



**Report of a National SSC Workshop on  
ABC Control Rule Implementation  
and Peer Review Procedures**

October 19-21, 2010

Charleston, SC

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# Third National Meeting of the Regional Fishery Management Councils' Science and Statistical Committees

Hosted by the  
South Atlantic Fishery Management Council  
October 19-21, 2010



Report of a National SSC workshop on  
ABC Control Rule Implementation  
and Peer Review Procedures

John Carmichael and Kari Fenske, 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. The regional fishery management Councils recognized that these revisions to the Act increased the demands placed on their SSCs and supported a meeting of all the national SSCs to discuss common challenges and help develop common solutions.

In 2008, the Western Pacific Fishery Management Council (WPFMC) hosted the first National SSC workshop in Honolulu, HI. During the first workshop representatives from the eight regional fishery management Councils discussed their operating procedures and

potential challenges to meeting the requirements of the revised MSA. In 2009, the Councils agreed to fund a second workshop to discuss technical aspects of establishing scientifically-based annual catch limits. This workshop was hosted by the Caribbean Fishery Management Council (CFMC) and held in St. Thomas, USVI. These workshops provided opportunities for representatives from the eight regional Council SSCs to compare notes and best practices and are credited with increasing the exchange of information and ideas among scientists from around the nation.

The South Atlantic Council hosted this third annual gathering of the SSCs in Charleston, South Carolina. Representatives reported on progress toward implementing ABC control rules and providing fishing level recommendations to their respective Councils. There was also a discussion of regional stock assessment peer review programs and the role of SSCs in those programs. Reports from all three workshops are available on the regional fishery management councils' website:

[www.fisherycouncils.org](http://www.fisherycouncils.org).

### Key Findings

- The group acknowledged that all regions are grappling with limited assessment resources and increasing assessment



- obligations under the OFL-ACL framework.
- Considerable attention has been devoted to peer review procedures for assessments. However, evaluations of management alternatives prepared following assessments, often highly complex and as critical to management outcomes as the assessments themselves, receive little to no peer review. Councils should consider increasing the level of peer review for management evaluations.
  - The group recommends that best practices guidelines be prepared, either regionally or nationally, to describe the difference in assessment types and clearly distinguish what constitutes acceptable updates.
  - There is a need to continue expanding the expertise available for assessments. This includes more training programs in universities and expanded use of contracts and grants to reach out to more potential experts. The group encourages the agency to continue efforts to exchange scientists between regions during assessment work as a way of sharing information and techniques and providing a source of outside expertise.
  - To address assessment production limitations in the short term, the group recommends considering simplified models for some stocks, increasing the use of non-agency expertise, and devoting assessment cycles to unassessed data-poor stocks.
  - To address limitations in peer review capacity, the group recommends prioritizing stocks, considering simpler review approaches for data poor stocks, and streamlining the assessment review activities required by SSCs.
  - Panel members encouraged reconsideration of content for the individual reports provided by peer reviewers appointed through the CIE to ensure that SSC and Council needs are met and to avoid competing technical documentation.
  - Given the integral role CIE appointees now play in regional peer review processes, the panel requested that SSC needs be considered when the next contract revision opportunity arises.
  - Guidelines should be developed to address the use of indicator species and stock complexes for supporting fishing level recommendations and status determinations.
  - The panel recommends that Advisory Panel Fishery Performance Reports, as proposed by the MAFMC, be considered by other Councils as an effective way to obtain timely information from the fisheries that may be useful to the SSC in providing fishing level recommendations.
  - The panel recommended that a 4<sup>th</sup> National SSC Workshop be held in 2011. Topics to consider include incorporation of social and economic issues information into the SSC process, ecosystem-based management, species groupings, and SSC workload management.

## Preface

This, the third national SSC workshop, was intended to build upon the topics discussed in prior workshops. The largest of the three National SSC meetings to date, the workshop included representatives from each of the eight regional Science and Statistical Committees, Council staff, NMFS Science Center and Regional Office staff, and observers from academia and NGOs. The workshop, hosted by the South Atlantic Council, was held in Charleston, SC, October 19-21, 2010. Carolyn Belcher, Chair of the South Atlantic Council SSC chaired the workshop.

During the first workshop in 2008 members focused on reviewing their SSC policies and procedures.



During the second workshop in 2009 members discussed progress on developing ABC control rules and responding to other MSA provisions and National Standards revisions. This workshop was devoted to issues related to implementation of ABC control rules and to discussing the information and approaches used by SSCs to provide fishing level recommendations, which include ABC and OFL. Representatives from all the Councils had an opportunity to discuss how the plans developed over the last several years are performing.

### Workshop Goals

- Continue the exchange of information and experiences between representatives of Regional Fishery Management Council SSCs.
- Compare regional assessment peer review procedures, including the role of SSCs in those procedures.
- Discuss progress on ABC control rule implementation and development of ABC recommendations that account for uncertainties.

The Workshop opened with a progