, 2008.

The workshop was organized and coordinated by staff from the regional councils, lead by Paul Dalzell of the WPFMC and Dave Witherell of the NPFMC. WPFMC staff (Kitty Simonds, Marsha Hamilton, Mark Mitsuyasu, Sylvia Spalding, Eric Kingma, and Charles Ka ai ai) and Gail Bendixen (NPFMC staff) provided logistical and technical support. WPFMC SSC Chair Paul Callaghan served as the meeting chair, and held the discussions to a tight agenda schedule. Sean Martin (WPFMC Chair) and Charles Ka ai ai gave a group of early risers a guided tour of the Honolulu fish auction. Evening receptions, featuring fresh Hawaiian sashimi, provided participants an opportunity to mingle and further discuss ideas for SSC practices.

This report was based on written synopsis of the presentations given by SSC members and staff. Discussions of the group were captured and summarized by regional council staff rapporteurs (Mike Burner, PFMC; Rich Seagraves, MAFMC; Marsha Hamilton, WPFMC; John Carmichael, SAFMC; and Chris Kellogg, NEFMC). Dave Witherell and Paul Dalzell edited and formatted the submissions for consistency and assembled the workshop report. The report benefited from review comments made by Pat Fiorelli, Chris Kellogg, Rich Seagraves, Mike Burner, Don McIsaac, Keith Criddle, Terry Quinn, and Rick Methot. Photos of the meeting and fish auction were provided courtesy of Dave Witherell, Jim Berkson, and Don McIsaac.

Welcoming Remarks

Western Pacific Fishery Management Council (WPFMC) SSC Chair Paul Callaghan, who served as the meeting chair, reviewed the agenda, which was developed to examine two major topics: 1) SSC operating procedures, and 2) the role of SSCs in the peer review process and setting catch limits. A copy of the agenda is attached as Appendix 1, and a list of participants is attached as Appendix 2.

WPFMC Executive Director Ms. Kitty Simonds opened the meeting with a warm Hawaiian welcome of aloha. She expressed her pleasure at hosting the first national meeting of the Scientific and Statistical Committees of the regional fishery management councils and she encouraged SSC members to meet together frequently to

share ideas and learn from each other's successes.

The Director of the Pacific Islands Fisheries Science Center, Sam Pooley, also welcomed the SSC members and said that he has been a strong proponent of this type of meeting. He was pleased that SSC scientists were meeting together in a national forum to discuss the MSA requirements.

John Boreman, Director of the Office of Science and Technology, National Marine Fisheries Service (NMFS), noted the uneven application and use of SSCs around the nation. The MSA reauthorization changed the responsibilities of the SSCs and will likely result in increased workloads and time commitments. He offered the support of the NMFS but emphasized that this meeting was intended primarily for the SSC and Council representatives. He felt that it would be desirable if the group could come to a common understanding of the new requirements, the new challenges and new opportunities.

SSC Structure and Practices

MSA Requirements

John Boreman provided a review of the following MSA language pertaining to SSCs. He noted that MSA Section 302(g)(1) reads:

"Each scientific and statistical committee shall provide its Council ongoing scientific advice for fishery management decisions, including recommendations for acceptable biological catch, preventing overfishing, maximum sustainable yield, and achieving rebuilding targets, and reports on stock status and health, bycatch, habitat status, social and economic impacts of management measures, and sustainability of fishing practices."

"Members appointed by the Councils to the scientific and statistical committees shall be Federal employees, State employees, academicians, or independent experts and shall have strong scientific or technical credentials and experience."

"The Secretary and each Council may establish a peer review process for that Council for scientific information used to advise the Council about the conservation and management of the fishery."

"In addition to the provisions of section 302(f)(7), the Secretary shall, subject to the availability of appropriations, pay a stipend to members of the scientific and statistical committees or advisory panels who are not employed by the Federal Government or a State marine fisheries agency"

John noted that the regional fishery management councils are varied in their support for SSC stipends and that he would like to hear reasonable recommendations from this group on the subject in advance of the February 2009 Council Coordinating Committee meeting.

In discussing the presentation, one participant noted that according to the MSA, SSCs are to recommend fishing levels, but the MSA is less clear regarding the SSC's role in setting annual catch limits. In response, the general understanding was that the SSC would be responsible for fishing level recommendations, which could be equated to acceptable biological catch (ABC). The setting of annual catch limits (ACLs) should be a policy decision of a Council that is informed by risk analysis and cannot exceed the ABC.

NMFS Working Groups

Rick Methot (NMFS) reported on three workgroups (WGs) that were recently convened by NMFS. Membership included representatives from each of the NMFS regions. The groups are currently working to produce reports by the end of the year. The three groups are:

WG1 – Methods for ABC that account for uncertainty
WG2 – Update of National Standard 2 Guidelines
WG3 – Criteria for evaluating vulnerability of stocks to effects of fishing

WG1 is focused on ABC control rules and methods of quantifying scientific uncertainty. The group is building on the 1998 National Standard 1 guidelines that have many of the same provisions as the newly reauthorized MSA. WG1 topics include:

- Elucidate factors that contribute to scientific uncertainty;
- Proxies for unmeasured uncertainty
- Overview of current control rule implementations;
- Management strategy evaluation: quantifying the expected outcome of applying a control rule;
- Quantitative probability based methods for calculating target catch with known Pr (overfishing);
- Data-limited approaches; and
- OY discussion regarding accounting for social, economic and ecological factors.

WG2 is focused on the issue of determining best scientific information available and the use of peer review. NMFS has published an advance notice of proposed rule making and is seeking input on this topic through December 17, 2008. WG2 topics include:

- Content of SAFE with regard to new requirements for SSC statement of fishing level recommendations;
- Guidance as to what constitutes "best scientific information available" (BSIA); and
- Definition of peer review process and its relationship to SSCs.

Rick noted that the Stock Assessment and Fishery Evaluation (SAFE) is a critical document. The current National Standard 2 guidelines are specific about SAFE contents. However, the guidelines are unclear about the role of the SSC as author/reviewer of the SAFE, and if the SSC catch limit determinations should be reported in the SAFE.

Although the National Research Council provided guidance on the topic of "best available science" in 2004, the NRC did not provide a specific definition of BSIA. NMFS is seeking comments on how to define BSIA and is also considering the characteristics of a peer review process in the guidelines.

WG3 is focused on the evaluation of a stock's or stock complex's productivity and vulnerability to fisheries as a means of expressing that stock's risk of overfishing. Susceptibility and productivity are key aspects of these evaluations. The goal of WG3 is to provide guidance on how to determine the vulnerability of a stock to a fishery, with the following objectives:

- Provide a practicable and useful tool for evaluating the vulnerability of a stock becoming overfished.
- The tool should follow a consistent methodology but also be flexible in its use.
- The tool should be capable of evaluating a stock's vulnerability at a suitable resolution to allow classification into a relatively narrow category of risk.

The WG is developing a Productivity-Susceptibility Assessment (PSA), an established scoring system that can be applied to a variety of stocks and fisheries to address the question of vulnerability. The PSA system does not assess the absolute vulnerability of a stock or stock complex, but rather characterizes the stock's relative vulnerability to overfishing. This WG is the furthest along of the three and plans to report in December 2008 with case studies, and may develop technical guidance in 2009.

Q & A

Participants discussed Rick's report. It was noted that ABC is supposed to be reduced

from OFL based on scientific uncertainty. One participant raised concerns that species for which adequate data exists to quantify scientific uncertainty could have a larger buffer than species for which quantifying scientific uncertainty is not possible. Rick responded that a tiered system for treatment of data poor species can address this concern and noted that the technical methods should move towards a smaller buffer as more information is available.

It was noted that the regional fishery management councils and NMFS seem to be on two separate and simultaneous tracks in the development of methods to address the reauthorized MSA but felt that things should occur sequentially, with NMFS guidance available first. Rick responded that the time lines mandated by the MSA preclude such an approach. The group noted that it would be beneficial in the future to include regional fishery management council representation in NMFS workgroups and to have WGs participate in SSC meetings.

One participant noted that the PSA method discussed by WG3 could potentially be arbitrary and meaningless by simply changing the elements in the analysis. Rick responded that the scores are relative rather than absolute and the elements in the PSA are not necessarily weighted evenly.

Scientific and Statistical Committee Reports

Each SSC was asked to provide a brief presentation describing their SSC structure and process, paying particular attention to: frequency and duration of meetings, seating arrangements, process for public input, composition and recruitment of SSC members, terms and selection of officers, development of advice to Councils, development of research priorities, document review and staff presentations, scientific peer review process for impact analyses (EA/RIR/IRFAs) and other reports, procedures for decision-making, preparation of minutes and other MSA requirements for SSCs. These presentations are posted as pdf files on the WPFMC website and summarized below.

Western Pacific

Presenter - Paul Callaghan, SSC Chair

The Western Pacific Fishery Management Council is required under its Statement of Operating Practices and Procedures (SOPP) to have a Scientific and Statistical Committee (SSC). The SSC is composed of scientists and specialists who represent a wide range of disciplines relating to Council fisheries management activities. The SSC Chair is appointed by the Chair of the Council after consultation with the Executive and Budget Committee. There is no vice-chair. The SOPP specifically precludes the simultaneous membership of any individual on both the Council and the SSC.

The Council SOPP mandates the following specific SSC responsibilities: 1) Identify scientific resources required for the development of management plans amendments and recommend resources for Plan Teams; 2) Provide multi-disciplinary review of management plans or amendments and advise the Council on their scientific content; 3) Assist the Council in the evaluation of such statistical, biological, economic, social, and other scientific information as is relevant to the Council's activities, and recommend methods and means for the development and collection of such information; and 4) Recommend to the Council the composition of Plan Teams.

Currently the SSC is composed of 18 members with fisheries related interests in the following disciplines: anthropology (1), archeology (1), biology (6), economics (1), genetics (1), population dynamics (4), physiology (1), sociology (1), statistics (1), and trophic ecology. Seven members come from academic backgrounds, two from international organizations, and three from federal government, two from state government, and three from the private sector.

Given tiny island populations, small government agencies and a paucity of academic institutions, the pool of eligible SSC candidates in this part of the world is relatively small; yet, the expanse of Council jurisdiction is immense. Several SSC members travel great distances to attend meetings – one from Australia, three from

Guam, eight from various locations in Hawaii, one from the Northern Mariana Islands, one from New Caledonia, one from American Samoa, one from French Polynesia, and two from the U.S. Mainland.

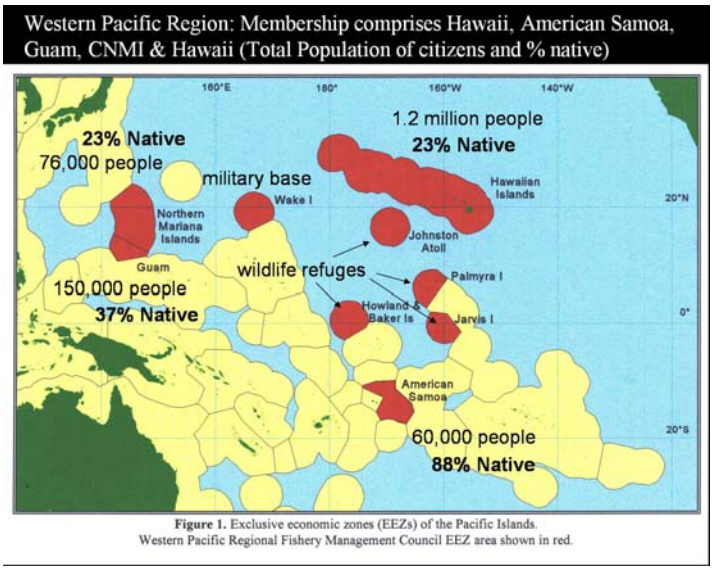


Figure 1. Exclusive economic zones (EEZs) of the Pacific Islands. Western Pacific Regional Fishery Management Council EEZ area shown in red.

Formal Council review of SSC membership occurs; however, for the most part SSC members are allowed to serve for as long as their participation reflects a continued desire to serve. Vacancies are filled as needed from recruits suggested by SSC members, Plan Teams, Council staff, and other Council Family participants.

Three-day SSC meetings are held three times a year in Honolulu. Under current practice SSC meetings are held on Tuesday, Wednesday, and Thursday of the week prior to a Council meeting. This mid week session allows SSC members a weekday of travel time at both ends of their meeting. It further allows staff time for document preparation and travel to Council meetings that are not always held in Honolulu.

SSC members are seated around a rectangular table. Two or three seats at the head of table, next to the Chair, are reserved staff, the Executive Director, and others making presentations to the SSC. Rostrums are not used. Audience seating is arranged behind the table so that the Chair has full view of all participants. A sound system and separate audience viewing screen are provided. Each position at the SSC table is equipped with a microphone, and cordless microphones are available for audience participation and presentation needs. A stenographer records all SSC discourse including public comment. The resulting transcript constitutes the official SSC record.

Agendas are prepared by staff in consultation with the Executive Director and the SSC Chair for timely publication in the Federal Resister. Documents are circulated to members prior to the SSC meeting via hard copy, thumb drive (sent express mail), and Council web-site access. Items requiring immediate SSC action are clearly noted as "action items" on the agenda. This allows members to more efficiently focus their attention on critical issues. SSC meetings often contain informative presentations by staff and Pacific Islands Fisheries Science Center (PIFSC) scientists regarding ongoing research and data analysis related to issues of SSC and Council interest.

The Western Pacific Regional Fishery Management Council SSC does not have a written SOPP regarding procedures. Most have arisen over time and reflect a consensus style common to Pacific island tradition and are frequently used by the Region's international organizations. Votes are not taken. Business is conducted by consensus-building. Generally, the Chair declares a consensus on an issue whenever there is no overtly expressed objection.

At the beginning of each meeting the Chair appoints one or more rapporteurs for each agenda item. Rapporteurs are selected based on their expertise relative to the agenda item. The number of rapporteurs assigned to an item increases with the complexity or controversy of the issue. Rapporteurs are responsible for capturing the essential wording and reasoning for any SSC recommendation arising during their assigned agenda item.

During the meeting Council staff and/or PIFSC scientists review data and analysis related to each action item on the agenda. Staff often provides a decision matrix that is used to frame SSC discussion and deliberation. Contributive public comment as well as comment from Council staff, PIFSC

scientists, and Pacific Island Regional Office staff is allowed at the Chair's discretion during SSC deliberations. Public comment is solicited on each agenda action item before final SSC consensus is reached. All non-SSC contributors are requested to state their name and affiliation for stenographic recording purposes.

Draft rapporteur reports are submitted in writing on the last day of the meeting. They are dealt with sequentially. Each report and its associated recommendations are discussed and reviewed in detail by the entire SSC. Often the previous days' opinions and arguments are revisited. If necessary minority opinions are incorporated into the final report in order to facilitate a consensus. Agreement is sought paragraph by paragraph until a consensus is reached on the entire report. In each case the Chair declares a consensus after determining that members have no further expressed objection.

After the meeting council staff, in consultation with the SSC Chair, prepares final SSC Reports to the Council. These Final Reports contain SSC recommendations and other advice along with introductory and supporting material. Final SSC Reports to the Council are emailed to SSC members immediately upon completion. The SSC Chair or his designee delivers written SSC Reports to the Council. The Reports are summarized or read in detail and questions are taken. Over time the SSC Reports to the Council have come to contain standard wording that reflects the relative importance of SSC concern regarding issues.

A most important and firmly held SSC consensus is reflected in wording such as:

"The SSC recommends…."
"The SSC reiterates its previous recommendation…."
"The SSC continues to recommend…."

A slightly less important or less firmly held consensus is reflected in wording such as:

"The SSC expresses concern…."
"The SSC reiterates its previous concern…."
"The SSC calls the Council's attention to…."
"The SSC notes that…."
"The SSC believes that…."

A widely held but not universally held SSC opinion is reflected in wording such as:

"Some members felt that…."
"It was noted by some members that…."

A request by SSC for information or action is reflected in wording such as:

"The SSC requests…."
"The SSC suggests…."

Periodically the Council staff compiles a list of research topics that have arisen during Council subcommittee meetings, public hearings and staff discussions. The SSC reviews this list, adds its own suggestions and recommends priorities. After Council approval this list is forwarded to the PIFSC and other regionally-based research institutions.

Q & A

A question was asked if the WPFMC SSC report is a single report or if is broken into sections or multiple reports. Paul Callaghan stated that the SSC statement is developed to match the SSC agenda and that the Council receives one report, but that report is broken up into sections and sent to the appropriate advisory bodies. John Siebert added that the tenor of WPFMC SSC discussions is collegial although there are strongly held opinions and heated debates. Disagreements occur and everyone's opinion is heard. In rare circumstances and when appropriate, minority opinions are reflected in the SSC statement. In most cases a statement can be worded to get consensus. Sam Pooley noted that during his tenure on the WPFMC SSC, he tended to be an outlier and that he often allowed a consensus to be reached so long as his opinion was heard. Paul Callaghan noted that this style of dialogue is the Pacific way. Consensus is a tradition in the Pacific and there is a relatively small pool of scientists in the region who have known each other for a long time.

There were questions about turn over and attendance rates on the WPFMC SSC. Paul Callaghan stated a vacancy is rare and the SSC receives a new member every 2-3 years. He added that

over his 25 years, the size of the WPFMC SSC has been as low as 11 and that it is currently at its highest level, 18. Never has there been more than two new members added at the same time. Regarding attendance, it is common to have at least 14-15 members and never less than 12.

It was noted that the WPFMC SSC does not meet concurrently with its Council. It was further noted that are financial benefits to meeting together, and it also allows interaction between the SSC, the other advisory groups, and the Council. Paul Callaghan responded that the WPFMC SSC members do not miss going to the Council sessions and added that Council members often attend SSC sessions under the current arrangement.

It was noted that reef fish make up only 5% of the catch in the WPFMC, yet the catch is very important to communities. A question was asked about the amount of time the WPFMC SSC spends on reef fish issues relative to the pelagic species. WPFC SSC members agreed that it varies considerably, and the time spent on reef fish issues is increasing, but the SSC attention to particular species or species groups is not in proportion to the size of the fishery.

A participant inquired about the relationship between the region's stock assessment community and the SSC. John Seibert noted that the assessment scientists at the Inter-American Tropical Tuna Commission are very involved with the SSC on pelagic species issues. Regarding reef species, it is bit less clear as to who is an assessment lead, but the SSC has managed to get the information and the scientific support necessary for review.

A question was asked regarding how the concerns and comments about science are heard from the indigenous people. Paul Callaghan stated that many SSC representatives bring the perspectives of native communities to the meetings, but most of the native peoples' input comes via the advisory committees and the Council itself.

North Pacific

Presenter - Pat Livingston, SSC Chair

The North Pacific Fishery Management Council's Scientific and Statistical Committee (SSC) is critical to the success of the sustainable fisheries management program in Alaska. The SSC provides peer review of scientific analyses that form the foundation for decision-making by the Council, and establishes the annual catch limits for groundfish fisheries. The structure of the SSC and its peer review procedures are established in the NPFMC SOPPs.

The SSC currently consists of 16 members from a variety of disciplines: fisheries ecology and population dynamics (10), fisheries economics (2), marine affairs social anthropology (1), seabird and marine mammal specialists (3). Of the total, eight are from federal agencies (NMFS, USFWS) or state marine fisheries agencies (AK, OR, WA), and eight are from academic institutions. The multidisciplinary nature of the SSC provides a fuller awareness of biological and social dimensions of any particular harvest strategy, including changes in productivity, associated risks, potential impacts on non-target species, and social and economic tradeoffs involved. The SSC report integrates these perceptions and offers a fair characterization of impacts.

For the most part, SSC members serve as long as they wish to participate. Although SSC members serve one year terms and are appointed by the Council annually, there are no term limits so membership generally changes only when vacancies arise (approximately 1.8 vacancies per year, based on 1995-2008 data). The longest serving current member (T. Quinn) has been with the SSC for 23 years. New members are normally recruited by the SSC to fill a vacancy or obtain additional expertise in a given field. Additionally, the Council annually issues a call for SSC nominations, but few members are recruited this way. Officers (Chair and Vice-chair) are selected annually by the SSC membership.

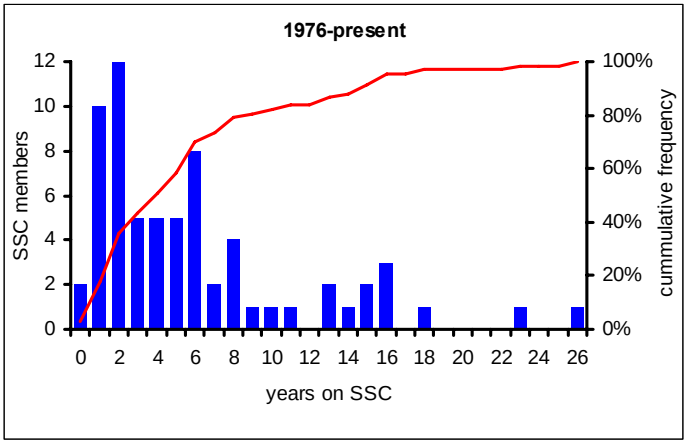
The North Pacific Council SSC meets five to six times per year, and where possible, in the same hotel as the Council and its Advisory Panel. The SSC convenes for 3 days

(typically Monday through Wednesday), is fully concurrent with the Advisory Panel meeting and overlaps with the Council meeting on the third day. The meeting room is set up with a 'U' shaped table for SSC members, and theater seating for 40 or so public to attend. A sound system is used to amplify the discussion, but no recordings are made. A sign up sheet is provided for those wishing to testify to the SSC. Public testimony is commonly taken, with the focus on scientific aspects of a given issue.

The primary functions of the SSC are: 1) to provide peer review of biological and economic analyses prepared for Council decision-making and 2) to establish annual catch limits for groundfish stocks. Additionally, the SSC provides guidance to the Council on data collection programs and provides other ongoing scientific advice, prepares comments on national standard guidelines and biological opinions, and develops 5-year research priorities. Lastly, the SSC serves as the peer review body for influential scientific information pursuant to the Information Quality Act.

Each SSC meeting agenda is set by the SSC chair in consultation with the Executive Director and/or Deputy Director. Normally, the SSC will address all Council agenda items that are at the 'initial review' draft stage (first draft of a complete analysis of alternatives), as well as agenda items dealing with data collection, annual catch specifications, or ecosystem-based-management issues. On occasion and when time permits, the SSC may also hold a "mini seminar" to get up-to-date information on ongoing research related to an area of particular interest to the SSC and the Council.

Approximately two to three weeks before the meeting, SSC members receive analyses in the mail from the Council office. At this point, the SSC Chair assigns 2-3 members to be leads for each particular agenda item. The leads are responsible for understanding the details of the analysis, leading the SSC discussion and deliberation of the issue, and preparing the first draft of the written summary of the deliberations and SSC recommendations. At the meeting, the process begins with a presentation of the issue by staff, and clarification questions are asked by SSC members. Public testimony is taken, followed by SSC deliberation. The Chair summarizes the SSC comments, and a written summary is prepared and reviewed by the full SSC the first thing in the morning the following day (or later in the same day for agenda items on the last day of the meeting).



The SSC reviews all technical analyses for proposed plan or regulatory amendments before they are officially released to the public. These analyses include NEPA assessments (EAs and EISs) and scientific analyses required by other applicable laws (e.g., Regulatory Impact Reviews and Regulatory Flexibility Analyses). Generally, all of these are packed together as single analytical packages and reviewed by the SSC in its entirety to ensure that the best available scientific information is provided for public comment and final decision-making. In reviewing any analysis, the SSC focuses on appropriateness of the input data, methodology applied, and conclusions drawn. The SSC provides comments and recommendations to the analyst to improve the analysis. The SSC also makes a recommendation to the Council as to its adequacy; i.e., whether or not the analysis is ready to be released for public review. If an analysis is deemed deficient and major revisions are required, the SSC will recommend that the analysis not be released, with the expectation that a revised analysis would be reviewed by the SSC for adequacy at a subsequent meeting. On a rare occasion, the SSC may recommend that an analysis not be released, but due to time pressures the Council has decided to release the document to the public once staff revises the analysis to the extent possible based on revisions

suggested by the SSC. In those cases, the SSC is usually provided an opportunity to review the revised analysis and make comments prior to final action by the Council.

The SSC has a long history of providing research priorities to the Council. Each year, the various plan teams (groundfish, crab, and scallop teams) review the Council's 5-year list of research priorities and provide updated research needs to the SSC. The SSC in turn, reviews the plan team suggestions, discusses their own views, and revises the research list accordingly. The Council generally accepts the SSC recommendations, but may reprioritize the list slightly to reflect management needs. The Council then forwards the list to NMFS and other federal and state research agencies, as well as universities and other institutes that fund or conduct marine research off Alaska.

The SSC provides the final level of peer review for stock assessments, and sets the annual overfishing level (OFL) and Acceptable Biological Catch levels. The plan teams provide the first level of this review, and the SSC often agrees with the team recommendations on OFL and ABC.

The SSC provides both an oral and written report to the Council. The written report (minutes) reflects the general consensus of the SSC. The SSC does not vote on issues, and there are no minority reports. The draft minutes are finalized at the conclusion of the SSC meeting, and are copied and distributed to the Council and public when completed. The oral report to the Council is given by the SSC Chair (or designee) for each individual agenda item, following the staff summary of the analysis, and prior to public testimony. Usually, there are questions from the Council regarding the SSC deliberations or recommendations. Due to lengthy Council meetings, and in consideration of the SSC Chair, the Council may take the remainder of the oral SSC report well before the Council addresses all of its agenda items.

Being a member of the North Pacific Council's SSC is challenging in terms of workload, but also rewarding, with each member having an individual and important role in the stewardship and sustainability of the regions resources and fisheries.

Q & A

A question was asked about the criteria the NPFMC SSC uses in determining what is the "best scientific information available." Terry Quinn responded that the SSC does not use a single set of criteria or a checklist for such a determination, rather we review information based on generally accepted scientific standards, the application of strong methods, and whether correct conclusions were drawn.

Several SSC members from around the nation are concerned about the mandatory timelines involved with many fishery issues and the pressure this puts on timely decisions, even if the decisions may be based on incomplete or inappropriate scientific advice. Keith Criddle added that if the NPFMC SSC determines that a document is inappropriate for management, it reports these findings to the Council to help prevent a Council decision that could be successfully challenged. The Council appreciates SSC input on these matters.

A question was asked about recusals for SSC members, and how SSC members avoid reviewing their own work. Pat Livingston clarified that SSC members with a hand in developing a particular analysis are not assigned as leads for that issue. However, she noted that it is helpful to have them in attendance to assist with questions and clarifications, but they do not participate in the deliberations or development of minutes for that issue.

Pacific

Presenter - Bob Conrad, SSC member

The full SSC meets during scheduled meetings of the Pacific Fishery Management Council (PFMC) which occur five times per year (March, April, June, September, and November). SSC meetings are typically two-day events scheduled at the beginning of the Council week. In addition, the SSC has formed subcommittees, with Council approval, for specific FMPs or to address issues that are emerging and of great interest to the Pacific Council. These subcommittees often meet outside the normal Council meeting schedule but on an irregular basis. The form and function of SSC subcommittees are discussed in more detail under the "Document Review and Staff Presentations" section.

There is no formal seating arrangement for the SSC of the PFMC. The tables in the meeting room are typically arranged as a four-sided box and people decide on their own where they would like to sit.

There is time identified on each SSC agenda for public comment, usually in the afternoon of the first meeting day. Comments on items not on the SSC agenda are allowed. SSC meetings are open to any member of the public who wishes to attend. It is the discussion leader's, or SSC Chair's, prerogative to solicit input from the general public in attendance. When discussions are occurring, public comment is usually allowed if there is time on the agenda.

Guidelines for the composition of the Pacific Council's SSC are provided in the PFMC's Council Operating Procedure (COP Number 4). There are 17 designated SSC members. The COP specifies that "The Council shall strive to include on the committee three social scientists, of which at least two shall have economic science expertise." More generally, the Council strives to recruit and appoint members that reflect the range of expertise needed for all Council FMPs. The COP specifies that SSC membership will consist of the following agency representation:

A. One member from each of the state fishery management agencies: (1) Washington Dept. of Fish and Wildlife, (2) Oregon Dept. of Fish and Wildlife, (3) California Dept. of Fish and Game, and (4) Idaho Dept. of Fish and Game,
B. National Marine Fisheries Service: (1) one member from the Alaska Fisheries Science Center, (2) two members from the Northwest Fisheries Science Center, (3) two members from the Southwest Fisheries Science Center,
C. One member from a West Coast Tribal fishery management agency, and
D. Seven at-large positions.

The at-large positions are typically filled with representatives from industry, academia, NMFS, and Tribal fish management agencies. At-large positions serve three-year terms. All other agency appointments are indefinite.

There is an attempt to maintain a balance of expertise on the SSC. Other than the social scientists guideline specified in COP 4, the SSC tries to maintain expertise in the other FMPs (salmon, groundfish, coastal pelagic, etc.) Because of the larger workload associated with the groundfish stock assessment and review process, an effort is made to ensure there is a sufficient number of members with groundfish expertise that can participate in that process.

When an at-large position becomes vacant, the PFMC issues a request for nominations for the positions. The SSC reviews and comments on the qualifications of the nominees. The Council takes these under consideration when making the final decision on an appointment.

An SSC Chair and Vice Chair are elected by common vote of all SSC members every two years. Typically, the plan is for the Vice Chair to assume the Chair after the two-year term with an affirmation vote.

Prior to the Council meeting, Council staff identifies items needing SSC review and produces a draft of the SSC agenda for approval by the SSC Chair. The SSC occasionally adds items to the agenda that need SSC discussion but may not be on the Council agenda. Typically, these are planning items pertaining to workshops. The SSC Chair identifies one SSC member as a discussion leader and another as a rapporteur for each agenda item. It is the discussion leader's duty to ensure that (1) the agenda item is thoroughly discussed and that the discussion stays focused on the matters important to the Council, (2) all SSC members are allowed to get their questions answered by any experts presenting material, and (3) at the end of the discussion the advice needed by the Council has been provided. It is the rapporteur's duty to ensure that the main points of SSC discussion are captured by the statement, (2) that the strengths and weaknesses of the science under discussion are relayed to the Council, and (3) that the conclusions and recommendations of the SCC to the Council are clearly stated.

Typically PFMC staff schedules one or more experts to discuss the agenda item with the SSC and answer questions. A specific amount of time on the agenda is allocated for the presentation of the agenda item and discussion by the SSC. Typically one to two hours are allocated for an agenda item. This relatively short amount of time for presentation and discussion requires that SSC members familiarize themselves with the agenda item beforehand by reading all briefing materials provided prior to the meeting.

Statement preparation is sometimes an arduous process involving two to three, and sometimes four iterations for SSC review including comments, corrections, and additions to the original statement, and a final review by members before SSC approval.

Once the SSC has finalized its statement, copies are provided to Council members and made available to the public. When the agenda item is under discussion by the Council, the SSC Chair, or a designated SSC member, reads the statement to the Council and answers any questions the Council may have concerning the statement itself, or the discussion that occurred in the SSC.

The PFMC's Council Operating Procedure (Number 12) addresses "Update and communication of Research and Data Needs". It specifies that the Council "will update and maintain a research and data needs document which lists and prioritizes Council research and data collection needs for each fishery management plan". The goal is to update this document every five years. Preparation of the Research and Data Needs document is primarily the responsibility of the SSC with assistance from Council staff and input from other Council advisory bodies. After a draft document has been prepared by the SSC, it is submitted to the Council for comment by other advisory bodies and Council approval of a draft for public review. After reviewing comments from the public and Council advisory bodies, the Council adopts its Research and Data Needs document. If the need arises, the Council may modify the Research and Data Needs document outside of the 5-year cycle.

Much of the in-depth document review occurs at the SSC subcommittee level. Currently, there are six subcommittees within the SSC:

1. Salmon
2. Groundfish
3. Coastal Pelagic Species
4. Highly Migratory Species
5. Economic, and
6. Ecosystem-based Management.

Prior to the Ecosystem-based Management subcommittee there was a Marine Reserves subcommittee. Subcommittee membership is voluntary but each SSC member is encouraged to participate in two subcommittees.

Subcommittees provide a number of functions:

1. If a technical issue or document requires more review than can be given at a regularly scheduled SSC meeting, the appropriate

subcommittee will meet, conduct a review, and prepare a draft statement for presentation to the entire SSC. Typically, a subcommittee member will verbally report on the subcommittee meeting to the full SSC.

2. The Groundfish Subcommittee is responsible for the coordination of the meeting and providing a chair and at least one other SSC member to participate in the Stock Assessment Review (STAR) Panel process.
3. The Salmon Subcommittee meets every October to review new, or substantially revised, methodologies and models that are proposed for use by the Council for salmon management in the upcoming management cycle.
4. When there are issues that are of ongoing concern to the Council, an SSC subcommittee will often collaborate and produce a "white paper" on that topic. Two white papers that have been produced by SSC subcommittees are: Marine Reserves: Objectives, Rationales, Fishery Management Implications and Regulatory Requirements (Marine Reserves Subcommittee, Scientific and Statistical Committee, Pacific Fishery Management Council, September 2004) and Overcapitalization in the West Coast Groundfish Fishery: Background, Issues, and Solutions (Economic Subcommittee, Scientific and Statistical Committee, Pacific Fishery Management Council, March 2000).
5. Planning and coordinating workshops addressing technical issues important to the PFMC.

The SSC of the Pacific Fishery Management Council is a consensus body. All statements regarding items on the agenda that result in advice to the Council are developed by the SSC as a whole and approved by consensus. Council staff assemble all statements that are produced by the SSC during the meeting into the minutes of that meeting for SSC review and approval at the next meeting.

Q & A

The question of minority reports and reaching consensus rather than voting was discussed. In New England, the discussions and deliberations are collegial, but coming to consensus on matters is often difficult. Even though the advice may be confusing to the Council, the NEFMC SSC statements often contain issues for which consensus was reached, but they can also include minority positions.

The group was curious about statement development at the PFMC SSC. Bob Conrad noted that the statements are compiled, reviewed and completed during the public meetings, but draft versions of statements are generally not distributed. He added that PFMC SSC meetings are not recorded. He further added that the PFMC SSC does not recommend a preferred alternative to the Council when reviewing alternatives, rather the SSC advises on the strength of the scientific information that informs the decision. The choice of a preferred alternative is appropriately left to the Council.

The use of subcommittees was discussed and Bob Conrad noted that the SSC subcommittees do not meet during an SSC meeting and generally precede SSC meetings by as little as a day and as much as a month. He reported that the extra time necessary for subcommittee work is very dependent on the subcommittee; the highly migratory species subcommittee has met once in last ten years, the salmon subcommittee meets 1-2 times a year, and the groundfish subcommittee has an intensive schedule, particularly when the STAR process is active.

Gulf of Mexico

Presenter - Walter Keithly, SSC Chair

The Gulf of Mexico Fishery Management Council's Standing Scientific and Statistical Committee (Standing SSC) consists of 16 members from various disciplines: biology and population dynamics (9), sociology and anthropology (3), economics (2), law (1), and statistics (1). Members and officers of the SSC are appointed by the Council for a period of two years and may be reappointed at the pleasure of the Council. One member of the Standing SSC has served for almost 30 years while another four were appointed prior to 1996. Conversely, 10 members of the Standing SSC have been appointed since 2004. Twelve of the Standing SSC members are from academic institutions while two members are from state agencies. The Chair and Vice-Chair of the Standing SSC are elected by its members (or may be designated by the Council at its discretion). The Chair or Vice-Chair presides when the Standing SSC is convened and is responsible for summarizing committee consensus when advice is requested by the Council. Overall, the Council recruits new members for the Standing SSC with only limited input from the current SSC membership.

In addition to the Standing SSC, the Council has established a number of Special Scientific and Statistical Committees (Special SSCs). Most of these Special SSCs were established in association with the individual management units (i.e. Fishery Management Plans). With exceptions, these Special SSCs consist of three to five members who are especially knowledgeable about each specific fishery in the management unit to which they are appointed. Individuals appointed to these Special SSCs are generally biologists. The Council has also established an Ecosystem SSC and a Socioeconomic Panel (SEP). Both of these Panels are comprised of 12 members with appointments based on expertise in a given area.

The Standing SSC meeting agenda is set by the Executive Director of the Gulf of Mexico Fishery Management Council in consultation with the Standing SSC Chairman. The Standing SSC meets approximately four times per year with meetings generally lasting two to three days. Depending on the issue(s) to be considered at a given meeting, the Standing SSC will generally meet with one or more of the Special SSCs. Thus, the potential number of participants at any given meeting can exceed 20. When the agenda is very limited or there is a time-sensitive issue to be considered, the Standing SSC along with any Special SSCs may be convened via conference call. In general, the Standing SSC does not meet with the Ecosystem SSC or the SEP. However, the Standing SSC will review the output provided by these Panels.

All SSC meetings (including conference calls) are open to the general public and the Chairman provides ample opportunity for public input. At the discretion of the Chair, input by the public may occur at any point during the meeting or may be reserved for a specific period of time during the meeting. In general, the Chair attempts to be flexible with respect to this issue and will generally allow public input at any time during the meeting if he is of the opinion that the public input may be beneficial to the deliberative process. At a minimum, public input is permitted at the conclusion of SSC discussion of an agenda item and before any formal action is taken on the agenda item.

A member of Council staff, National Marine Fisheries Service, or other appointed individual will generally provide a formal presentation on the agenda item being considered by the Standing SSC (and Special SSCs). After the presentation, the SSC deliberates and these deliberations often lead to one or more formal motions. The motion is voted upon and a "roll call" vote may be taken in rare instances.

All SSC meetings are recorded and minutes of the meetings are subsequently transcribed. These minutes, which will include a summary of discussions, motions, and votes are then distributed prior to the next relevant SSC meeting. The minutes are then approved with appropriate changes. A summary of the minutes is generally provided to the Council and either Council staff or the Chairman of the SSC will present the SSC report to the Council at the appropriate Council meeting.

Attendance and participation by Standing SSC members has been, and continues to be, an area of concern. Eleven members of the Standing SSC have an appointment span of approximately three years which covers 11 meetings. Two of these 11 members have made only four of the 11 meetings while a third made only five meetings. Only five of the 11 members made eight or more meetings. Attendance rates by the newer SSC members (i.e., those whose terms do not span the last 11 meetings) do not appear to be any higher than the longer-serving members.

The Standing SSC (and Special SSCs) provides many functions for the Council. First, it advises the Council on the adequacy of scientific information and support analyses for proposed management measures and alternatives in FMPs and amendments. The emphasis of the SSC is on evaluating the scientific data and logic on which the management measures are based rather than selecting management measures. The Standing SSC (and appropriate Special SSCs) is also tasked with assessing the appropriateness of the problem statements and adequacy of objectives in solving these problems. It may also suggest additional or revised problems, objectives, and management measures and may indicate which measures are most effective in achieving the objectives.

More recently, the Standing SSC (and appropriate Special SSCs) has been tasked with providing the Council with recommendation for establishing ACLs for each managed fishery that may not exceed the fishing level set by the SSC, and associated AMs. While always providing research advice to the Council, the Standing SSC has, more recently, also been tasked with developing multi-year research priorities for

fisheries, fisheries interactions, habitats, and other areas of research that are necessary for management purposes.

The Standing SSC (and Special SSCs) is also given the task of reviewing all stock assessments. These reviews cover both benchmark assessments (very detailed assessments that undergo peer review prior to the SSC review) and assessment updates (assessments that are less detailed than the benchmark assessments). The Standing SSC has been struggling for several years to properly identify its role with respect to the benchmark assessments since these assessments are peer reviewed by members of the Center of Independent Experts. Given the relatively large percentage of SSC membership that has no formal stock assessment background, furthermore, there has been recent discussion as to whether the Standing SSC, as a body, can adequately review the stock assessments (either benchmark or updates).

Q & A

The group was intrigued by the lack of NMFS representation on the GMFMC SSC. Walter Keithly stated that an effort was made in the 1990s to remove NMFS representatives as they were very involved with the stock assessment work and the SEDAR process was not yet in place. It was an effort to avoid having reviewers reviewing their own work.

Walter Keithly further noted that unlike some other regions, the GMFMC SSC conducts frequent votes and motions with an occasional role call vote taken. Consensus is not required.

There was a question about how the SSC meeting schedule is arranged and how SSC recommendations are conveyed to the Council. Walter Keithly stated that the SSC chair determines the schedule in response to requests by the Council and in conjunction with the Council staff. The timing of the SSC meeting is depended on when fishery management plan amendments are available and when SSC members are available. Due to the large amount of academics on the SSC, participation by the full SSC is problematic. Representative SSC members and the SSC Chair deliver the statements to the Council.

The group was also curious about the unique use of "special SSCs" and how they function. Walter Keithly noted that most reports of the special SSCs go first to the standing SSC, but in unique situations, due to meeting timing and availability, some items go directly from the special SSC to the GMFMC.

The group found some discomfort in the notion that Federal or NGO scientists cannot objectively review science and felt that such a policy sends an undesirable message to the stakeholders. Rick Leard clarified that the rationale for the policy was developed before the SEDAR peer review process and was not an attempt to discredit scientists, but rather to avoid conflicts of interest. He noted that the policy may be outdated now that SEDAR is active and that GMFMC is looking into the matter, including the role of the SSC, before the next appointment process.

South Atlantic

Presenter - Luiz Barbieri, SSC member

The South Atlantic Fishery Management Council (SAFMC) SSC currently consists of 16 members from a variety of disciplines: fisheries ecology and population dynamics (13), fisheries economics (2), and marine affairs and social anthropology (1). Of the total, eight are from NMFS or state marine fisheries agencies (NC, SC, GA, and FL), six are from academic institutions, and two are independent experts with no institutional affiliation. Recruitment of SSC members is mostly informal (word of mouth). However, during the last recruitment process (spring 2008) we solicited more broadly through an announcement on the AFS regional list servers and on the Council website and newsletter. Terms are currently indefinite for members, but the Council does review attendance and participation and consider needs about once a year. Officers are elected annually and typically serve two terms, though there is no formal limit on the number of terms a member can serve.

The SAFMC SSC meetings are held twice a year (June and December), in conjunction with Council meetings. The SSC convenes for 3 days (typically Sunday through Tuesday). The meeting room is set up for a 'U-shaped' table for SSC members, and theater seating for observers and the public. Meetings follow Roberts Rules with regard to motions and actions, and are recorded and transcribed for the administrative record. SSC meetings are open to the public but have no formal process for public input. Public input is usually allowed at the discretion of the Chair.

The meeting agenda is prepared by Council staff in consultation with the SSC Chair. Agenda item discussions are typically preceded by a staff presentation (may include numerous informational and update reports). A written SSC report is prepared by the end of the meeting and submitted to the Council. The SSC Chair and Vice Chair present a brief summary report to the Council and address questions.

The SSC receives every Council meeting Briefing Book (distributed via CD but also available on the SAFMC website and html-

linked agenda). Other supporting documentation may include scientific articles and agency reports relevant to agenda items and issue discussions. A key document for organization and conduct of SSC meetings is the "SSC Roadmap." The SSC Roadmap is a detailed guide to SSC actions and tasks that tracks the meeting agenda, provides an overview to each SSC action item, as well as a timeline for FMP amendments and long-term projects. Specific questions or requests are noted for followup or research. The Roadmap is prepared by staff but may be revised through input and suggestions from the SSC.

SSC task management is based on the Roadmap. Each member is asked to volunteer for tasks or else the Chair will make assignments. Tasks are assigned for the 'life' of the task—an FMP amendment may stay in the Roadmap for several years. An SSC member assigned to a task takes the 'lead'; some tasks have multiple leads, some members have multiple tasks. The task lead initiates discussion on those specific tasks and is responsible for writing and editing that portion of the SSC report. However, all issues are generally discussed and decisions are made by the entire SSC.

A written report addressing issues outlined in the Roadmap is prepared by the SSC (the entire committee, not the Chair) and presented to the Council. The report is prepared during the last day of the SSC meeting (the 'work day') completed by end of meeting (some sections may be required earlier). The report includes the list of motions and recommendations, justification for actions, and a summary of SSC deliberations and positions. Consensus is desired, but multiple viewpoints are supported.

The SSC provides peer review of biological and economic analyses prepared for all SAFMC proposed FMPs or regulatory amendments, and provides recommendations on allowable biological catch levels for SAFMC-managed stocks. Additionally, the SSC provides the final level of peer review for stock assessments, develops the list of five-year research priorities (including guidance on the development of integrated, large-scale data collection programs), as well as other ongoing scientific advice.

Q & A

A question of clarification was raised as to how the SAFMC SSC reaches a decision. Luiz Barbieri responded that the SSC follows Roberts Rules and makes motions for all action items. However, in most cases the motions are adopted by consensus, but occasionally consensus can't be reached and a vote is taken. If the vote is unanimous the Council is informed of the results, otherwise they do not see the results of the vote.

Since the SSC meets only twice per year and the Council meets four times per year, a question was raised regarding how the other meetings are covered. SAFMC SSC members responded that Council staff organizes the agenda for the SSC meetings such that all the Council needs are met and in some cases Technical Committees are utilized to fill the gaps.

The issue was raised as to how the SSC interacts with the SEDAR process and what happens if the SSC disagrees with a SEDAR conclusion or outcome. The response was that the SSC usually has two members who participate in the SEDAR process, so in general disagreements between the SSC and SEDAR do not occur. This raised the issue of how the SSC is to serve its function as an independent review body once some of its members become imbedded in the stock assessment process. It was noted that the PFMC SSC occasionally disagrees with STAR panel reports in which case the issue is normally resolved quickly by a "mop up" panel.

The issue of authorship of SFMC SSC report was raised. Liuz Barbieri and Carolyn Belcher responded that the SSC reports are written by individual members of the SSC. The SAFMC staff constructs a Roadmap report which helps to guide the Council and SSC through various management actions.

Caribbean

Presenter - Barbara Kojis, SSC Chair

The Caribbean Fishery Management Council (CFMC) has responsibility for managing the federal fisheries of the US Caribbean (Puerto Rico, US Virgin Islands, and Navassa Island). The CFMC's SSC provides scientific and technical advice to the CFMC on a wide variety of issues associated with fisheries management. The role of CFMC's SSC has expanded with the reauthorization of the MSA. As a result of the increased responsibility, a new draft SOPPs has been developed for the SSC that outlines objectives and duties, membership composition, terms of members, selection of the Chair, and administrative rules. The draft SOPPs are under review.

The SSC is composed of 9 members appointed by the CFMC for two year terms. They can be reappointed at the end of their terms. There is no limit on the number of terms that they may serve. If a member resigns, etc., the vacancy is filled for the remainder of the unexpired term of the vacancy. The chair of the SSC is appointed by the Chair of the CFMC from among the SSC members and serves at the pleasure of the Council Chair. When a vacancy needs to be filled, the CFMC usually asks for recommendations from the NMFS Southeast Regional Office (SERO), local government fisheries agencies, and SSC members. Current SSC members are local or federal government scientists, university professors, and independent experts. They have a wide range of relevant expertise in stock assessments, fisheries management, habitat protection, and the social and economic issues related to fisheries at the federal and local level.

Traditionally the SSC convenes for one day once or twice a year at the request of the CFMC to provide advice on draft Fishery Management Plans (FMP) and amendments to FMPs. Meetings have generally been held a week or two prior to Council meetings. Frequency is dependent on the issues confronting the CFMC and the availability of relevant information from the Southeast Fisheries Science Center (SEFSC). With the larger role of the SSC in regional fisheries management, it is anticipated that in the future the SSC will meet prior to most CFMC meetings and for an increased number of days. It has been the responsibility of the chair to report the recommendations of the SSC at the next CFMC meeting. The chair usually is present for the whole period of the Council meeting to answer questions related to SSC recommendations and contribute to the discussions.

Meetings have traditionally been convened at the request of the Chair of the CFMC and held in San Juan, Puerto Rico. Under the draft SOPPs, the SSC will meet as a whole or in part at the request of the SSC chair with the approval of the CFMC chair as often as necessary, taking into consideration budget constraints. The SSC members sit at a U-shaped table facing a projection screen. Theater seating is available for the public. SSC business is conducted in English with simultaneous translation in Spanish. If public testimony is in Spanish, it is simultaneously translated into English. A sound system is used to amplify the discussion and meetings are recorded. Summary minutes are prepared by CFMC staff and reviewed and approved by the SSC. The SSC makes decisions either through roll call voting or by a simple aye, nay, or abstain when it appears a consensus has been reached.

The agenda is prepared by the Chair of the Council and reviewed by the SSC Chair before the meeting. Council staff usually types the questions and issues to be discussed on individual Power Point slides prior to the meeting. New agenda items are voted on at the start of the SSC meeting when the agenda

is discussed and approved. These slides are used to help focus the discussion and formulate a written response for the Council. The wording provided by the SSC for each response/recommendation/decision is typed under each question by Council staff, discussed and revised by SSC members, and voted on. The SSC then reports to the Chair of the Council or a Council designee. The slides are often used by the SSC Chair to present the recommendations/decisions of the SSC to the Council.

Documents are submitted to SSC members prior to SSC meetings. The SSC has requested that all relevant documents be available to SSC members a minimum of two weeks prior to the SSC meeting at which they will be discussed. At the meeting, a presentation of the specific issues to be discussed may be made by Council staff, the SEFSC, or an expert on a topic. After each presentation, the presenter answers questions from the SSC. Public testimony is often then taken followed by SSC deliberations and the formulation of a response on a Power Point slide. Once it appears a consensus has been reached a voice vote is taken.

Commercial fishery management in the U.S. Caribbean is difficult because of its multi-port, multi-species (>100 species under active management) and multi-gear nature. U.S. Caribbean fisheries are small scale and as such do not generate income/fees/taxes commensurate with the cost of management and enforcement. In fact, in many cases local fisheries are as important culturally as they are economically. They tie communities together as well as provide jobs for coastal people and local fresh fish for public consumption. Sale of fish supplements income from poorly paid land-based jobs or fills the gap when times are tough and jobs hard to find. There is little or no export of commercially caught fish, almost all is sold locally. While research priorities will be developed when the available data has been analyzed and its adequacy for determining the status of fisheries in the US Caribbean is clear, it has become increasingly apparent that the current data are inadequate for formal stock assessments and even to determine trends in fisheries stocks. Several attempts at stock assessments have been carried out using the Southeast Data, Review, and Assessment process on high priority commercial and recreational fisheries species in the U.S. Caribbean. However, because of inadequacy of the data, no SEDAR stock assessment has been successfully completed. The SSC will be playing an important role in advising the Council, SEFSC, and local governments on the most cost effective ways to collect adequate data for comprehensive fisheries management.

The CFMC's SSC will be embarking on a new role as it takes on the responsibility of setting the annual overfishing level (OFL) and the Acceptable Biological Catch (ABC) levels.

Q & A

There was no discussion following the presentation.

Mid-Atlantic

Presenter - Rich Seagraves, MAFMC Staff

Historically, the Mid-Atlantic Fishery Management Council (MAFMC) has depended on scientific advice from the Northeast Regional SAW/SARC process as the basis for determining the appropriate levels of fishing to prevent overfishing and rebuild overfished stocks for each of it's managed species. Prior to recent reauthorization of the MSA, the Council used its SSC only periodically on an ad hoc basis to answer specific scientific questions not addressed by the SAW/SARC process. However, due to recent changes in federal law governing marine fisheries management coupled with changes in the protocol of the SAW/SARC process (the SAW report no longer provides management advice), the Council is currently redefining the role of its SSC in the development of annual catch limits.

The MAFMC's current interpretation of the proposed National Standard 1 (NS1) guidelines is that the SSC fishing level recommendation (FLR) equates to Acceptable Biological Catch (ABC). The Council also interprets the Proposed Rule to mean that ABC is the level which sets the upper bound for the Annual Catch Limit (ACL), and is the yield associated with the Maximum Fishing Mortality Threshold (MFMT) as reduced based on scientific uncertainty about the MSY estimate for a particular stock or $F_{rebuild}$ if the stock is undergoing rebuilding. The charge to the SSC is to give scientific advice to the Council on levels of ABC that prevent overfishing *and* achieve stock rebuilding if a stock is overfished.

The Council recently formed an ad hoc committee to evaluate its current quota setting procedures and to determine how to most effectively integrate the SSC into the current quota setting process in the light of the new MSA requirements. The committee concluded that SAW/SARC documentation needs to be at a level such that the SSC has a clear understanding of data quality, rationale for and consequences of decisions made during assessment development, and conclusions drawn about stock status In addition, the committee concluded that the use of the SSC in the FLR/ACL development process should strive to strike a balance between avoiding competing assessment situations and maintaining SSC review independence. The committee recommended that the Council modify its annual quota setting process by inserting SSC review of staff recommendation white papers prior to Monitoring Committee meetings. The SSC is to be provided with the staff white papers 15 working days in advance of SSC meetings. The fishing level recommendation of the SSC will set the upper bound for the ACLs subsequently recommended by the Council. While the Council has endorsed this approach, each of its FMPs must be amended to incorporate these changes. In addition, while the Council has concluded that its current quota setting procedures most likely fulfill the new ACL requirements, current accountability measures are under review and may need to be modified, especially for recreational fisheries.

The Council currently plans to have the SSC meet twice annually to make ABC recommendations for its managed species. During the spring meeting (to be held in late May) the SSC will review management recommendations and make fishing level recommendations (ABC) for Atlantic mackerel, butterfish, surf clams, ocean quahogs and tilefish. During the summer meeting (late July) the SSC will review summer flounder, scup, black sea bass, bluefish and spiny dogfish. SSC meetings will be held about two weeks prior to the Council meeting during which the Council will be setting specifications for the upcoming fishing year. SSC meetings are announced in the Federal Register and are open to the public. The public is invited to comment directly at the SSC meetings at the discretion of the SSC Chair. SSC findings are reached by consensus. Council staff act as rapporteurs during SSC meetings and are

responsible for developing summary minutes. After review by the SSC, the minutes are approved by the SSC Chair. The SSC chair attends the ensuing Council meeting to transmit the SSC findings and to answer any questions related to SSC deliberations.

The Scientific and Statistical Committee of the Mid-Atlantic Fishery Management Council is currently composed of 12 members. In light of the expected increase in the demands on the SSC as a result of changes embodied in the MSA, the Council recently revised its SOPPs to allow for expansion of its SSC to 20 members. The current SSC membership is comprised of eight biologists, three economists, and one sociologist. The Council intends to maintain the current distribution of membership by discipline but will be placing a high priority on recruiting new members with expertise in the areas of fish population dynamics and stock assessment. SSC members serve two year terms. Prospective SSC members are nominated by Council members and appointed based on a majority vote by the Council. The Committee may be composed of Federal and State employees, academicians, or independent experts, and each must have strong scientific and/or technical credentials and experience in the biological, statistical, economic, social, and other relevant disciplines. While not currently part of the SOPPs, the Council intends to have the current SSC membership review and comment on the qualifications of prospective new members prior to a Council vote during expansion of the SSC roster.

The Council also utilizes its SSC to respond to specific scientific questions that arise periodically through the course of development of FMP amendments or framework actions. The Council has not routinely utilized its SSC to review analyses or other documents associated with FMP development. The Council currently utilizes Fishery Management Action Teams (FMATs), comprised of Federal, State and Council scientists to review Council documents including all required NEPA documentation. In addition, the Council convenes the SSC at least once annually in conjunction with a Council meeting to develop research priorities which are transmitted to the Northeast Fisheries Science Center Director.

Q & A

There was a question about who owns the SAW/SARC process and who specifies the terms of reference (TOR). The response was that the SAW/SARC is a regional stock assessment process which operates under the purview of the Northeast Regional Coordinating Council (NRCC) which is populated by the executive leadership of the NMFS NE Regional Office, Northeast Fisheries Science Center, Mid-Atlantic and New England Councils and Atlantic States Marine Fisheries Commission. The SAW Chairman develops draft TORs, which are circulated to all interested parties. The NRCC is responsible for establishing the SAW/SARC schedule and the final TORs. Steve Cadrin noted that the Northeast SAW/SARC process no longer provides management advice, and it may be necessary to revise the SAW/SARC terms of reference to include catch advice.

New England

Presenter – Steve Cadrin, SSC Chair

At present, the New England Council is bringing SSC operating policies into compliance with the new provisions of the MSA. As a result, it has adopted a set of policies that the SSC has begun operating under; however, our SSC hopes to use the results of this workshop to recommend possible improvements to current operating policies as well as to best serve the Council in meeting National Standard 1 and National Standard 2 requirements. The SSC will consider the discussion of this workshop at its next meeting on November 17 and recommend any changes in operating procedures for Council consideration on the next day.

The responsibilities of the SSC described in the operating policies basically repeat verbatim the description of SSC responsibilities under the MSA. Additionally, SSC members are asked to serve as members on Stock Assessment Review Committees, a component of the Northeast Stock Assessment Workshop (SAW) process. The workshop usually meets twice annually to provide stock assessments for the NEFMC, MAFMC and ASMFC. The Council also may request SSC advice on any scientific issue of concern to the Council.

The NEFMC SSC is composed of no less than 15 members, nine of which have expertise in fisheries stock assessments, three in fisheries ecology and three in social sciences related to fisheries management. SSC nominees are gathered through a public solicitation and serve for renewable three-year terms. Members of the Council may make recommendations to its Executive Committee prior to the selection of SSC members. The SSC may call upon additional expertise with the approval of the Executive Director. The SSC will nominate from its members a Chair and Vice Chair who both will be confirmed by the Executive Committee for one-year, renewable terms. Members may be compensated when funding is available and will be reimbursed for travel expenses. The Council's Executive Director will provide staff and other support as necessary.

To the extent practicable, the SSC meets regularly the day before and if necessary on the first day of Council meetings and the SSC chair (or appropriate representative) provides a report to the Council. The Council normally meets five times annually and additional SSC or Council meetings may be scheduled if necessary. To complete the work needed to comply with the new provisions will require the SSC to meet more frequently over the next two years.

The NEFMC has developed a set of generic terms of reference for the SSC's major responsibilities in providing the Council advice on management actions. The SSC also has recommended that it be allowed to provide advice not specifically requested (via white papers) but which might be of great value to the Council; for example, advice in dealing with ecosystems or socio-economic issues. Specific terms of reference for each SSC meeting are approved by the Council's Executive Committee.

Prior to the requirement date for Annual Catch Limits (2010 if overfishing, 2011 all others), the SSC will review the scientific basis of all fishery management plans with a focus on methods to derive catch associated with overfishing (OFL), Acceptable Biological Catch (ABC), Annual Catch Limits (ACLs) and Accountability Measures (AMs). The annual schedule of FMPs, amendments and framework adjustments for Council deliberation will be provided by Council staff. An SSC member will be assigned to lead review of each Council agenda item at least one month in advance. This designated SSC lead will work with the SSC chair to identify issues for SSC discussion. In addition to meeting in conjunction with Council meetings, the SSC will schedule additional meetings as needed for additional FMP item reviews and to develop recommendations in the form of 'white papers' for longer-term issues.

The NEFMC SSC currently is proposing the following procedures to provide the opportunity to thoroughly review documents and prepare a detailed report for the Council. The SSC considers each Council request at least one month before the Council deliberates on the issue:

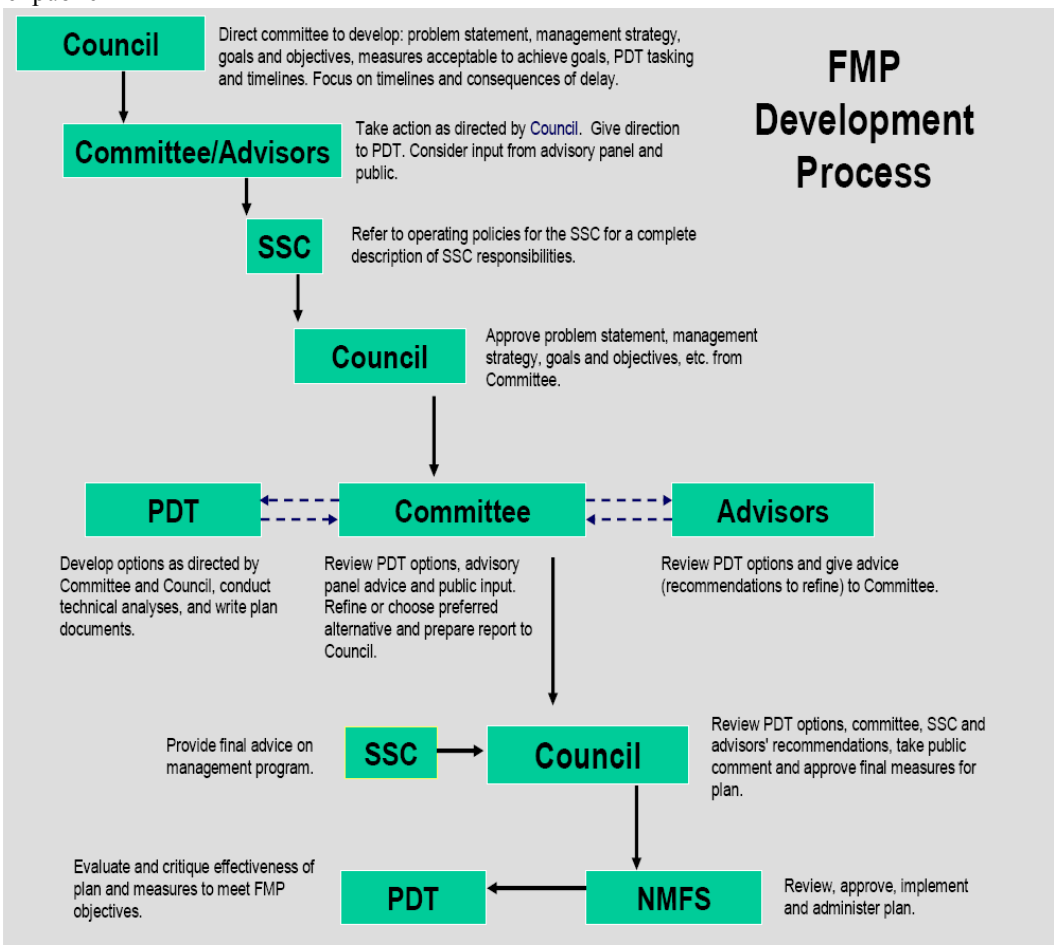
- Month 1 – 'new business'
  - Documents are available for SSC review before the meeting.
  - Critical issues are identified.
  - SSC recommendations are discussed and drafted, if possible.
  - Tasks are delegated for intervening month.
- Intervening work
  - Critical issues are reviewed further, if necessary.
  - Draft recommendations are developed (by correspondence or within subgroups).
- Month 2 – 'old business'
  - Intervening review and draft recommendations are discussed.
  - SSC consensus is developed.
  - SSC recommendations are reported to the Council.

SSC meetings are held in public locations. SSC members sit at a U-shaped table along with support staff. Members of the public usually attend SSC meetings and public comment is invited at the discretion of the SSC chair.

A majority quorum will be sought for SSC recommendations, and SSC recommendations should be consensus statements. The NEFMC SSC believes that consensus statements can identify greatest common perception with caveats, and that majority and minority reports could be included in a consensus statement as a last resort. Only matters of process will be voted on (chair, vice-chair, agenda, etc.). SSC reports will consist of concise recommendations, identification of supporting documents, and technical appendices that document SSC analyses. The meetings are recorded and summaries are prepared; however, the SSC report may substitute for summary minutes when appropriate.

Until final National Standard 1 Guidelines are published the NEFMC decided that all recommendations on ABCs will be explicitly 'interim'. Based on discussions with other regional SSC's, it also commented that:

- ABC determinations do not need to be as complex as specified in the proposed guidelines.
- As long as there are effective Accountability Measures for exceeding ACLs, precautionary targets are not needed.
- The MSA definition of optimum yield suggests that socioeconomic targets less than the ABC would be more appropriate than targets that are based on management uncertainty.
- ABCs and ACLs require a time series of reliable total catch, and can't be supported in data-poor situations. It also noted that many resources have unreliable estimates of total catch; in these situations the SSC needs to advise that there is no basis for setting an ABC, and other management strategies are required.



Q & A

A participant raised a question about potential participation problems, with five meetings of the NEFMC SSC scheduled per year. Steve Cadrin responded that while he shares this concern, the SSC meetings are only two days in duration, starting early on a Monday and ending by Tuesday afternoon, so participation may not be a problem.

A comment was made that MSA lays out a broad range of responsibilities for the SSC and NMFS needs to increase its commitment to the SSCs, especially in the area of funding and compensation, if they expect the SSCs to meet all of their obligations.

A comment was made that in the North Pacific, the role of the SSC is very high profile and SSC members make their participation a high priority. The recommendations of the NPFMC SSC are taken very seriously by the Council. If an SSC's advice is not ignored, then SSC participation is likely to be high.

It was noted that the NEFMC has only one government representative on its SSC, and a participant questioned if this was a result of Council policy. Steve Cadrin responded that while there has been no explicit policy to exclude NMFS scientists from the NEFMC SSC, the Council has limited their participation historically to retain the group's autonomy. The NEFMC is currently re-evaluating that policy. Prior to the SAW/SARC process, stock assessments in the NE were conducted exclusively by NMFS scientists, so NMFS membership on the NEFMC SSC was limited to get independent review. That situation has changed under the current process.

A general discussion ensued about factors which tend to limit or discourage participation by SSC members. One argument was made that SSC membership tends to be limited when Councils ignore the advice of their SSC. In addition, the time that SSC members have to commit to SSC activities is limited, especially among members from academia. If NMFS provided the necessary funding to compensate SSC members for their time it is likely that participation would improve. There was general agreement that NMFS needs to make funding of SSC activities a high priority. Innovative funding mechanisms such as providing university faculty members with research assistantships or PhD fellowships to support SSC participation could also be explored.

A comment was made that peer review groups tend to have relatively short half-lives. The SSC of the future needs to maintain some continuity over time so that they maintain a more strategic view. The Roadmap concept utilized by the SAFMC may have utility in this regard.

Discussion of SSC Structure and Practices

The role of SSC members was discussed in terms of individual issues (such as how to deal with potential conflicts of interest and SSC selection) as well as the role of SSCs in the type of advice they provide Councils.

SSC membership

Workshop attendees agreed that the selection process for SSCs will become more important because of their role in setting ABCs, and SSCs should provide advice to the Councils in the selection of SSC members. SSCs can help by identifying the areas of expertise that they may lack or what qualifications an individual might need to be a productive SSC member. The membership should reflect the needs of SSCs in terms of meeting their responsibilities rather than provide representation on the SSC for various agencies or organizations.

There was general agreement that SSC members have the responsibility to participate as individual scientists and not represent a federal or state agency they worked for or an industry or environmental group with which they were associated. Most participants were not too concerned about dealing with potential biases on the part of other SSC members because whatever views are voiced by SSC members become part of the discussion, and the SSCs could deal with issues based on their merit. Also, if there was a potential conflict of interest, such as when stock assessment results are presented by someone supervised by an SSC member, the expectation was that the SSC member would recuse him/herself.

Advice to Councils

Also discussed was the broad role of the SSC in providing advice to the Council. In terms of meeting the new requirements of the MSA, participants felt that most SSCs needed to communicate to other participants in the system (Councils, NMFS regions, and the plan teams) about what the SSCs will need to fulfill their statutory responsibilities. However, in conveying their needs and defining their roles, SSCs should be sensitive to how the Councils think they are meeting their responsibilities. One of the problems is that SSCs may want to define their roles, but they can only go so far because they are advisory to the Councils.

In terms of providing management advice to the Council, participants described a variety of experiences and had several suggestions. The PFMC SSC has occasionally provided management advice to its Council on particular issues. The WPFMC SSC will try to pass on questions that don't involve science but sometimes will comment if asked to by the Council. Often the Caribbean Council will ask its SSC non-science questions.

Most participants commented that SSCs should limit their advice to only scientific issues, while acknowledging that there was some overlap between fisheries science and management. The primary reason for not giving management advice is that the MSA language implies some separation of science from management. If the SSC is fully engaged in policy decisions, it risks politicizing science issues. A final concern was that some SSCs were anxious about being viewed as making arbitrary

"The reason we don't want alternates on the SSC is because it implies that you're representing your agency or your stakeholder group or whoever pays your paycheck. You are there as an objective scientist."

Steve Cadrin

"The way SSC members are selected is going to become more and more important. And I, for one, would like the SSCs to have a significant input regarding how SSC members are selected. And in our part of the world, this becomes especially true if stipends are paid and money starts flowing to SSCs. The composition of SSCs should continue to reflect the needs of the particular SSC and not other issues."

Paul Callaghan

"In this relationship between the SSC and the Council and who's responsible for defining the parameters in how advice arrives, the reauthorization of the Act clearly provides greater responsibilities and greater opportunities for the SSC to define for itself how it's going to answer the call. But I think that process of charting our course, we have to be sensitive to the Council and their perceptions of how we're trying to answer what the law is requiring of us as members. I think that's going to be a delicate balance moving forward."

Will Patterson

"Even though we are advisory to the Council, I think we have a responsibility as scientists to bring the best science to the Council and tell them what direction they should be going in that regard. When we developed our overfishing definitions, it was not the Council staff who came to us and said, here is the way you're going to do your overfishing definitions. It was the SSC who structured the tier levels that we did, and the recommendations that were going to be made. So it was definitely a scientist-up type of a process. We as an SSC do try to play a leadership role in bringing science to the Council process."

Terry Quinn

"If you look at the guidelines in the law for committees and advisory panels, it lists a wide array of things that the SSCs are supposed to do. It almost seems crazy to think that the Council members could ask the totality of the right questions. And to be successful, you have to ask the right questions. It seems to me that the SSCs have to contribute to asking the right questions."

Brian Rothschild

"If SSCs have the authority to put items on their own agenda in isolation from what the Council dictates, then there's a potential conflict that could develop between what the SSC and the Council thinks is important to discuss. Yet we have a situation where the Council really decides SSC membership, and there's a potential interaction there. If the SSC independently creates their own agenda, then ultimately the Council could resolve any problems they see by altering the composition of the SSC."

Steve Ralston

"I was wondering about the level of consistency that should or should not be in place nationally about procedures and process, and also the relationship that the SSC has with peer review, and the role it has in really governing the science, directing the science, interpreting the science. Clearly, we can't have replication across the country, but I wonder if there's a need for some minimum level of consistency."

Robert Latour

"I think that there has to be minimum level of consistency, but perhaps our main strength is really in recognizing the different regional needs and the fact that we're going to need some level of flexibility within the system to be able to maximize our efficiency over the entire country."

Luiz Barbeiri

"We have eight fishery management councils around the country, and the reason we have eight is because it's been recognized that regionally we have different problems and different cultures and different needs, and I think we don't want to lose sight of that."

Steve Ralston

"If you recruit members to sit on an SSC and they don't know what times they need to be available, they'll say, sure, I can participate. But then when you try to schedule something, they're never available. So if you set your schedule and then recruit, then they'll know, okay, I have to be available at these times, and then you'll get the people who can be available."

Pat Livingston

"We have a very strict rule that we refuse to look at anything that comes to us at the last minute. I think it's a good practice because it's forced people to get their documents together in advance so that we can get them in a timely basis."

Steve Ralston

decisions until they can get better justification for making some recommendations on reference points.

If an SSC is reluctant about giving management advice, one suggestion was that it could avoid giving very specific advice and categorize management measures as risk averse, risk neutral, or risk prone. In terms of recommending a range of catch levels, it is problematic to recommend a range if the Councils must implement a single catch limit. The Councils should communicate their risk aversion preferences to SSCs. Although Councils may find this difficult, an SSC might determine the Council's risk preference through an iterative dialogue between the SSC and the Council.

National consistency among SSCs

In general, participants felt that SSCs should have some degree of consistency in how they fulfill their responsibilities, but noted that there are important regional differences in the level of fisheries information, stock assessment and peer review processes and the resources to support these, the desire of some Councils for management advice from their SSCs, and the needs of fishing communities. Nevertheless, there should be some consistency nationally with procedures and the role of the SSC in reviewing or using science. Although there are eight regional fishery management councils to deal with regional differences, SSCs could be more consistent in how they conduct themselves.

Staff worked with Chair Paul Callaghan to develop a list of discussion topics regarding best practices. For each topic, the group's discussion is summarized below.

1. Should all Councils have SSC's that meet on regular basis?

The efficacy of the SSC depends on efficient scheduling. ABC deliberations should be scheduled periodically throughout the year, but if they are discussed at every meeting an inordinate amount of time will spent on ABC related issues. Although a well-planned and efficient schedule is desirable, unforeseen issues always arise, and Councils may ask the SSC to address these issues on short notice. Some SSCs have a policy that they will not consider items unless they are on the agenda and the related documentation and analyses are made available to the SSC in advance (2-3 weeks prior to SSC meetings). Proper planning along with advance notification and briefing of SSC members is critical to the successful completion of the myriad of responsibilities of the SSC under MSA. Adhering to a well planned schedule set well in advance allows SSC members to adjust their schedules in advance and enhances the probability of participation by SSC members.

2. Should SSC only review what the Council tells them to review, or should they bring issues to Council attention?

The SSC serves as an advisory body to the Council, so their primary role is to advise the Council on scientific issues as requested by the Council. However, the SSCs are populated by experts from a diverse group of disciplines which are integral to meeting the challenges of fisheries management. While the overall role of the SSC is advisory, that advisory role should not preclude the SSC from initiating scientific

recommendations to the Council when appropriate. It is incumbent upon the SSC to play a leadership role in bringing scientific issues to the attention of the Council. In some areas, particularly international fisheries management, SSC members can play an important role in informing the Council about emerging scientific issues internationally. The MSA tasks the SSC with a wide array of responsibilities and it is unrealistic to expect the Councils to always ask the right questions, especially in the areas of ecosystem management and habitat use.

3. What is the SSCs role in selecting members?

Participants concluded that SSCs should review the professional qualifications of prospective SSC members prior to Council consideration for appointment. Also, it was suggested that SSCs should provide advice on types of expertise needed; for example, whether they needed ecologists, economists, or anthropologists.

4. Should SSC terms be limited or indefinite?

Council policy relative to length of SSC terms varies around the country. Each Council should have the latitude to determine its own policy in this regard. However, policies which tend to maintain SSC continuity are preferred. Conversely, some mechanism must be in place to hold SSC members accountable in terms of quality and quantity of their contributions to the SSC over time, especially given their new responsibility relative to fishing level recommendations which will place an upper bound on Council specifications of ACLs.

5. Should SSCs recommend a preferred policy alternative or only review analyses for scientific adequacy?

Some SSCs recommend preferred alternatives while others only provide comments on the scientific merits of the different management alternatives under consideration. It was noted that fishing level recommendations made by SSCs will constitute "preferred" alternatives.

6. Should Councils be limited to a single SSC?

Practices vary among Councils with respect to single versus multiple SSCs (or SSC subcommittees). Some Councils prefer to break their SSCs up by area of expertise (i.e., biological, economic and social sciences) while others see more value in maintaining a single multi-disciplinary SSC.

7. How should SSC recommendations be developed, by consensus or voting?

Some SSCs reach agreement on decisions/positions using Roberts Rules while others operate via consensus. In general, most scientific review bodies operate by consensus.

8. Should the SSC provide summary reports, minutes, or transcription of meetings?

"I think it's advantageous to have SSC members comment on the qualifications of potential nominees to the SSC. I don't think there is a group of people that is better qualified to do that. That's not necessarily to say that the SSC should pick the members, but I think they should be given a consultation role, at least, in that capacity."
Steve Ralston

"Just to clarify, it is the Council that appoints the SSC members. So the SSC can provide advice and review qualification if the Council agrees to that. But it's not the SSC's job to really select members. The selection and, in essence, appointment is made by the Council."
Barbara Kojis

"It would seem to me that if there's going to be significant SSC compensation, then there should be significant review of SSC members, their participation and productivity and that ought to occur at least every two years by the Council."
Paul Callaghan

"I think that consensus should always be the goal, but I don't know that it can be the only path that you need to keep going until you reach that point. Sometimes there are going to be disagreements, and that is due to the nature of the makeup of the SSC. If consensus still cannot be reached, I don't see anything wrong with voting as long as everyone is able to express their point of view in the document that goes forward to the Council in some way."
Jim Berkson

"One of the problems that can come up with voting is suppose you have Discipline A and Discipline B, and let's say there are 18 people in Discipline A and two people in Discipline B, but you have an unbiased view of the problem and that unbiased view would side with the minority. Well, that is the fallacy in the voting problem. And that's why in the scientific discussions you have to develop a consensus that has the main point of view conditioned by all of the ancillary arguments."
Brian Rothschild

"I think this is a case where we don't want to get into one-size-fits-none. These sort of issues should be judged in the context in which they occur."
John Sibert

"I think a true consensus report is one that reflects the whole range of opinion that has been expressed scientifically and is conveyed to the public as such. We don't want to hide the uncertainty. We want to present it in its full glory."

Terry Quinn

"For me as Chair, transcriptions are great, because I can go back and look to the dialogue. But where it's getting us in trouble is what I consider scratch-sheet discussions, when we are talking amongst ourselves and it just happens to be on the record. It's going to be used against us later on."

Carolyn Belcher

"You want to encourage people to speak openly without having their thoughts being attributed to them. We should discuss things and we should clearly document what we agree are recommendations. But the discussion, itself, shouldn't be a matter of record. It's how the recommendations were formed, and that's what needs to be documented."

Steve Cadrin

"I'm wondering if there are any SSC members here who feel like if we have strong justifications written with the positions that we take, then we also need transcripts? Is anyone in favor of transcripts? Or is it that the attorneys and the policymakers are pushing us to do that? It sounds like nothing but grief for the SSC members involved and not necessary, but I don't know the legality."

Jim Berkson

"Transcripts would also tend to suppress the expression of scientific opinion if you feel like every single word you've mentioned can be quoted out of context sometime in the future."

Terry Quinn

"Our Council places great value on the SSC's scientific opinions on things other than just ABCs or ACLs, and FMP amendments. So I think that's another reason to think about meeting on a regular basis, because there is so much more to scientific fishery management than just those two things."

Don McIsaac

"Why can't you overfish stocks? Because it says so in the law. But it also says in the law that the SSCs should be compensated. Is one part of the law good and the other part of the law bad? I don't know."

Brian Rothschild

Most SSCs provide scientific advice based on a summary of their deliberation. The general consensus was against the practice of using verbatim transcripts. SSC deliberations are a dynamic process and statements made by SSC members could be quoted out of context under the transcript format. The transcript approach is likely to discourage open discussion especially in the current litigation environment.

The potential legal liability that the SSC has in the litigation process was discussed. It was concluded that while individual SSC members (or even the entire SSC and Council) are not held culpable from legal challenges to federal fisheries regulations, the decisions made and recommendations put forward by the SSC are likely to be at the forefront of legal challenges.

9. Who should prepare and present the SSC report?

Practices vary among SSCs around the country, and there seemed general agreement that this was probably best left to the discretion of each individual SSC. However, it was generally agreed that attendance of the SSC Chair and other SSC members at Council meetings improves communication and amplifies the importance of SSC advice.

10. Should all SSC meetings be scheduled with Council meetings?

Practices vary around the country. Some overlap with Council meetings is preferred, but is not always practical or cost effective.

11. What resources are available to ameliorate impacts on SSC workloads?

Significant discussion occurred relative to the limited resources available to the SSCs in an environment of expanding responsibilities. The new requirement for the SSC to specify ABC for all managed stocks, which will form the upper bound for subsequent ACL specifications by the Councils, places a responsibility on the SSC of paramount importance. The MSA has also placed other responsibilities on the SSC which will require additional resources (for meetings, support staff, etc.). Many attendees expressed the opinion that Congress, through the MSA, has burdened the Council system and the SSC process in particular with an unfunded mandate. If the SSC is to meet all of its obligations specified under the MSA, additional resources need to be made available to them.

SSC compensation is one element that might improve SSC participation. Another innovative approach put forward was the granting of research stipends to SSC members. Financial resources garnered by faculty members in the form of grants or research assistantships are generally more favorably viewed by Universities than personal compensation.

SSC Role in Peer Review and Catch Limits

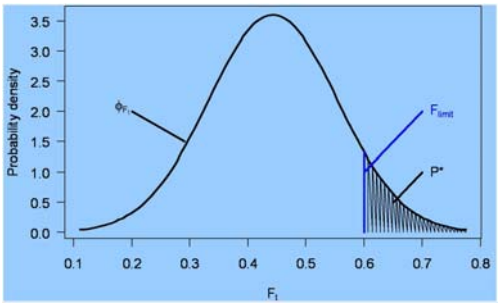
Rick Methot made a presentation on using stock assessments and a peer review process in SSC determination of fishing level recommendations. The main players in the process are the regional stock assessment scientist (whose job #1 is doing assessments), peer reviewers (who ensure technical accuracy of the assessment; may include CIE, plan teams, SEDAR, etc.), the SSC (the designated responsible party that does a higher level review), other Council advisory bodies, and the affected public (with on-the-water knowledge).

Single species assessment models can be useful in developing holistic ecosystem models, and likewise, ecosystem indicators and models may provide input into single species assessments. For example, natural mortality may be expected to change with a changing ecosystem. A complete holistic ecosystem model is not feasible at this time but may be in the future. Regardless, it should be clear that there is uncertainty relative to the effect of long-term ecological factors on achieving optimum yield.

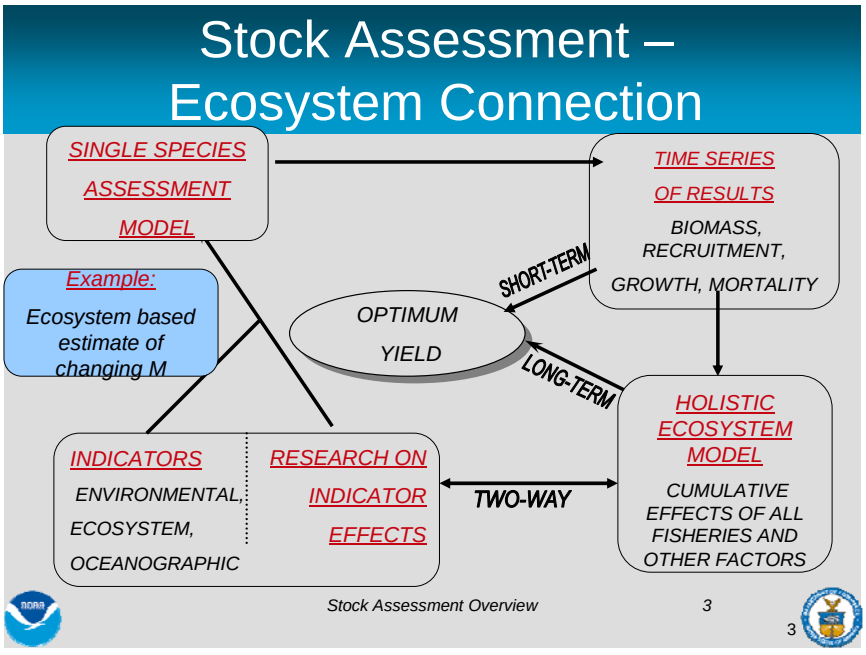
Probability approaches are already used in rebuilding plans. For previously overfished stocks currently on rebuilding plans, we typically calculate future catches that will have an acceptable probability of allowing the stock to rebuild to its target level while taking into account various components of uncertainty.

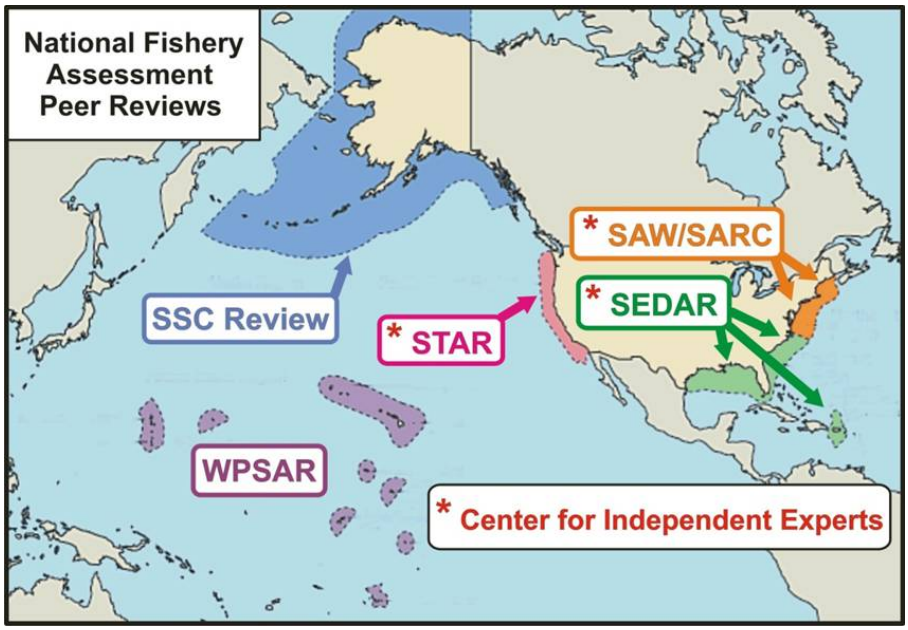
A risk assessment would address the question of what harvest policy (e.g., ACLs) would have no more than a Y% chance of exceeding the true overfishing level, have at least X% chance of leaving the stock above the target level of abundance, and produce Z level of catch and benefits.

Because any amount of fishing has an associated risk of overfishing, managers need to manage the stock at an acceptable level of risk. We can define P* as the probability that fishing mortality rate (F_t) is greater than the limit (F_{limit}). So, if P* is small, there is a large buffer against overfishing. A scientist can calculate the probability levels, but the value of P* is a management decision. In other words, the 'right' level of risk aversion is a management decision, and determining the consequences of that level is a science determination.



There are several components of uncertainty in forecasts. There is statistical uncertainty in parameter estimates. There is uncertainty in future productivity, as future recruitment will fluctuate. The ecosystem constantly changes, yet these factors are normally held constant in single species assessments. There are the effects of a time lag in the collection of data and the assessment. And finally, there are the effects of implementation, in that the actual catch will likely differ from the intended target catch.





Stocks with limited data may require different approaches. For data poor stocks, there is a level of catch that would constitute overfishing, but we don't know what that level is. In some cases, catches can be limited to recent catch levels, however that level may not provide a reasonable estimate of sustainable catch. Putting data poor stocks into assemblages may be a pragmatic solution, but there is some chance that an assemblage could mask overfishing of some individual stocks within an assemblage. In general, the best approach should be at least as conservative as what would be expected if you could do a "data weak" assessment. As more data become available, buffers could be smaller. A tier approach could be a useful framework.

The peer review process begins with completion of the assessments, followed by technical peer review. The technical review of assessments is critical. A technical review can evaluate assessment methods, identify uncertainties in results, and clarify status of alternative (non-agency) assessments. Technical reviews are done by different processes across the country. Some Councils rely on plan teams, others on stock assessment and review panels, SEDAR panels, or CIE review. Participation of the SSC at some level can further assure consistency across species, and provide corporate knowledge.

The SSC receives assessment results and a technical peer review statement, and then evaluates any additional uncertainties or unresolved disputes. The SSC review should not be a redundant full technical review. The SSC then uses the assessment and peer review statement from the technical review team to make fishing level recommendations (e.g., ABCs) to the Council.

The relationship between the SSCs and the peer review process will be the focus of the National Standard 2 Guidelines. Rick Methot put forth a number of questions to consider in commenting on the National Standard 2 Guidelines. How does a range of possibilities get boiled down to a single ABC? When is the process complete and "best scientific information available (BSIA) asserted? How are the process and results documented, in SAFE reports or elsewhere? How is an administrative record of decision created and maintained? What is the relationship of the SSC in peer review? What is default action when new assessments are not available, knowing that doing nothing may increase the risk of overfishing?

The author concluded that the peer review process developed must balance competing priorities related to timeliness, the number of stocks assessed, development of comprehensive stock assessment, and full technical review.

Q & A

Rick Methot further clarified that his presentation was designed to bring forth items for the SSC workshop participants to consider, related to NS1 and NS2, but these were not necessarily the official agency view on how these issues should be addressed. One participant suggested that SSC members be included in NMFS headquarters workgroups and deliberations to increase SSC understanding and buy-in.

Regarding peer review of stock assessments, it was noted that SSC members may be fully capable of doing technical reviews, in addition to higher level evaluation of assessments. Some participants commented that the review process should be more flexible, not as constrained as shown. Rick

Methot responded that while SSC members are capable of technical reviews, it would be more efficient to put a few SSC members on the review panel, and not have the entire SSC do a second technical review.

Rick Methot clarified that he didn't want to imply that the SSC is not part of a technical review process, but he felt the full technical review should be completed before the SSC considered ABCs, which would be the focus at that point. He sees this as a two step process that does not preclude SSC participation in the technical peer review, but which does separate the technical peer review from the SSC's ABC determinations.

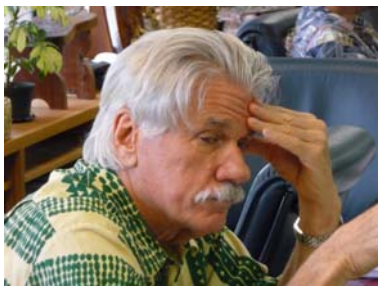
The group had a number of comments regarding the relationship of single species assessments to ecosystem modeling. While holistic ecosystem models don't require input from stock assessments, ecosystem effects should be considered and built into rebuilding timelines.

There was some discussion about incorporating uncertainty and risk. Concern was raised regarding the role of the SSC in incorporating risk in its advice to the Council. Additionally, there was concern about the ability of the SSCs to review assessments and set ABCs during a single meeting. Rick Methot responded that risk aversion is a policy determination at the Council level, but development of a risk aversion policy needs scientific advice and evaluation. After the risk aversion policy is described in an FMP amendment or other policy statement, the SSC can then use it as it makes its ABC recommendations.

It was noted that as you move away in time from a stock assessment, uncertainty (e.g., from recruitment projections) increases. It's a Catch 22 – ABC is a function of acceptable risk, but the Council decides the risk level. Rick Methot responded that this is somewhat of an iterative process. The Council has to see results/consequences of various risk levels and then they can build this risk into the control rule (via FMP amendment), such as a tier-based approach. The elapsed time since the last assessment can be among the factors considered in this control rule. There was also concern that if an SSC conducts peer reviews, then NGOs and industry will also want to present alternative assessments.

It was noted that every SSC has 2-3 social scientists, but it is unclear how their input gets into the process of setting catch limits. Incorporation of social/economic concerns is expected to occur at the Council level, but the constraint is that ACT can only be less than ABC. How can we get social science into the SSC side of the process? Rick noted that one could put all numbers (e.g. OY) into dollars instead of fish, but this hasn't been a successful approach to date. The proposed NS1 guidelines would allow socioeconomic considerations to be taken into account as the SSC provides a full suite of fishing level advice to the Council. While the SSC is formally charged with the ABC recommendation, they also can provide information to the Council on catch levels that would account for management uncertainty and social, economic, and ecological considerations.

One participant asked for a clarification of the NS1 guidelines, regarding the relevance of ABC, if OFL is the threshold (limit) and the target is OY (per MSA). Rick Methot clarified that there needs to be a buffer between OFL and ACL, which is explicitly called for in MSA. You need both to prevent overfishing and attain OY. The proposed rule for the NS1 guidelines notes that attainment of OY must still prevent overfishing, so the determination of OY should take into account the various factors and uncertainties that could lead to overfishing. To attain OY while preventing overfishing, ABC and ACL are defined as intermediate levels between OFL and OY. ABC is reduced from OFL to account for scientific uncertainty and ACL/ACT incorporates additional considerations, such as management uncertainty.



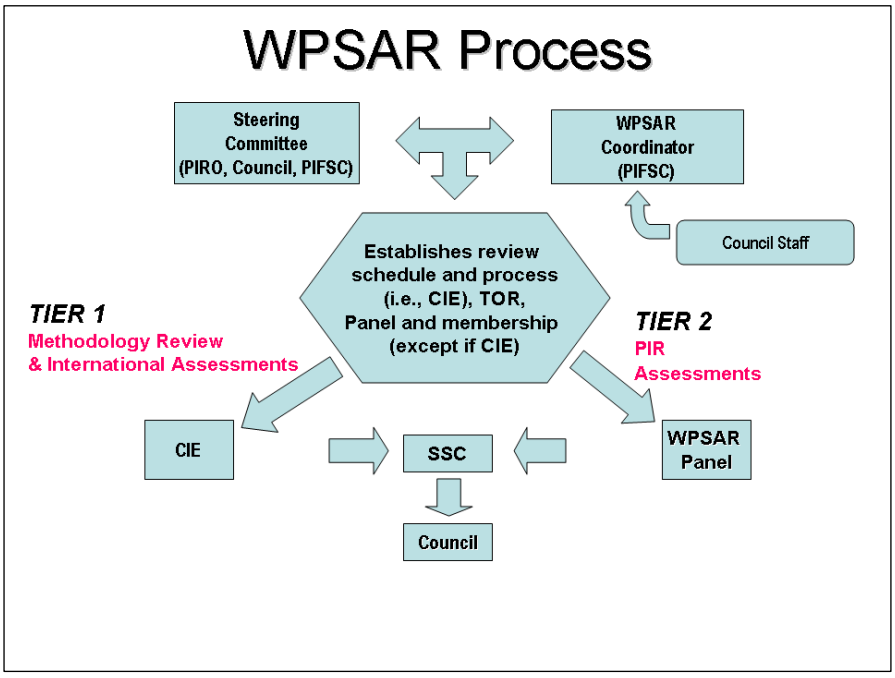
Scientific and Statistical Committee Reports

Western Pacific

Presenters - Marsha Hamilton and Paul Dalzell, WPFMC staff

Pacific pelagic stock assessments are conducted by collaborations between NMFS scientists and the science providers to the Regional Fishery Management Organizations (Western & Central Pacific Fishery Commission and the Inter-American Tropical Tuna Commission), which develop international management policies for tuna and tuna-like species in the Pacific Ocean. Some Western Pacific Regional Fishery Management Council's (WPR Council) Scientific and Statistical Committee (SSC) and Pelagic Plan Team members are involved in these stock assessments.

The SSC has reviewed stock assessments for Pacific pelagic stocks, Northwestern Hawaiian Islands lobsters, some precious corals and deep-water bottomfish around Hawaii, American Samoa and the Mariana Archipelago. These reviews were relatively informal with the SSC providing written comments to the scientists involved. Based on the recommendations of the SSC, the WPR Council has also held several workshops on aspects population modeling and data inputs into stock assessments for crustaceans and bottomfish



Most fisheries in the Western Pacific Region have not been managed by quotas or Total Allowable Catches (TACs) as limited entry programs, ocean zoning and vessel size limits have generally been used to manage catches where necessary. A TAC approach was used for the Northwestern Hawaiian Islands (NWHI) lobster fishery, and TACs are in place for bottomfish around the Main Hawaiian Islands as well as for precious corals throughout the region. In addition the region's longline fisheries are subject to quotas established by RFMOs.

The NWHI lobster TAC was based on the Council's acceptance of a 10% risk of overfishing. Through simulation modeling this was found to correspond to a harvest rate of 13% of the exploitable population. The model used to generate the annual TAC was based on a formula that used the previous years catch and effort data along with catchability and recruitment data from a NMFS survey conducted before the next fishing season. Once this procedure was established, the SSC was not required to annually review the TAC, but until the fishery closed after the 1999 season, the SSC continued to suggest improvements to setting the TAC such as developing bank specific quotas.

Existing quotas for precious corals are based on extrapolations from one surveyed coral bed in the Main Hawaiian Islands (MHI), to other known beds in the Hawaii Archipelago. This fishery has been inactive for almost two decades apart from harvests of black coral, which has a quota in addition to a minimum size limit. The MHI bottomfish TAC resulted from an initial stock assessments conducted by the NMFS Pacific Islands Fisheries Science Center (PIFSC) which concluded that Hawaii's archipelagic bottomfish stock was not overfished but was subject to overfishing. As a result, the Council implemented a TAC for the 2007-2008 fishing year. However, following a data review, recommended by the SSC, revised assessments suggest that the stock as a whole is not being subjected to overfishing. The most recent SSC review of

Table 1. Proposed schedule for WPSAR process reviews.

Species	Completion Date	Type of Review
Impact of increases in Hawaii shallow-set longline effort on sea turtle populations (Snover's SQE Analysis)	December 2008	Tier 1 - CIE
HI Archipelago Bottomfish	July 2009	Tier 2 – Expert Panel
NP Swordfish	October 2009	Tier 1 – CIE
NP Striped Marlin	October 2009	Tier 1 - CIE
Guam, CNMI and American Samoa Bottomfish	June 2010	Tier 2 – Expert Panel
Pacific Blue Marlin	September 2010/2011	Tier 1 - CIE

this assessment included an independent ad-hoc modeling exercise which supported this conclusion. Nevertheless, the Council has recommended continuing the precautionary TAC approach to this fishery.

The Council's stock assessment review WPSAR (Western Pacific Stock Assessment Review) process is shown in the adjacent figure. The process contains two tiers of review; Tier 1 makes use of the Center for Independent Experts (CIE) and is concerned primarily with the stock assessments generated by the science providers for the Pacific tuna RFMOs, and any new methodologies that might be proposed for use in these assessments. Tier 2 is for stock assessment reviews for other fisheries, primarily within the EEZ. A panel will convene under the auspices of WPSAR and will be chaired by an SSC member. It will include one to two additional SSC members and two to three independent reviewers that are from academia, other government agencies or are nominated by the public. A WPSAR Panel will review up to two assessments per review. In years when there are no stock assessments for review, a panel may still be assembled to review methods, models and data used for stock assessments or other purposes. WPSAR reviews will be focused primarily on demersal fisheries and will be open to the public for transparency.

Tier 1 reviews of bigeye and yellowfin stock assessments in the Western and Central Pacific Ocean have already been completed and a review of an SQE analysis related to Hawaii's longline fishery is underway. As shown in the adjacent table, the first application of the Tier 2 process will be for Hawaii bottomfish in 2009.

The Council has recommended the following process for the establishment of Overfishing Limits, Allowable Biological Catches, Annual Catch Limits and Annual Catch Targets:

1. The Plan Teams determine the 5-10 ACL species (or species groups) without known

MSY values and most at risk of overfishing in each archipelago.

2. The SSC adopts the overfishing limit (OFL), MSY or MSY proxy values provided by NMFS or other scientific institutions using the WPSAR process for the 5-10 non-RFMO species most at risk. The SSC considers and characterizes scientific uncertainty and sets allowable biological catches (ABCs) for these species as well as for those non-RFMO species for which OFL/MSY values have already been established.

3. The Council receives the ABCs set by the SSC and sets ACLs at or below this level. The Council determines appropriate accountability measures (AMs) to accompany the ACLs. The Council considers and characterizes the management uncertainty remaining given the AMs, as well as the likelihood and consequences of overfishing, and sets ACTs at or below the ACLs.

4. The sequence repeats as funds and information allow until initial ACLs and AMs are established for all non-RFMO ACL species or species groups.

Q & A

There were several comments and questions regarding the WPSAR process and how much the SSC will be engaged in peer/technical review. It was noted that SSC participation by individual members is built into the process, in that the WPSAR allows SSC members to engage without burdening the entire SSC. It was also noted however, that if the intermediate review panel changes each time, some institutional memory would be lost.

North Pacific

Presenter - Terry Quinn, SSC member

The North Pacific Fishery Management Council's Scientific and Statistical Committee (SSC) provides the final level of peer review for stock assessments, and sets the biologically-based annual catch limits for groundfish and crab stocks, as well as provides ongoing scientific advice on a host of other issues regarding management of the region's fisheries.

In the North Pacific, fisheries are managed by 'hard TACs', meaning that the fisheries are actively managed in-season to achieve, but not exceed, the total allowable catch (TAC) level. The TAC level is annually specified by the Council, at a level equal to or less than biologically based sustainable limits established by the Council's SSC. There are two such catch limits: the overfishing limit (OFL) and the acceptable biological catch (ABC) limit, where TAC≤ABC<OFL. The OFL is the harvest limit associated with maximum sustainable yield, and the ABC is the harvest limit that takes into account uncertainties in the assessment process. The TAC is the target catch level that takes into account socioeconomic considerations. For nearly all groundfish stocks, the OFL and ABC are founded on biomass-based stock assessments. The majority of biomass-based assessments use age- and length-based population assessment models.

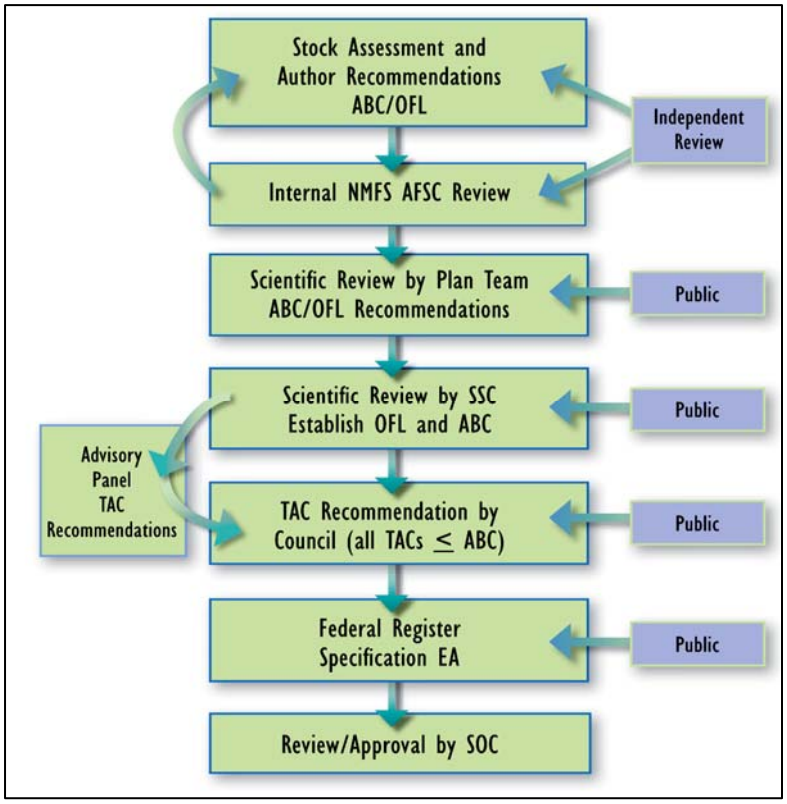
Stock assessments for most North Pacific groundfish stocks are relatively data rich. NMFS Alaska Fisheries Science Center conducts annual and biennial trawl, longline, and hydroacoustic surveys. A comprehensive, industry funded at-sea observer program provides critical data on total catch, discards, species composition, length composition, and collections of age, growth, and maturity data. As a result of having 'good' data, most groundfish assessments are based on age structured models.

Stock assessments for groundfish are prepared and updated annually by scientists from the Alaska Fisheries Science Center, NMFS. These assessments are subject to internal review at the Science Center. As a further quality control measure, one or two assessments are sent each year to the Center for Independent Experts for further peer review. Following these review processes, the stock assessments are further vetted by the Council's groundfish plan teams (Gulf of Alaska groundfish team and Bering Sea/Aleutian Islands groundfish team). The plan teams consist of state, federal, and university population dynamics scientists and managers that meet twice annually to review the assessments, prepare the stock assessment and fishery evaluation (SAFE) reports, and recommend OFL and ABC limits for all groundfish stocks.

The SAFE reports actually consist of several parts: groundfish stock assessments for Gulf of Alaska (GOA), groundfish stock assessments for Bering Sea/Aleutian Islands, an ecosystem consideration chapter, and an economic status report. The plan teams compile the individual stock assessments into the SAFE reports, and provide a summary section containing recommended OFL and ABC limits.

The SSC makes a final review of the stock assessments and SAFE reports, and establishes the final OFL and ABCs for each groundfish stock. The Council has had a long- standing practice of adopting all of the SSC's OFL and ABC recommendations, and this process was formally incorporated into the FMPs in 2004 and cemented by statute in 2006 by the Magnuson-Stevens Reauthorization Act. As recommended by the National Standard Guidelines, OFL is a limit reference point to stay away from, whereas the ABC is a target level that provides for sustainability of stocks.

The groundfish OFL and ABC values are initially based on a set of mathematical formulae as prescribed through a set of six tiers. These tiers are listed in descending order of preference, corresponding to descending order of information availability. The SSC has final authority for determining whether a given item of information is



reliable for the purpose of this definition. In tiers (1-3), the threshold coefficient α is set at a default value of 0.05, with the understanding that the SSC may establish a different value for a specific stock or stock complex as merited by the best available scientific information. For these tiers, fishing mortality is reduced when the stock drops below its target level. In tiers (2-4), a designation of the form "Fx%" refers to the F associated with an equilibrium level of spawning per recruit (SPR) equal to x% of the equilibrium level of spawning per recruit in the absence of any fishing. If reliable information sufficient to characterize the entire maturity schedule of a species is not available, the SSC may choose to view SPR calculations based on a knife-edge maturity assumption as reliable.

For the NPFMC, these six tiers have been sufficient to develop reference points for all managed stocks. In Tier 1, a reliable probability density function (pdf) of B_{MSY} is available, and the preferred point estimate of B_{MSY} is the geometric mean of its pdf. In Tier 2, a point estimate of B_{msy} the basis for reference points. In Tier 3, the term $B_{40\%}$ refers to the long-term average biomass that

Tier

1) Information available: *Reliable point estimates of B and B_{MSY} and reliable pdf of F_{MSY}.*

1a) Stock status: $B/B_{MSY} > 1$

$F_{OFL} = \mu_A$, *the arithmetic mean of the pdf*

$F_{ABC} \le \mu_H$, *the harmonic mean of the pdf*

1b) Stock status: $\alpha < B/B_{MSY} \le 1$

$F_{OFL} = \mu_A \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

$F_{ABC} \le \mu_H \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

1c) Stock status: $B/B_{MSY} \le \alpha$

$F_{OFL} = 0$

$F_{ABC} = 0$

2) Information available: *Reliable point estimates of B, B_{MSY}, F_{MSY}, $F_{35\%}$, and $F_{40\%}$.*

2a) Stock status: $B/B_{MSY} > 1$

$F_{OFL} = F_{MSY}$

$F_{ABC} \le F_{MSY} \times (F_{40\%}/F_{35\%})$

2b) Stock status: $\alpha < B/B_{MSY} \le 1$

$F_{OFL} = F_{MSY} \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

$F_{ABC} \le F_{MSY} \times (F_{40\%}/F_{35\%}) \times (B/B_{MSY} - \alpha)/(1 - \alpha)$

2c) Stock status: $B/B_{MSY} \le \alpha$

$F_{OFL} = 0$

$F_{ABC} = 0$

3) Information available: *Reliable point estimates of B, $B_{40\%}$, $F_{35\%}$, and $F_{40\%}$.*

3a) Stock status: $B/B_{40\%} > 1$

$F_{OFL} = F_{35\%}$

$F_{ABC} \le F_{40\%}$

3b) Stock status: $\alpha < B/B_{40\%} \le 1$

$F_{OFL} = F_{35\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$

$F_{ABC} \le F_{40\%} \times (B/B_{40\%} - \alpha)/(1 - \alpha)$

3c) Stock status: $B/B_{40\%} \le \alpha$

$F_{OFL} = 0$

$F_{ABC} = 0$

4) Information available: *Reliable point estimates of B, $F_{35\%}$, and $F_{40\%}$.*

$F_{OFL} = F_{35\%}$

$F_{ABC} \le F_{40\%}$

5) Information available: *Reliable point estimates of B and natural mortality rate M.*

$F_{OFL} = M$

$F_{ABC} \le 0.75 \times M$

6) Information available: *Reliable catch history from 1978 through 1995.*

OFL = the average catch from 1978 through 1995, unless an alternative value is established by the SSC on the basis of the best available scientific information

$ABC \le 0.75 \times OFL$

would be expected under average recruitment and $F=F_{40\%}$. In Tier 4, a reliable estimate of $B40\%$ is not available. In Tier 5, maturity information is not available, so reference points are based on natural mortality. In Tier 6, biomass estimates are not available, so reference points are based on average catch.

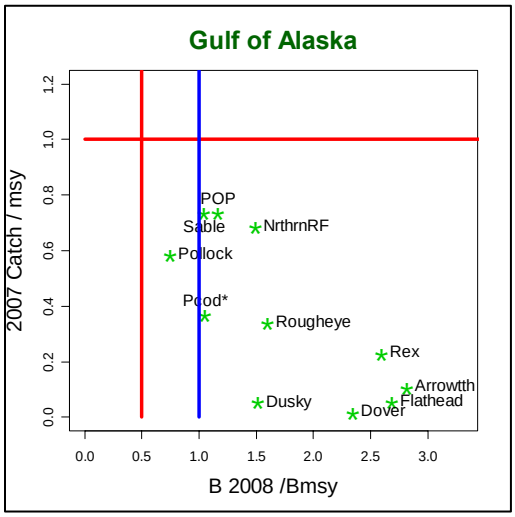
The SSC treats the initial ABC calculation as the maximum permissible. It then considers whether further reductions are warranted due to decreasing trends in recruitment or other population parameters, changes in environmental conditions, uncertainties in the stock assessment models, and other factors. This results in the final ABC. The OFL is always calculated from the set of formulae.

For 2008, about half (48%) of the groundfish catch limits were based on the Tier 3 level, 33% on the Tier 5 level, and a few catch limits based on the Tier 1 (8%) , Tier 4 (3%), or Tier 6 (8%) levels. No stocks were in the Tier 2 level. With only a few exceptions, the SSC concurred with the plan team recommendations.

A few examples were provided to illustrate the use of Tiers under various types of assessments, and describe some situations where the SSC reduced the ABC from the maximum permissible. For example, for the 2008 Bering Sea pollock catch specifications, the SSC noted several concerns dealing with uncertainty in stock projections, and agreed with the plan team that the ABC should be reduced to 1.0 million mt, below the maximum (1.17 million mt) allowed under the Tier 1 formula. The SSC has also, on occasion, used alternative procedures, such as 'stairsteps', to address concerns with changes in an assessment model or parameters that translated into large increases in ABC. For example, a new GOA Pacific cod assessment with a new maturity schedule was done in 2006, resulting in a much higher Tier 3 ABC (from 58,100 mt in 2005 to 79,618 mt in 2006), despite a 4-year series of low recruitment. As a precautionary measure, the SSC set the 2006 ABC at 68,859 mt, halfway up to the higher number produced under the Tier 3 formula.

An independent scientific review of the NPFMC management strategy concluded that the process used to set ABCs and OFLs is very conservative, at least for Tiers 1 through 5 (Goodman et al. 2002). The review also concluded that the in-season monitoring and management system was adequate for implementing the TACs with little risk of exceeding them.

The implementation of biologically-based catch limits, together with the huge investments in the science to develop these limits, and the program to monitor and actively manage the fisheries, have resulted in sustainable groundfish fisheries in the North Pacific. The groundfish stocks are all considered to be close to (or well above) B_{msy}. The SSC plays a big role in the management success by ensuring that catch limits are sufficiently conservative, while allowing fisheries to remain viable and well managed.



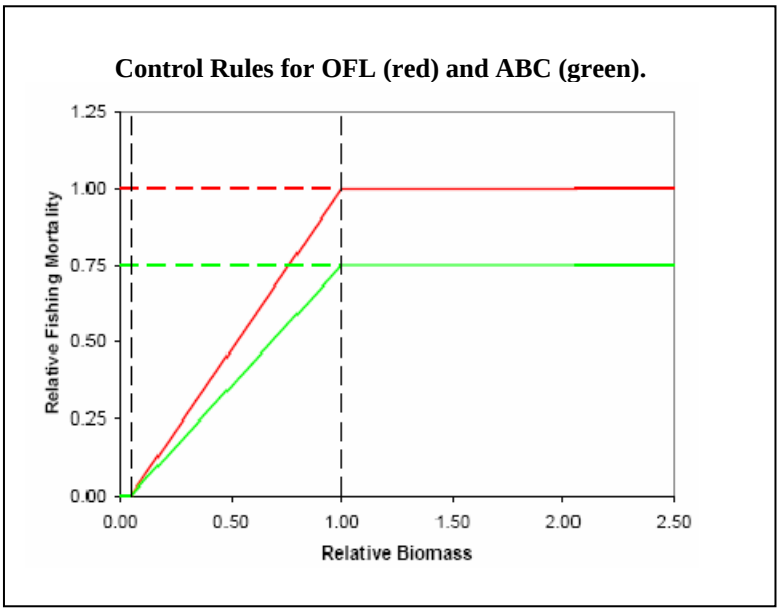
Q & A

It was pointed out that as the tier numbers increase so does uncertainty, and one commenter observed that this seemed to be a logical approach. For the two lowest tiers (based on natural mortality rates or catch limits), a 0.75 adjustment was incorporated to account for that uncertainty.

One commenter raised a concern about ABCs being based on F35% across stocks, despite having different life histories, such as long-lived rockfish species. In response, it was noted that the tier formulas generate a 'maximum permissible ABC'; it's a default value that can be and is often reduced. For example, in the case of some rockfish, a higher spawner-per-recruit value, such as F44%, is used. Also, it was noted that the focus is on ABCs because catches are constrained to stay well below the OFLs.

Another commenter pointed out that the reductions from maximum ABC seem ad hoc. The response was that yes, the SSC bases its logic and results using collective wisdom of the SSC, plan teams, and assessment authors. Examples of the SSC deliberations of making these adjustments and the rationale for doing so were included in the workshop briefing materials, which contained the December 2007 SSC recommendations.

The SSC originally developed the standardized approach to the stock assessment and peer review process used in the North Pacific. Every stock assessment begins with standardized information to allow easy comparison (even if model approach varies somewhat). Should there be a proposed change to an assessment model, the plan teams and SSC consider that at the October meeting. However, before committing to a new assessment model, the existing model will be continued and overlap with the new model for a year or two to examine consistencies.

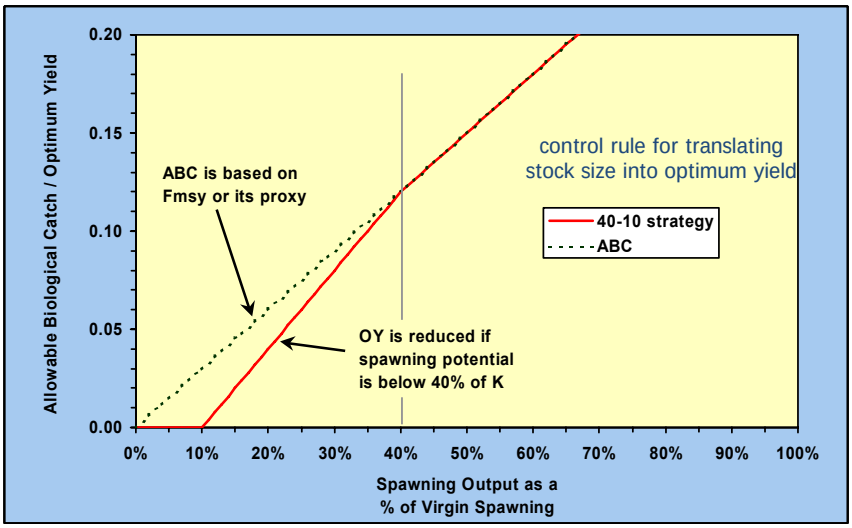


Pacific

Presenter - Steve Ralston, SSC Chair

The Pacific Fishery Management Council (PFMC) has developed four Fishery Management Plans (FMPs) for groundfish, salmon, coastal pelagic species (CPS), and highly migratory species (HMS). Of these, groundfish and salmon have the most well-developed processes for conducting stock assessment, obtaining peer review, and setting target and threshold catch levels. In particular, groundfish management at the PFMC has evolved to the point where a very structured process is employed to ensure efficiency of staff work load. Consequently, a somewhat detailed description of groundfish procedures follows, with an abbreviated presentation of salmon and CPS.

Groundfish stock assessments are conducted on a biennial cycle at the PFMC. For example, although no assessments were completed this year, 13 are scheduled for 2009. This 2-year schedule is biologically sensible because groundfish stocks are relatively long-lived and as a consequence stock status is slow to change. Detailed procedures for the conduct and review of groundfish stock assessments by the PFMC are contained in the Council's "Terms of Reference for the Groundfish Stock Assessment and Review Process" (TOR), including the roles of the various agencies and institutions, the required contents of a full assessment, the composition and duties of the review panel, mechanisms for resolution of technical disputes, a time line for delivery of products, and other explicit instructions to all parties involved. The TOR have been developed over the last decade and have been revised after every assessment cycle to better suit the Council's needs and to address unexpected procedural issues that arise. Revisions to the TOR are conducted by the SSC's groundfish subcommittee, the full SSC and, with input from NMFS, are approved and adopted by the Council.



In a typical assessment, a Stock Assessment Team (STAT) is assembled from agency (NMFS, WDFW, ODFW, or CDFG) staff and/or from University personnel. The STAT conducts its work during the first half of the year and presents its findings to a Stock Assessment Review (STAR) panel. In 2009 there will be four STAR panels that will meet between May and August. STAR panels meet for one week and typically review two stock assessments. The panel is chaired by a member of the SSC's groundfish subcommittee and includes three other scientists, one of whom must be an analyst with personal familiarity with west coast data systems and modeling practices and one of whom comes from the Center for Independent Experts (CIE). In recent years the fourth reviewer has also been from the CIE, although that is not a requirement. The STAR panel reviews the contents of the assessment and seeks clarifying analyses but cannot direct the STAT team to a particular end. Conflicts between the STAT team and the STAR panel, when they arise, are later resolved by the SSC, which reviews the assessment and panel report at the next Council meeting. When no clear decision can be made about a disputed assessment, it can be referred to a "mop-up" review that is conducted after all the STAR panels have completed their business and which is composed of members of the groundfish subcommittee and one CIE reviewer.

When complete, full stock assessments, which are largely conducted using the Stock Synthesis modeling platform, contain a large number of required elements, including: (1) an executive summary of specific form, (2) description of the fisheries, (3) life history information, (4) management history and performance, (5) landings, (6) discards, (7) age and length compositions, (8) fishery-independent indices of abundance, (9)

fishery-dependent indices, (10) model likelihood components, (11) parameter constraints, (12) model selection criteria, (13) residual analysis, (14) likelihood profiles, (15) convergence status and randomization tests, (16) detailed base-run results, (17) reference points, (18) 10-yr term projections, and (19) uncertainty and sensitivity analyses, including a decision table characterizing the key source of uncertainty in the assessment.

Specific outputs from the assessment model feed directly into the Council's groundfish harvest policy. In particular, the PFMC has taxon-specific harvest rates that are applied (e.g., $F_{50\%}$ for rockfish of the genus *Sebastes*). The default harvest rate, when applied to the exploitable biomass in the terminal year of the assessment, defines the Acceptable Biological Catch (ABC). In addition, the Council has adopted a biomass-based decision rule to conform with the requirements of the Sustainable Fisheries Act of 1996. Specifically, a minimum stock size threshold (MSST) of 25% of virgin biomass is used to define overfished stocks. A precautionary control rule is used to reduce OYs below the ABC when stock sizes fall below 40% of the unfished level. Thus, the Council has adopted very clear targets and thresholds to define overfishing and stock depletion. Currently a number of rockfish stocks are overfished and are under rebuilding plans that are highly constraining to virtually all west coast groundfish fisheries. The management practice has been to protect the weakest stocks while foregoing yield of healthy stocks. Consequently, bycatch reduction of overfished stocks is of paramount importance when the Council adopts management measures for the groundfish fishery.

The PFMC also has a process in place to review and adopt stock assessment updates, which are an accelerated way of completing an assessment. In this instance a full assessment model that was previously reviewed and adopted by the Council can be carried forward for up to four years by simply updating the data file with recently acquired data and refitting the model, i.e., a "turn-the-crank" approach. Stock assessment updates are then reviewed by a meeting of the SSC's groundfish subcommittee, a process that normally takes little more than a few hours, to insure that strict adherence to the TOR is maintained and that the new model results are consistent with the old results. If an update fails to meet these criteria it can be referred to the mop-up review panel that is scheduled later in the year.

Management of salmon by the PFMC is generally designed to achieve two legislative mandates, i.e., the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the Endangered Species Act (ESA). Because many of the Chinook and coho salmon stocks that are included in the salmon FMP are listed under the ESA, the Council must meet the recovery goals and conservation standards set by the National Marine Fisheries Service for listed stocks. The Council's primary objective, however, is on obtaining optimum yield (OY) and maintaining sustainable fisheries for the salmon stocks that are not listed under the ESA. Fundamentally the practice is similar to groundfish, wherein weak-stock management is exercised to make certain that harvests of listed stocks do not exceed those specified in their recovery plans.

For healthy salmon stocks, OY is typically set based upon an escapement goal that is derived from an analysis of spawner-recruit data. Escapement goals are usually designed to achieve maximum sustainable yield (MSY) and, in the case of Chinook salmon, an overfishing concern is triggered when escapement goals are not met in three consecutive years. Stock forecasts are conducted using sibling regressions, wherein the abundance of jacks (2-yr old precocious

males that return to spawn) in the preceding year is used to forecast the return of 3-yr old fish (or the entire run) in the current year.

Given forecasts of the run size of the multitude of salmon stocks, as well as the escapement and recovery goals of each, the Council's Salmon Technical Team (STT) devises a set of management options for ocean fisheries that meets all the necessary constraints. This process is conducted using the Fishery Regulation Analysis Model (FRAM), which models the ocean time-area abundance of all stocks subject to Council management. The FRAM model itself is tuned to a large quantity of coded wire tag information that provides a basis for estimating the time-area distribution of salmon stocks in the ocean.

Unlike groundfish, the development of management options for salmon occurs very quickly. The SST summarizes all sibling regressions and run forecast information between December and February and presents it to the Council at its March meeting. A variety of season options are explored using the FRAM during that week and the Council adopts a range of measures for public review. At the next Council meeting that occurs in April, public comment is taken, more management options are considered, and by the end of the week the Council adopts a final salmon season structure. Hence, the entire process of setting salmon management measures happens very quickly within about a 4 month period.

Because of the very rapid pace of salmon management, there is no opportunity for a formal peer review to occur. Instead, every year during October a subcommittee of the SSC conducts a review of any new methodologies proposed by the STT (e.g., spawner-recruit analyses, sibling regressions, and changes to the FRAM). In addition, the STT conducts an internal review of all the data that are provided by constituent stakeholders pertaining to the previous year's escapements that are used in forecasting and the SSC reviews the actual forecasts at the Council's March meeting. Lastly, fully independent peer-reviews that utilize the CIE are sporadically conducted on matters of special interest, as for example occurred for the Klamath Ocean Harvest Model.

Council management of CPS is somewhat similar to groundfish. However, because CPS species are much shorter-lived, assessments are conducted annually. At present only Pacific sardine and Pacific mackerel are actively managed by the PFMC, although northern anchovy and market squid are monitored stocks. Hence it is feasible for the SSC CPS subcommittee to review these assessments, which is accomplished using a TOR similar to groundfish. CPS stock assessment review panels are chaired by a member of the SSC and, to insure independent peer review, at least one panel member must be unaffiliated with the Council in any way (e.g., CIE). Like groundfish, an abbreviated process for adopting CPS assessment updates is available, which utilizes the SSC's CPS subcommittee during a relatively short, half day meeting.

Pacific sardine is somewhat unique in that the PFMC has adopted an environmentally explicit control rule that alters the harvest guideline in response to changing ocean conditions (a running mean of sea surface temperature); when the ocean is warm a higher harvest rate is implemented. The control rule also explicitly sets aside a considerable escapement of sardine as an ecosystem forage consideration and explicitly shares the harvest between Mexico and the United States by way of an allocation rule.

Q & A

There was no discussion following the presentation.

Gulf of Mexico

Presenter - Will Patterson, SSC member

The Gulf of Mexico is a productive large marine ecosystem. Its myriad habitats support diverse fisheries targeted at pelagic, demersal, and benthic fauna, which is reflected in the diversity of fishery management plans (FMPs) established by the Gulf of Mexico Fishery Management Council (GMFMC). Individual plans are specified for shrimp, coral, spiny lobster, stone crab, coastal pelagic fishes, and reef fishes, with additional plans, such as the Council's essential fish habitat FMP, falling into a generic category.

The GMFMC's SSC has been actively involved in evaluating the science, including relevant socio-economic analysis, which inform amendments to the Council's FMPs, as well as provide scientific advice to aid the Council in achieving management targets specified in the FMPs and their various amendments. Review of FMP amendments by the SSC has been conducted under the auspices of a general rule that the SSC only provides input as to whether the best science available was utilized in crafting preferred management strategies and their alternatives. Issues of allocation or other non-scientific issues have been avoided; however, a revision of SSC standard operating procedures (SOPs) in light of new SSC responsibilities included in the MSA may incorporate a more explicit statement regarding the SSC's review of FMPs and amendments to them.

Perhaps the principal function of the GMFMC has been to serve as the final layer of peer review for stock assessments, and provide science-based advice on stock determination criteria (SDC), biological reference points (BRPs), and future allowable biological catch [per the former definition of ABC contained in the Sustainable Fisheries Act (SFA) of 1996]. The SSC was actively involved in advising the GMFMC on issues related to the Council's adoption of general and stock-specific policies related to BRPs and establishing control rules required by the SFA of 1996.

Historically, stock assessments were performed by NMFS analysts from the Southeast Fisheries Science Center with significant input and review by stock assessment panels (SAPs) whose members were appointed by the GMFMC. Full or updated assessments typically were performed annually for marquee or overfished species, such as red snapper, *Lutjanus campechanus*, and king mackerel, *Scomberomorus cavalla*. The chair of a given SAP would present scientific conclusions based on assessment results in both written and oral formats to the SSC. The SSC then would serve as the final layer of peer review and advise the Council with regard to stock status and catch levels projected to meet management targets while avoiding thresholds

The Southeast Data, Assessment, and Review (SEDAR) process replaced the former SAP-driven process in 2002 with the central goal of improving the quality and reliability of stock assessments in the southeastern U.S. and Caribbean (www.sefsc.noaa.gov/sedar/). Other goals of instituting the SEDAR process were greater involvement of constituent groups, increased transparency in the process, and an independent review of the stock assessment process, the latter of which has been accomplished by the involvement of Center for Independent Experts (CIE) scientists in assessment reviews.

The SEDAR process is organized into three workshops: a data workshop to compile life history, landings, and fishery-dependent and -independent indices of abundances, an assessment workshop focused on model selection and development, and a review workshop in which a panel of mostly CIE scientists reviews assessments and evaluates stock status and recommends overfishing thresholds and ABC. Each workshop produces a lengthy report. Hence, each step of the process is well documented, thus insuring transparency. Increased constituent input also is widely perceived to have increased the objectivity and quality of assessment results.

There are two circumstances in which the GMFMC SSC has expressed some frustration with the SEDAR process: timeliness of assessments and duplication of review. Benchmark SEDAR assessments typically take 6 to 9 months to complete, although assessment updates should have a much quicker turnaround time. A greater issue is getting species, even ones which support significant fisheries and/or are classified as overfished and/or undergoing overfishing, on the SEDAR schedule due to the fact that SEDAR serves the assessment needs of three Councils: the GMFMC, the Caribbean Council, and the South Atlantic Council.

The SEDAR process is still relatively new and has gone through modifications to improve any perceived shortcomings. The issue remains concerning duplication of review as most GMFMC SSC members feel strongly that the SSC should provide a thorough review of SEDAR findings since the SSC is the body responsible for making binding management recommendations to the GMFMC; language in the Magnuson Stevens Act (MSA) confirms that role. Recent revisions in the makeup of SEDAR Review Panels, which will now include appointees from the Council may help to address this issue, but perhaps even greater SSC involvement in the SEDAR review process is warranted given the increased responsibilities bestowed on SSCs.

Management advice has been made to the GMFMC by its SSC in a consistent manner regardless of whether stock assessments were generated by the SAP or SEDAR processes. Following passage of the SFA, the SSC typically would recommend that total allowable catch (TAC) be set at the projected median probability of achieving the management target of yield at F_{OY}, which also imparted a high probability of avoiding the threshold of yield at MFMT. Despite having adopted management targets based on F_{OY} proxies, the GMFMC typically set total allowable catch (TAC) based on F_{MSY} proxies. The SSC, in turn, repeatedly warned that such policies were not risk-adverse, and thus contrary to the spirit of the SFA.

Establishing overfishing level (OFL) and acceptable biological catch (ABC) control rules for Gulf of Mexico fisheries that are consistent with MSA language and intent will require the Gulf SSC, and hence the GMFMC, to impart greater conservatism and precaution into management than has been practiced routinely. The GMFMC SSC has yet to establish, or even propose, such control rules, given the lack of finalized NS1 Guidelines from NMFS. However, now that guidelines are nearly in place, the SSC will begin the task of control rules that are consistent with MSA and the NS1 Guidelines.

Q & A

There was no discussion following the presentation.

South Atlantic

Presenter - Carolyn Belcher, SSC Chair

The South Atlantic Fishery Management Council's Scientific and Statistical Committee evaluates peer reviewed stock assessments conducted through the Southeast Data, Assessment, and Review (SEDAR) process on the grounds of being based on best available science. The SSC provides a second level of peer review that includes scientists more familiar with the local nuances of the fisheries associated with the species being assessed. Although the majority of assessments have been approved without a lengthy debate or discussion, there have been two species (vermilion snapper and king mackerel) that required reruns because of data issues.

The SEDAR process vetted its first assessment in 2002, and to date 15 species from the South Atlantic have been through the SEDAR process. Three weeklong workshops are held, one focusing on potential data sources, the second focusing on the assessment methodology, and the third focusing on the review of the results from the assessment. Similar to the SARC process in the Northeast, SEDAR requires an independent review that is moderated by reviewers from the Center for Independent Experts (CIE) and brings in scientists from the south Atlantic as well as other areas of the U.S. and abroad.

The SEDAR process conducts two types of assessments. Benchmark assessments apply to species that have not been vetted through the SEDAR process previously or to species that exhibit pressing management issues. During benchmark assessments all previous assumptions, datasets, methodologies, review decisions and management actions are reconsidered (i.e., should not be consistency-based). Update assessments are applied to species already vetted through the SEDAR process, however, these assessments only allow for minor changes to the data streams, although some have allowed for minor changes to the modeling techniques (e.g., requested sensitivity runs not previously applied in the benchmark). The SSC has a larger role to play in the oversight and review of the updates. Consensus and summary reports in formats similar to the benchmark updates are produced for the benchmark assessments, with these reports coming directly from the SSC. The lead analyst in both the benchmark and update is responsible for presenting the results of the assessment to the reviewing committees and to the Council, if requested.

The SAFMC's SSC has been actively debating how to best assess uncertainty associated with the stock assessments used for management. Currently, much of the discussion focuses on where the uncertainty should be accounted for; is it adequately addressed in the models or should it be addressed at the management level? Shertzer et al. (2008) drafted a methodology (known as the P* method) that builds on "the common projection methodology by including uncertainty in the limit reference point and in management implementation, and by making explicit the risk of overfishing that managers consider acceptable." Currently, this methodology can only be applied to data rich species and there is continued debate over what level of risk should be applied as well as who (i.e., the SSC or the Council) is responsible for determining the appropriate level.

A tiered approach to assessing stocks was an agenda item during an SSC meeting several years ago. The SSC agreed that a framework was needed; however, it never had the time to discuss the matter further given more pressing management needs since that time. With the current requirements under the MSA the SAFMC SSC needs to revisit this approach. It is currently specifying "OFLs and ABCs" for Snapper-Grouper Amendment 17, which requires these values for 10 species. Values are specified using the criteria used in the past for data rich species

(OFL=Yield at MFMT; ABC=Yield at 75%F_{MSY}), which applies to 8 of the 10 species. Two of the remaining four have landing streams, but have not had an assessment vetted through SEDAR and as such their recommended levels are predicated on average landings over the past five years (equals OFL) and an ABC equal to 90% of OFL. These two species (black and red grouper) are scheduled for SEDAR assessment in 2009. Two additional species, Warsaw grouper and speckled hind, lack data to determine OFL; however, scientists with first-hand knowledge of these species indicated an ABC of 0. The SSC has been requested to provide further explanation of the implications of the 0 (i.e., does this include bycatch mortality or exclude it). Past adjustments for bycatch mortality have been conducted outside the realm of the SEDAR process, and are generally applied at the management level, thus justifying the concerns from the Council.

The snapper-grouper complex contains 73 species, of which 10 species account for more than 95% of the landings. The SSC has been asked to provide guidance on potential species groupings for this fishery based on bathymetric characteristics of the fishery (i.e., shallow water vs. deep water groupers), with the hopes that an indicator species can be used to manage the groupings. Shertzer and Williams (2008) assessed the utility of statistically-determined species groupings for snapper-grouper species represented in commercial (handlines specifically) and recreational (headboat) catches. The results of their study did not support the use of indicator species; however, the utility of species assemblages provided a means to assess ecosystem relationships that could prove to be useful in management actions.

Q & A

It was pointed out that the workshops in the SEDAR process are very collaborative. There is no specifically named author of individual assessments (although there is an analytical team and lead analyst) so the group as a whole is ultimately responsible for the outcome. The data workshops are likely to take less time in the future as they learn more about data sources and assessment teams have experience with the data sets.

Caribbean

Presenter - Barbara Kojis, SSC Chair

Stock Assessment Review's in the U.S. Caribbean have been undertaken for the last several years using the Southeast Data, Assessment and Review (SEDAR) process. This process consists of 3 consecutive workshops and is organized by the Southeast Fisheries Science Center and the Southeast Regional Office. Experts from local and regional federal fisheries agencies, academia, and the fishing community are invited to the workshops. The first workshop, the Data Workshop, compiles and reviews all available data on the selected species and assesses the adequacy of the data for conducting a stock assessment. The process can stop at this point if the data are clearly inadequate for a stock assessment. The second workshop, the Assessment Workshop, gathers together experts and local fishers and fisheries professionals to analyze the data for about one working week. The third and final workshop, the Review Workshop, consists of a review of the results and the conclusions by a panel of independent experts.

To date, all stock assessments attempted by SEDAR on U.S. Caribbean fishery species have been unsuccessful because of inadequate data. In the case of the spiny lobster (*Panulirus argus*), data were inadequate at least in part because it is a Caribbean – wide species with a long pelagic larval stage and data were only available from the U.S. Caribbean and Florida for the stock assessment. In other cases, there was a lack of useful effort data (queen conch – *Strombus gigas*), or there were too few samples to

conduct a stock assessment (yellow-tail snapper – *Ocyurus chrysurus*). As a result of the lack of successful stock assessments, the Caribbean Fishery Management Council's (CFMC) Scientific and Statistical (SSC) has not peer reviewed stock assessments or set annual catch limits for species, except for some that have been determined to be overfished where the SSC set MSY at 0. The SSC will likely be reviewing a variety of perhaps less precise methods, such as conch density surveys, to obtain ball park estimates of the status of U.S. Caribbean stocks.

During the development of the Sustainable Fisheries Act Comprehensive Amendment 2005 (SFA 2005), MSY and OY levels were established for groups of taxonomically related species (species units) for reef fish and for spiny lobster (*Panulirus argus*) and queen conch (*Strombus gigas*). Given the data poor situation in the U.S. Caribbean, MSY and OY were based on the mean of recent catch data (1997 – 2001 for Puerto Rico and 1994 – 2002 for the USVI). Because of the large number of species in the Reef Fish FMP and because species specific catch data were only available for some species in Puerto Rico and not for any in the USVI, reef fish were grouped into units.

When development of the SFA Amendment commenced, some of the catch report data and about half the port sample data (TIP – Trip Interview Program) from the USVI were not entered into a computer database and, therefore, unavailable for analysis and inclusion in the SFA Amendment. The uncorrected total catch from catch reports for the USVI was divided among the taxonomic units based on the percentage of the Puerto Rico catch in that unit.

Data for the USVI from both catch reports and TIP have since been entered in databases and proofed. Unlike Puerto Rico, the USVI does not require fishers to report their fish catch by species. Instead fishers report their reef fish catch by family. The family reporting requirement only commenced in 1995 in St. Croix District and 1997 in St. Thomas/St. John District and only became a universal requirement for all fishers in 1999. This information, along with the TIP data, is being used to refine the USVI contribution to the total catch of the different units.

In November 2007, the SSC recommended that the CFMC establish two working groups to assist the SSC in establishing Overfishing Limits (OFL) and Acceptable Biological Catches (ABC): 1) Technical Monitoring and Compliance Group (TMCT) and 2) Annual Catch Limit Plan Development Group (ACLG). The TMCT's responsibility is to review available commercial, recreational, and fishery-independent data, ensuring that all available datasets are entered and proofed, and make recommendations on methods for data analysis and determination of OFLs and ABCs.

The SSC recommended modeling the ACLG on the SFA Working Group that was established to assist in the development of the SFA 2005. Members of the SFA Working Group consisted of scientists from SEFSC, local government fisheries agency, university fisheries researchers, independent experts, local fishers, etc. and had a wide range of scientific expertise and knowledge of US Caribbean fisheries and fisheries management.

The ACLG was tasked with reviewing and updating the SFA 2005 status determinations; assembling information on trends in effort, abundance, size, etc.; making status determinations using quantitative and qualitative approaches; recommending annual catch limits to the SSC; identifying and evaluating alternative management measures that would prevent ACLs from being exceeded; developing specifications for monitoring compliance with ACLs and recommending measures for corrective action of ACLs are exceeded. The ACLG also was tasked with updating the data in the SFA Comprehensive Amendment and using the revised data and life history parameters to reassess the species groups and ascertain the feasibility of establishing "island-based" fishery management and make recommendations to the SSC.

As well, the ACLG was asked to provide the SSC with an assessment of the adequacy of the data to indicate stock status and trends and, if data are adequate, perform these analyses. The SSC also recommended that data from MARFIN, CRP bycatch studies, and any other relevant research programs be used in the analyses.

The TCMT met in July, 2008 to review the available data and recommended using average landings to estimate MSY, similar to the method used in the SFA 2005. The SSC agreed that the SFA Amendment provided a good model, but also recommended that other models be explored. The SSC strongly recommended that the TCMT ensure that the data in the SFA Amendment is comprehensively updated, revised and/or changed. The TCMT recommended using TIP data to partition snapper and grouper landings from the USVI by species. They also recommended calculating separate limits and targets for St. Thomas/St. John District, St. Croix District, and Puerto Rico and recommended using MRFSS data to set limits in Puerto Rico. No MRFSS data exists for the USVI.

The ACLG also met in July 2008 and reviewed the existing data from Puerto Rico and the USVI and data analyses to determine how best to estimate the Overfishing Limit (OFL), the Acceptable Biological Catch (ABC), the Annual Catch Limits (ACLs), and the Annual Catch Targets (ACT). The ACLG concurred with the TCMT with respect to using the SFA 2005 model but made more specific recommendations on which landing years should be used for which species units. They recommended setting OFL equal to MSY and establishing the ACL based on the 25%, 50%, or 75% lower confidence limit of the average catch as adjusted for stock status. The choice of % lower confidence limit will depend on the estimate of risk for the stock. They asked the SSC for a recommendation on how to set the ACT: should it be set equal to OY, which was defined as 0.75*MSY, or be based on the ACL as reduced by management uncertainty?

The SSC reviewed the ACLG recommendations and concurred with many of their recommendations. Of import, the SSC recommended adjusting MSY (based on average catch) using the following equation: status scaler x average catch x vulnerability. It was recommended that vulnerability be based on the susceptibility and productivity factors being considered by the current Vulnerability Evaluation Working Group (note: vulnerability incorporates susceptibility and productivity). Status scalers incorporated the risk status of species and were denoted as follows: At Risk (species overfished or undergoing overfishing) = <1; Undetermined = 1.0; Not at risk = >1. The SSC recommended that ABC be set at 25%, 50%, or 75% of the lower confidence limit of average catch, as adjusted for stock status (Formula: ABC = MSY – (Average Catch * % LCL). The SSC requested guidance on the grounds for applying the different percent confidence limits.

The St. Thomas Fisheries Association (STFA) has been an active participant in fisheries management in recent years. They recently made a presentation to the ACLG and SSC, which analyzed US Virgin Islands commercial fisheries data and recommended allocating ACLs by gear type. The SSC recommended deferring consideration of the STFA's proposal until after a process is established for setting limits and targets by species/units. At that time, they would review this approach based on the calculated limits.

Recreational fishing is an important activity in the US Caribbean, which must be incorporated in any determination of OFL, ABC, and ACLs. However, data on recreational fishing is limited. The Marine Recreational Fisheries Sampling Survey

(MRFSS) has only been conducted in Puerto Rico. It has not been successfully implemented in the USVI. Data from the MRFSS survey in Puerto Rico indicate that the recreational catch is equal to 100% the commercial catch. In the USVI telephone surveys of recreational fishers and boat based recreational fishers were carried out in 1992 and 2002, respectively. Also, data was collected and reports written on shoreline fishing participation and catches, and tournament catches and effort. The information in these reports appears to indicate recreational landings in the USVI comprise a much lower proportion of the catch than Puerto Rico.

The next meetings of the TCMT, ACLG, and SSC will be held in February 2009, when substantial progress should have been made on analyzing the data. However, it is likely that the data will be inadequate to determine MSY, and therefore, ABC, as required by the MSA. It is more likely that we will be making expert judgments regarding the status of a stock using imprecise or no data. The most useful outcome of the process will be the resulting recommendations on the most cost-effective methods for collecting adequate data for determining stock status and trends.

NOTE: In 2007, the SSC also recommended establishing a Monitoring and Compliance Team (MCT) once OFLs, ABCs, ACLs, and ACTs have been set. The purpose of the MCT is to continuously monitor landings and compliance, and report to the CFMC when the ACT and ACL levels have been reached or exceeded so that action can be taken.

Q & A

There was a question about the rationale for using lower confidence intervals to set ABC. It was clarified that the goal is to be precautionary. For ABCs based on catch data, the SSC deliberately reduces ABC below average landings, given the confidence in accuracy of landings, and an overall goal to be precautionary. It was noted that if average landings are stable, but effort increasing (ie increased traps), this situation would indicate that CPUE had declined and thus biomass had declined. There was a comment that best Caribbean data is below the lowest tier of North Pacific data. Fishermen admitted to not giving accurate data due to regulatory concerns.

There was concern expressed that with no reliable data or assessments, how can the SSC establish OFLs and ABCs for several hundred species by 2011? Both the CFMC and WPFMC face similar challenges for extremely data poor species. While it is appealing to 'opt out' due to data poor situations, details are a challenge (how poor is data poor?), and you lose impetus for improving the data level.

Rick Methot suggested that if all that is available is average catch, and that catch has no trend, then one option is to specify OFL as average catch, and ACL at a level somewhat lower. The onus then is to collect better data and improve analysis to ultimately increase fishery yield. There may be a reason to set ACL above average catch, but would need to be supporting evidence. The option of basing OFL and ABC on a moving average of catch may not be optimal, however, because over time the catch limits would decline. If information to justify a sustainable catch is lacking, it is difficult to argue for a higher ABC. The SSC's judgement becomes more important as data sources get weaker. The final goal is provide as much assurance as possible that overfishing is prevented.

Mid-Atlantic

Presenter - Brian Rothschild, SSC Chair

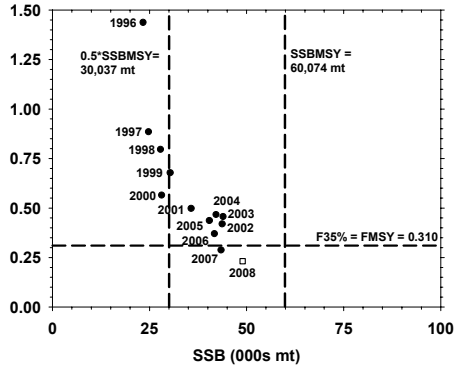
The Mid-Atlantic Fishery Management Council (Council) is currently developing protocols to implement the new provisions of the Reauthorized Magnuson Stevens Act which require the specification of annual catch limits and accountability measures for all federally managed species. All of the Council's FMPs have historically controlled fishing morality on managed stocks through hard quotas. The Council recently formed an Ad Hoc Committee to review existing quota setting procedures and to develop a mechanism to incorporate its Scientific and Statistical Committee in the process to meet the new ACL and AM requirements.

Annual quota specifications by the Council to achieve prescribed levels of fishing mortality contained in the FMPS are based on the best scientific information available from the most recent stock assessment for each managed species. The Northeast Regional Stock Assessment Workshop (SAW) coupled with review by the Stock Assessment Review Committee (SARC) provides the primary mechanism for conducting analytical stock assessments in the Northwest Atlantic Ocean. Stock assessments are conducted through the SAW/SARC process twice annually during the spring and fall of each year. A benchmark analytical assessment is conducted for each species approximately every three years. Terms of reference (TOR) for each assessment are developed cooperatively by the Northeast Regional Coordinating Council, which includes the Northeast Regional Administrator and Science Director along with the executive leadership of the Mid-Atlantic and New England Fishery Management Councils and the Atlantic States Marine Fisheries Commission. The TOR are transmitted to the species working groups responsible for development of the stock assessments for the species in question. The working papers developed by the species working group form the basis of the stock assessment.

The development of the benchmark assessment for summer flounder provides a recent example of the SAW/SARC stock assessment process in New England. The Southern Demersal Working Group (SDWG), comprised of 20+ state, federal, NGO scientists, developed the benchmark assessment for summer flounder during the period January though May of 2008. The SDWG stock assessment workshop (SAW) report was transmitted to the SARC for review in late May of 2009. The SAW report for summer flounder provided updated estimates of total stock size, spawning stock biomass, recruitment and fishing mortality for summer flounder. In addition, the SAW report recommended alternative biological reference points and provided a stock status determination for the species.

The SARC review panel, which provides external peer review, was comprised of three assessment scientists recruited from the Center for Independent Experts (CIE). The external peer review focuses on the scientific merits of the stock assessment and comments on whether or not the SDWG findings are of acceptable scientific rigor. In the case of the summer flounder assessment vetted in SAW/SARC 47, the CIE agreed with the findings of the SAW report relative to estimates of stock size, fishing mortality, recommended revised biological reference points and stock status determination. The final scientific reports of the SARC were transmitted to the Council through the SAW Chairman. The SARC accepted the SAW 47 assessment model which was used by Council staff (in collaboration with the NEFSC stock assessment scientists) to develop a white paper which included yield projections at the level of fishing mortality required to rebuild the summer flounder stock (which formed the basis for 2009 quota and management recommendations to the Council).

Time series of fishing mortality and spawning stock biomass of summer flounder.



Prior to recent revision of the MSA, staff recommendations would have been communicated directly to the Summer Flounder, Scup and Black Sea Bass Monitoring Committee which is responsible for making recommendations to the Council concerning quota and other management measures for the upcoming fishing year. Based on the findings of its Ad Hoc Committee, the Council decided to insert SSC review of the staff quota and management measure recommendations prior to consideration by the existing Monitoring Committee. The Council's current interpretation of the Proposed NS1 guidelines is that the SSC fishing level recommendation (FLR) equates to Acceptable Biological Catch (ABC). The Council also interpreted the proposed rule to mean that ABC is the level which sets the upper bound for the Annual Catch Limit (ACL), and is the yield associated with the Maximum Fishing Mortality Threshold (MFMT) as reduced based on scientific uncertainty about the MSY estimate for a particular stock (i.e., to F_{target}) or $F_{rebuild}$ if the stock is undergoing rebuilding. The charge to the SSC was to give scientific advice on the level of ABC for summer flounder in 2009 that prevents overfishing *and* achieves stock rebuilding (since the species is currently in a formal stock rebuilding plan).

A simple framework to guide the SSC and Council in specifying annual quotas for 2009 was as follows:

MSY (OFL) $\geq$ ABC $\geq$ OY (TAC)

MSY (OFL) is the catch associated with F_{msy} or proxy (i.e., catch at $F_{threshold}$ or MFMT)

ABC is the catch associated with F_{target} (i.e., $F_{threshold}$ reduced to account for scientific uncertainty) or $F_{rebuild}$ if stock is undergoing rebuilding

OY is actual TAC based on ABC as reduced by management uncertainty.

The Council received scientific advice for summer flounder from its SSC following the model described above in 2009 but is currently evaluating its FMPS to determine if existing quota-setting procedures meet the ACL and AM requirements of the MSA. One critical issue which remains is the relationship between the scientific review of stock assessments by the SSC and the SAW/SARC process. The Council has concluded that SAW/SARC documentation needs to be at a level such that the SSC has a clear understanding of data quality, rationale for and consequences of decisions made during assessment development, and conclusions drawn about stock status. If the current FLR/ACL development process is maintained, the Council intends to strike a balance between avoiding a competing assessment situation and maintaining SSC review independence. An alternative approach being considered is to have the SSC assume CIE review responsibility within the existing SAW/SARC format (i.e., populate CIE panel with SSC members).

The MAFMC SSC has had limited experience with developing ABC recommendations for data poor stocks. During their review of the 2009 quota specifications, the SSC identified both scup and black sea bass as extremely data poor stocks and reluctantly endorsed staff ABC recommendations for both species. During SSC deliberations, the question arose as to the consequences of not making an ABC recommendation in cases where scientific uncertainty and lack of data overwhelms the SSC's ability to make an ABC recommendation. Both scup and black sea bass are currently being evaluated in a data poor workshop being conducted through the NE SAW/SARC process.

Q & A

There were no questions following the presentation.

New England

Presenter -Bob O'Boyle, SSC member

The following summary of Stock Assessment and Setting of Annual Catch Limits in New England was prepared by R. O'Boyle, S. Cadrin, J. Kritzer (SSC), S. Correia, and T. Nies (Groundfish PDT).

There are a number of peer review processes underway in New England, including the SARC/SAW, CIE reviews and the TRAC (Transboundary Resources Assessment Committee). The Groundfish Assessment Review Meetings (GARM), which took place during 26 October 2007 – 6 August 2008 to review the assessments of 19 groundfish stocks in New England, is characteristic of a benchmark peer review in the region. As well, the groundfish stocks are the current focus of methodologies to determine ACLs.

The GARM was undertaken over four separate meetings with three to establish the data inputs, models and biological reference points to be used in the fourth, the assessment meeting. This GARM is the most extensive of the three that have been conducted since 2002, involving over 25 scientists from NMFS, Woods Hole, and 24 external and industry reviewers.

Regarding highlights of the data inputs review, analyses of tagging data generally corroborated current stock definitions. Exploratory analyses using a finite-state continuous-time process model showed the promise of the approach although it required further development. The same model was used to explore long-term time trends in maturity at age.

The GARM considered a range of assessment models (index, production, age and length-based) with a focus on what model best addresses the issues related to each stock. The index approach is noteworthy in providing a means to explore the relationship between stock productivity and fishing mortality in the survey data. Regarding VPA and SCAA, both produced similar results under the same assumptions and model structures. Most assessments employed VPA. Many models suffered severe retrospective patterns which the GARM spent considerable time exploring. The GARM adopted the default that, unless a model formulation could be found to address these, the terminal population numbers would be adjusted. In five of the assessments, splitting the survey time series in the mid-1990s was used to adjust for undetermined processes causing retrospective patterns. Trends in survey catchability by age, species, and season were explored to provide constraints to model parameters but further examination of these is required. Domed partial recruitments were observed in preliminary analyses of Gulf of Maine cod and white hake which were resolved by partial domes with external information (tagging and catch at age of old fish).

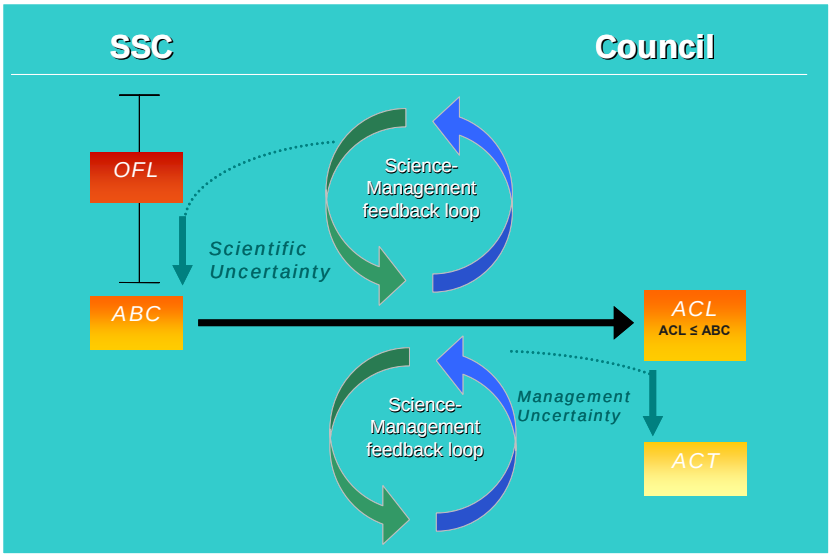
Biological reference points (BRP) were updated for all stocks, estimated external to assessment model primarily using stochastic projections at F= F40%MSP, often using a spawning biomass breakpoint to define recruitments associated with Bmsy.

An ecosystem – level analysis was undertaken which suggested that the sum of the aggregate MSY for the GARM stocks was similar to the sum of the single stock MSYs. It is expected that as productivity increases through stock rebuilding, the BRPs will increase and tradeoffs between stocks will become more apparent. A full set of the GARM's reports can be obtained at http://www.nefsc.noaa.gov/nefsc/saw/

The Groundfish Plan Development Team (PDT) of the New England Fishery Management Council has been developing an approach to setting of Annual Catch Limits (ACLs) for the 19 stocks assessed by NMFS during the Groundfish Assessment Review Meetings (GARM). Representatives of the PDT presented an outline of the approach to the SSC in July, which it favourably received and made constructive comments on. NMFS presented the results of the GARM to the NEFMC in August following which the PDT has continued to work on the ACL setting approach. As well, the NEFMC, based upon comments from staff and the SSC, provided NMFS with feedback on the proposed changes to the National Standard 1 Guidelines. Further developments of an ACL-setting approach will be informed by the discussion at this national SSC workshop. It is important to note that the approach will not be detailed in the Northeast Multispecies FMP Amendment 16 as it is expected that it will evolve considerably with experience and use.

The National Standard 1 Guidelines outline a suite of new reference points, including OFL, ABC, ACL and ACT. ABC is intended to incorporate biological uncertainty and thus be set below the OFL while the ACT is intended to be below the ACL to incorporate management uncertainty. It is not clear to the NEFMC why there is a difference between ABC and ACL. Consequently, the PDT sets ABC below OFL (based on point estimates of Fmsy / Frebuild) to address biological uncertainty and ACL below ABC to address management uncertainty and does not use ACT. It is acknowledged that some councils may wish to use ACTs but the NEFMC prefers to consider this optional rather than binding.

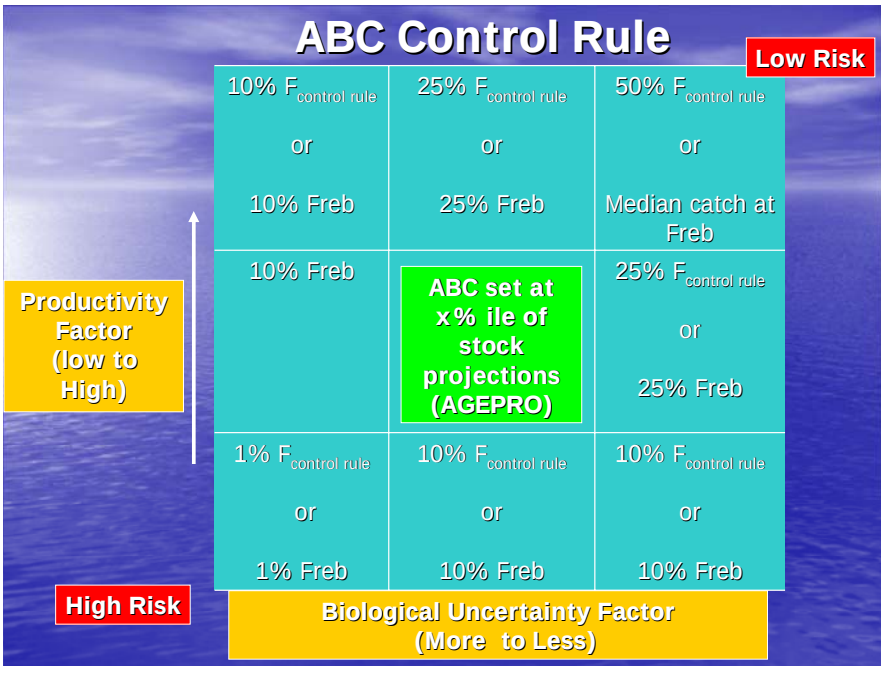
The ACL-setting will become part of the already established plan adjustment process which requires the PDT to draft a SAFE report each year and to recommend management revisions every two years. The general sequence of activities for groundfish will be for the PDT, following the August NMFS assessments, to draft ABC recommendations for the SSC to consider. The SSC either accepts these or makes changes, which it then provides to the PDT before September. The PDT then drafts ACLs and provides these to the NEFMC which in turn considers these and provides them to NMFS by mid-December. A part of the process still to be finalized is how this process handles ACL recommendations from the US / Canada TMGC and TRAC committees.



In this ACL setting approach, the SSC acts as an interface between science groups and the NEFMC, complementing tactical decision–making by the PDT with strategic thinking. Consequently, the SSC is strategically placed to undertake Management Strategy Evaluations (MSE) in support of planning. The SSC will interpret peer reviewed information to the degree that it exists and endeavor not to duplicate existing peer review processes. It will, on the other hand, define peer review as needed.

An issue that was raised during the discussion on the ACL approach is the availability of abundance indicators which service the control rules. Typically, control rules have to rely on information that is two years old (data in year t-1 used to inform harvest decisions in year t +1). The SSC recommended exploration of control rules which use information which can be provided on a more timely basis (e.g. direct use of annual survey indices) as has been done in other parts of the world (Butterworth, 2008).
The ACL approach being pursed by the NEFMC is based upon work by Rosenberg et al. (2007). The latter had developed a framework for ACL determination suitable

for a wide range of species and data availability, building on work on Ecological Risk Assessment by the Australian Fisheries Management Authority. The latter has developed a 3- phase triage system in which the second phase relates the risk of human impact on a stock to its vulnerability, as described by its productivity and susceptibility characteristics (Hobday et al. 2007). The intent of the so-called PSA (productivity-susceptibility analysis) is to identify resources which are at high risk to human impact and thus deserving of more in-depth examination. Rosenberg et al. (2007) suggested that the PSA could be used to classify stocks according to their vulnerability to fishing. Default OFL – ABC and ABC – ACL 'buffer' sizes would then be defined based upon this risk classification, the expectation being that buffers would increase with the level of risk. It is recognized that BRPs already incorporate measures of the vulnerability of a stock to fishing. What is being addressed through application of the risk-based buffers is the consequences for the resource of management non-conformance with the BRPs. Rosenberg et al. (2007) offered that these risks were in turn a function of both biological (as documented through assessments) and management uncertainty (as exemplified by issues in implementation of regulatory measures). This provided a means to adjust buffer sizes based upon these sources of uncertainty.



The Groundfish PDT modified the PSA approach by accepting that the risk was related to a stock's vulnerability but considered that the susceptibility of all the stocks was similar and thus did not have to be estimated. The SSC felt that while this might be true, susceptibility should nevertheless be included in the calculations. This issue is currently being revisited by the PDT. The PDT then related the size of the OFL – ABC buffer (ABC control rule) to biological uncertainty and the size of the ABC – ACL buffer (ACL control rule) to management uncertainty. The PDT has initially focused its attention on the ABC control rule by first constructing tables which describe how risk changes with both productivity and biological uncertainty. It has constructed a joint productivity – biological uncertainty table which outlines the percentile level to be used in the stochastic stock projection to set the ABC (e.g. ABC at which there is x% probability that the Fmsy or Frebuild would be exceeded). For instance, if productivity was high and biological uncertainty low, the ABC determined in the projections would be set by the 50% (median) Fmsy level. As productivity declines and biological uncertainty increases, the percentile level would decrease to a minimum of 1%. Thus far, these tables are drafts which need to be confirmed. Work on the ACL control rule has progressed but is not as advanced as the ABC control rule. The productivity factor table is available as is a draft management uncertainty factor table but these have yet to be combined into the ACL control table.

Work has also progressed on establishing ACL sub-components for each of the 19 groundfish stocks. These include sub-components associated with Accountability Measures (AMs) such as the directed fisheries, recreational fisheries and herring mid-water trawling and sub-components not associated with AMs such as the scallop fishery, fisheries in state waters and other non-specified fisheries.

While the broad plan for ACL-setting has been outlined, much of the details on the buffer sizes need to be confirmed. In its discussions with the PDT, the SSC suggested that the ACL setting approach be applied to past data and management outcomes judged through simulation using different buffer

sizes. It is hoped that the results for data-rich stocks will be able to inform buffer sizes for data-poor stocks. These explorations are in fact analogous to MSEs in that the robustness of objective attainment under different buffer sizes is being explored.

Indeed, MSE can provide a means for broader examination of the management system, from choice of assessment models, through harvesting strategies to regulatory options. It provides a forum for managers, scientists, economists and industry to cooperate on goal setting, strategy development, modeling, option valuation and so on. In a study conducted by the PDT on Gulf of Maine cod, it was determined that choice of the 25th percentile rather than the 50th percentile probability resulted in a 27% decline in landings with a negligible reduction in the probability of rebuilding by 2014. This exemplifies the utility of this approach in valuation of different buffer sizes and thus precautionary management.

The NEFMC raised a number of concerns with the National Standards 1 Guidelines. It noted that use of the ACT is not stipulated by the MSA and could cause confusion with the ACL. It felt that its use should be optional rather than mandatory. It did not feel that the overfishing definition should be stated in terms of catch but rather should remain in terms of fishing mortality. There can be instances (e.g. due to retrospective patterns) when the catch would be within RPs but not the fishing mortality. Further, the NEFMC felt that the adjustment of ACLs and implementation of AMs should be based upon fishery performance data which has been evaluated post-season. In-season adjustments are considered unrealistic.

In summary, the NEFMC has made considerable progress on the ACL-setting framework with an initial focus on groundfish. It has based its approach on work that is current internationally and which provides extendibility to species of widely different vulnerabilities and uncertainties. Work on the details of the ABC and ACL control rules is underway with the potential that this will be informed through MSE-style simulation.

Q & A

There appears to be a range of ways to incorporate buffers in ABCs, from a simple % downward adjustment from OFL, to P* to vulnerability evaluations. There was concern that added complexity may not be very useful, but it depends on the probability of exceeding threshold given a target. There was concern raised about adjusting estimates for vulnerability, and the possibility for double-counting of precaution, given that uncertainty should already be accounted for in the assessment.

"If one of the reasons we're being asked to do the impossible is the fact that we don't have catch data, then our effort should be directed to getting catch data and not trying to invent ways to deal with the ACL rule. The proximate problem is to go out and get data, darn it, and that's where we should be putting our effort."

Pierre Kleiber

"The notion of setting a catch limit on a fishery for which you don't know the catch is just absurd. Here we have an unregulated, unmonitored fishery and that makes the agency nervous. So how do we resolve this situation and resolve it in a way that is equitable for the stakeholders in that fishery? If we're not careful, we'll end up marginalizing them out of the system."

John Sibert

"If you have a time series of catch data that you don't have a lot of faith in, how do you define precautionary and taking into account uncertainty other than to not have a fishery?"

Jim Berkson

"If it can't be done, we have to say it can't be done."

Terry Quinn

"Catch data at a minimum has to be obtained. And it's particularly important to the Caribbean and the Western Pacific. This ought to be a strong statement coming out of this meeting."

Ed Houde

Discussion of SSC Role in Peer Review and Catch Limits

Catch Limits

Catch limits are a transparent measure of how effective management practices are at preventing overfishing. The purpose of the catch limit is to establish a threshold level of catch that triggers accountability measures to prevent overfishing. Various management measures (effort controls, quotas, etc.) can be implemented to keep the annual catch from exceeding an ABC or overfishing level.

The issue of whether to set catch limits when there is insufficient data received much discussion. Rick Methot commented that it was better to set some type of catch limit rather than let a fishery possibly become subject to overfishing until more information became available. Rick thought that in many cases there could be a way to come up with a number to set ABCs or ACLs that reflect scientific opinion. Several participants from data poor regions stated that it would not be possible to set catch limits when the catch was unknown (or not accurate) and suggested that resources should be spent on collecting the needed information rather than trying to devise catch limits. Some participants felt that if the SSC determines that it is not possible to develop catch limits for a fishery, the SSC should inform the Council and NMFS that it can't be done. In such cases, it would be the responsibility of the SSC to identify the information that would be needed to develop catch limits and to include them in SSC research recommendations.

In some cases, the SSC may need to make judgment calls based on limited information, but that doesn't mean these decisions are not scientific. They might be called arbitrary, but it reflects scientific judgement. An example of this is the F.01 reference point used by ICES. It was noted that there are great differences in the level of information available among regions, and the guidelines should provide some guidance on how to deal with fisheries with limited catch data.

Catch limit reference points are not homogenous across the nation, and these differences point to the need for a national dialogue on these issues. There have been several data poor workshops around the country (and more are planned), and there was general agreement that it would be very helpful if the SSCs could share the results of these workshops.

The group discussed using catch limits versus access constraints to limit fishing mortality and prevent overfishing, particularly when catch data are limited. Monitoring catch in fisheries with many boats and little reporting appears to be a recipe for failure, so managing access (e.g., limiting effort) is appealing. Regardless, any management measures implemented should be effective at limiting catch and preventing overfishing. Experience with controlling catch and fishing mortality varies by technique, area and fishery. It was noted that access and effort controls have been used in artisanal fisheries where accurate catch data are lacking; unfortunately however, there is no way to know if overfishing is occurring.

The group discussed the usefulness of an annual catch target (ACT) set below the TAC, which is how it is considered in the National Standard 1 Guidelines proposed rule. The overall concept of using targets to avoid limits is sound and justified, but it was noted that the real goal is to avoid overfishing and provide OY. Some noted that if the buffer between OFL and ABC is adequate, there is no need to have an ACT. It appeared to the group that there was not a rationale for any difference between ABC and ACL.

Galen Tromble clarified that the ACT is included in the proposed rule because ACL is mentioned specifically in the MSA as a limit. Logically then, there should be a target to associate with that limit. One could argue that ABC is a limit also, and then ACL is a defacto target, but the proposed rule avoids such confusion of calling a limit a target. It was noted that the accountability measures (AM) are proposed to be applied to the ACL, not the ABC, so a target is needed to avoid triggering AMs. If we apply AMs to ABC, we avoid the need to invent another concept, the ACT.

The group discussed species groupings and catch limits. In reef fish fisheries, there may be several hundred species that regularly

occur in the catch. How should these get grouped into species complexes for management, by trophic level, depth, fishing gear, or what? In some cases, these groupings need not be biologically based. For example, some groupings could be made based on catch co-occurrence, a technical interaction whereby the species may experience similar exploitation. Another concern with any grouping is life history traits and susceptibility, and vulnerability to gears. For example, despite technical interactions and co-occurrence in fisheries, shark species have vastly different vulnerabilities and it may not be useful to manage these as a group. Lastly, a major concern is that fluctuations in observed CPUE for a multi-species system may exaggerate the true abundance fluctuations of individual species.

Peer review

There were a number of topics of discussion with respect to the role of the SSCs in peer review processes and best available science. These discussions are summarized by topic below.

SSC participation in peer review processes

Participants discussed how SSCs should fit into the peer review process, particularly in regions where there is a stock assessment peer review process that has not formally involved SSCs. It was noted that the common responsibility of the SSCs is to determine the ABCs. With that responsibility comes a great deal of authority to be involved in the stock assessment process at all levels. SSCs will have to be comfortable with the process of setting ABCs. As such, there could be a high level of participation by SSC in the peer review of stock assessments for Council-managed fisheries.

Suggestions for SSC involvement in assessment peer review ranged from having the SSCs participate and own the peer review process from the beginning, to having the SSCs provide input on assessment terms of reference, to having SSC members participate on stock assessment review panels. SSC members have varying roles in the various regional assessment and technical peer review panels (SAW/SARC, STAR, SEDAR). Participants raised concerns about duplicating review efforts, however it was noted that SSC members could provide 'institutional memory' to the assessment review process that external reviewers might lack. Some general national guidance may be helpful, but it may not be necessary to require a single approach across all councils.

Overall, the group generally agreed that SSCs should provide a final level of peer review for assessments, noting that the SSC review is not intended to be as rigorous or involved as a technical review panel. In addition, there was general agreement that SSCs should have a defining role in the determination of 'best available science' given their role as peer reviewers of assessments and other scientific aspects of policy impact analyses.

One participant offered the following perspective on current peer review processes. First, there seem to be three peer review processes in some regions and a great lack of resources in other regions. It seems like resources could be deployed more evenly because so many processes are redundant. Secondly, the best science should start out with an explanation of the data, then methodologies and then conclusions. The information, methodologies, and rationale should be transparent and accessible (i.e., understandable) to the public. Third, the word "available" in the phrase "best available science" has been stretched. If there is only one observation, no matter how bad it is, it could be considered to be the best available science. Fourth, there appears to be a doctrine that NMFS science is always right. The SSCs should work with the agency to improve the science.

The group raised several other issues relative to the SSCs role in the peer review process. SSCs must rely on others to provide information, such as the assessment review teams that review technical aspects of an assessment. SSCs can add value to the process because SSC members may be aware of context or information not available to independent reviewers (such as CIE), who may be less familiar with regional fisheries.

The group discussed how CIE reviews, if used, should be incorporated into the process. One solution might be to combine SSC

"We need to ensure the word 'accurate' accompanies catch data. The Caribbean has catch data, but the question is how accurate is it."

Barbara Kojis

"Whether it's effort controls or quotas, those are management issues and they're different than the concept of ACL itself. ACL is an amount of catch that gives us a very transparent measure of how effective whatever management measures are being used. There is a difference between how you manage, and what you are using to measure the effectiveness of that management. The ACLs are there more for the effectiveness of the management, as a trigger for accountability measures. It's something that is very clear to see what's going with the catch for a year relative to the ACL. But how you manage to keep under that ACL is a related, but separate issue."

Rick Methot

"The words 'arbitrary' and 'ad hoc' do carry a certain pejorative aspect to them, and the reason for that is that, as scientists, we want certainty in what we say. We know we're in a situation where we don't have certainty. But in some cases, judgment calls based upon scientific perceptions have to be made. It does not mean it's not a scientific decision that's being made."

Terry Quinn

"Here's my strawman for best available scientific information: It's what the SSC says it is. It's going to be the SSC that's going to provide the advice to Council, and that is going to be deemed best scientific information available. That is the role of the SSC."

Terry Quinn

"We are very interested in the really positive work of the three working groups, and we think it would be worthwhile to have a national dialogue involving the SSCs on the scientific basis for reference points and parameter estimates and plans for addressing shortfalls in data."

Brian Rothschild

"It would be useful to go through the exercise of doing a comparison of the interpretation of the risk amongst the various Councils."

Bob O'Boyle

"It seems to me what the Councils need to do first is tell the SSC what they are looking for in terms of the degree of risk aversion, and then for the SSC to get back to them with a recommendation."

Jake Kritzer

"As we sat here over the last several days, it was really interesting to me to hear that several Councils have had data poor workshops or are considering them. Instead of each of us inventing the wheel eight different times, it sure would be nice if there was a way to exchange the results of those workshops."

Bob Conrad

reviews with CIE panels. Alternatively, any CIE review of an assessment could be done early in the process, and the SSC could then conduct a final review when it develops ABCs. It was noted that SSCs likely provide the most cost-effective way to conduct peer reviews.

The role of the SSC in providing peer review can be much broader than just stock assessment peer review, and could include other scientific information that might be used by a Council in decision-making. For example, the SSCs could play a vital role in providing peer review of social science analyses and other analytical documents (NEPA, EO 12866, etc.). Some SSCs provide peer review of all scientific analyses used in the Council process.

How to deal with insufficient information

The group discussed how SSCs should respond when assessments are flawed. This can be a problem when SSCs are required to make status determinations and ABC recommendations from which the Councils develop ACLs. There was agreement that SSCs could not avoid delay by accepting unsound science for any reason no matter what the consequences. A member of the NPFMC SCC noted that in at least one case, when there was insufficient data, the SSC recommended that the fishery should not be conducted until there was a program to collect sufficient data. One participant commented that if an SSC rejected an assessment, it had the responsibility of identifying what information would be needed for the assessment to be completed or for an alternate assessment method to be used. There was also agreement that without accurate catch data it was not possible for SSCs (or Councils) to fulfill their responsibilities. It was noted that in the past, Councils were given some programmatic funds to help them get needed data.

SAFE Reports

There was a discussion on how SAFE reports were developed across the country. In the North Pacific and Pacific Councils, the SAFE reports are prepared annually by the plan teams and staff. These SAFEs are an assemblage of the stock assessments and plan team recommendations. In the Western Pacific, SAFE reports consist of a collection of various reports or modules that are assembled by the plan teams. In New England, SAFE reports are prepared as part of periodical FMP adjustments by the plan development teams or staff; however, when an EIS is prepared for a major management action it usually substitutes for the SAFE report. In the Mid-Atlantic, South Atlantic, and Caribbean councils, formal SAFE reports are not prepared; rather, the Councils incorporate assessment data to periodically change management specifications. In the Gulf of Mexico, a SAFE report has not been prepared in the last 10 years; instead, the Council uses the report to Congress on the status of fisheries and the SEDAR assessment reports.

NMFS working groups

It was suggested that NMFS working groups involve the SSCs. Rick Methot responded that Working Group 3 (the vulnerability working group) has virtually completed its work. Working Group 2 is working on National Standard 2 guidelines and therefore cannot include public participation, but an opportunity for formal public review will be provided. Working Group 1 is working in parallel with the SSCs to identify science processes that can be used to develop ACLs. This working group has members who also serve on Council SSCs. Although there are not enough resources, increasing the dialogue between the working groups and Council SSCs might be possible. It was noted that having parallel processes is not the same as sharing ideas, and that it will take a commitment of resources to enable the science centers to work together with SSCs.

Next Workshop

There was consensus among the participants that another national SSC workshop could be very productive. It would allow SSCs a chance to compare notes about their success or problems in implementing new MSA requirements and provide an opportunity for each SSC to learn from the successes of others. As a result the participants agreed to the following statement:

The First SSC National Workshop strongly recommends that another National SSC Workshop be convened some time before the 2010 deadline for ACLs, and that NMFS provide the funding to support this meeting.

Potential agenda items suggested include the following:

- Evaluation of buffers between OFLs and ABC;
- Data poor methods, especially in situations where catch is not estimated reliably;
- Survey of reference points for ACLs and their scientific basis;
- Detailed reports from NMFS WGs;
- Case studies from different regions in establishing ACLs (difficult ones);
- Link between ACLs and AMs case studies;
- Susceptibility analysis and how can this be utilized in the ACL process;
- Developing stock groupings and selections of indicator stocks; and
- Separation of science from management.

There was also general agreement that a committee of SSC chairs should be established to continue the opportunity for SSCs to communicate with each other as a group.

Aloha

Closing comments were provided by Paul Dalzell, Paul Callaghan and Kitty Simonds. Thanks were given to all those who participated, and the staff who helped organize the meeting and prepare the reports.

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"You could say that access limitation is a proxy method for controlling catch. You could say that area management is a way to control catch. These are proxies to get at what you really want, which is catch control. And until such time, as you can actually measure catch, you use your proxy, but you put in a precautionary reduction to create an incentive to get the data."

Steve Ralston

"There is one common denominator here that links all of us, and that is that the SSCs now have the responsibility for determining the OFL and the ABC. But with that responsibility comes a great deal of authority as well. And with that authority you now have a great deal of say about what goes on at all levels of the stock assessment process and you will have to be comfortable with what comes out of that process in order to do the setting of ACLs. So take that responsibility and use it wisely. You can do it."

Terry Quinn

"I would like to extend my thanks to the Western Pacific Council for hosting this meeting because, from my perspective, it has been great meeting, and very productive. My eyes have been opened in so many ways."

Steve Ralston

Appendix 1: Meeting agenda November 12-14th 2008

National SSC Workshop

	Wednesday Nov. 12	**WPFMC Conference Room 1164 Bishop St., Suite 1400**
9:00	Introductions	Welcome Remarks -- *Simonds/Pooley/Boreman* Review of Agenda; appointment of Council staff rapporteurs; plan for preparation and review of final report – *Dalzell*
9:15	**MSA Requirements**	Review MSA requirements regarding SSCs – *Boreman*
9:30		Overview of 3 NMFS Working Groups: Control Rules for fishing level calculations, NS2 Guidelines, species vulnerability evaluation *-Methot*
10:00	SSC Reports	Presentations/Reports from each SSC on operating procedures, analytical document review and recommendations, and developing research priorities. [20 min each + 10 min Q&A]
	Western Pacific	Paul Callaghan, SSC Chair
	North Pacific	Pat Livington, SSC Chair
	Pacific	Bob Conrad, SSC member
	Gulf of Mexico	Walter Keithly, SSC Chair
12:00	*Lunch*	
1:00	*South Atlantic*	Luiz Barbieri, SSC Vice-chair
	Caribbean	Barbara Kojis, SSC Chair
	Mid-Atlantic	Rich Seagraves, MAFMC staff
	New England	Steve Cadrin, SSC Chair
3:00	Discussion	Discuss best practices relative to standard operating procedures for SSCs, and discuss related issues (e.g. stipends, NS2 revisions, providing ongoing scientific advice per MSA requirements)
5:00	Social	Hosted by the WPFMC [pupus and refreshments]

	Thursday Nov 13	**WPFMC Conference Room**
9:00	**ACLs & Peer Review**	Using Stock Assessments and a Peer Review Process in SSC Determination of Fishing Level Recommendations (i.e. ABC) - *Methot*
9:30	SSC Reports	Presentations/Reports from each SSC on setting catch limits including assessment, peer review process, and determination of OFL/ACL. [up to 30 min each +10 min Q&A]
	Western Pacific	Marcia Hamilton/Paul Dalzell, WPFMC staff
	North Pacific	Terry Quinn, SSC member
	Pacific	Steve Ralston, SSC Chair
	Gulf of Mexico	Will Patterson, SSC member
12:00	*Lunch*	
1:00	*South Atlantic*	Carolyn Belcher, SSC Chair
	Caribbean	Barbara Kojis, SSC Chair
	Mid-Atlantic	Brian Rothschild, SSC Chair
	New England	Bob O'Boyle, SSC member
4:00	Brainstorming	Open discussion on catch limits and peer review issues
5:00	Reception	At a nearby restaurant [Pier 38 – Nico's]

	Friday Nov 14	**WPFMC Conference Room**
9:00	Discussion	Discuss best practices relative to SSC peer review process and setting ACLs. Plan for developing comments on NS2 guidelines. Wrap-up and closing comments
12:00		Closing remarks – *Callaghan/Dalzell*

Appendix 2: National SSC Workshop Participants and Observers

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Tom Jagielo
Kate Semmens (Pew)
Claudia Friess (Ocean Conservancy)

Appendix 3: News Release from National Workshop.

WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

Press Release
FOR IMMEDIATE RELEASE
Contact: Sylvia Spalding 808.522.5341
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Scientific and Statistical Committee Chairs Hold Landmark National Workshop

HONOLULU (14 November 2008) Approximately 50 fishery scientists and managers concluded a three-day workshop today in Honolulu. This landmark meeting constituted the first-ever convening of the chairs and members of the Scientific and Statistical Committees (SSCs) of the nation's eight Regional Fishery Management Councils. These Committees are mandated by the Magnuson-Stevens Fisheries Conservation and Management Act to provide advice to the Councils on the management of fisheries in waters seaward of the United States, its territories and possessions.

The workshop revealed that the ways that SSCs function within the Council decision-making process varies significantly across the nation. The differences reflect their geographic and socioeconomic diversity as well as the fact that some regions have data-rich fisheries and others data-poor fisheries. The general consensus was that a uniform SSC process is not practical given these differences.

The participants also agreed that the SSCs should be the final arbiter regarding what constitutes the best available scientific information used by Councils for fishery management decisions. This issue addresses current efforts by the National Marine Fisheries Service (NMFS) to revise guidelines regarding the Magnuson-Stevens Act requirement that federal fishery conservation and management measures be based on the best scientific information available.

The participants of this first SSC National Workshop strongly recommended that a second workshop be convened before 2010, which is the deadline for annual catch limits to be set for all fisheries in federal waters that are experiencing overfishing or are overfished. In 2011, annual catch limits must be set for all federally managed fisheries.

"The anticipated increase in SSC responsibility will clearly necessitate increases in Council funding over the next few years," noted Paul Callagham, SSC chair for the Western Pacific Regional Fishery Management Council.

The Western Pacific Regional Fishery Management Council, which hosted the workshop, is the policy-making agency for fisheries management in offshore waters around the US Pacific Islands. For more information, contact the Council at (808) 522-8220, (808) 522-8226 (fax), info.wpcouncil@noaa.gov or www.wpcouncil.org.

SSC Participants: South Atlantic Fishery Management Council: Luiz Barbieri, Carolyn Belcher, John Carmichael, Andi Stephens; North Pacific Fishery Management Council: Patricia Livingston, Keith Criddle, Terry Quinn; Caribbean Fishery Management Council: Barbara Kojis, Jim Berkson, Miguel Rolon; Mid-Atlantic Fishery Management Council: Brian J. Rothschild, Robert J. Latour, Ed Houde, Rich Seagraves; New England Fishery Management Council: Steve Cadrin, Robert O'Boyle, Jake Kritzer, Chris Kellog; Pacific Fishery Management Council: Steve Ralston, Robert Conrad, Mike Burner, Donald McIsaac, Vidar Wespestad; Gulf Fishery Management Council: Walter Keithly, Will Patterson, Harry Blanchet, Richard Leard; Western Pacific Regional Fishery Management Council: Paul Callaghan, Pierre Kleiber, John Sibert, Bob Skillman. **Council Staff Participants:** Western Pacific Regional Fishery Management Council: Paul Dalzell, Marcia Hamilton, Eric Kingma; North Pacific Fishery Management Council: David Witherell, Gail Bendixen. **National Marine Fisheries Service (NMFS) Participants:** Pacific Islands Region: Alvin Katekaru; Headquarters, DC: John Boreman, Rick Methot, Galen Tromble; Pacific Islands Fisheries Science Center: Sam Pooley

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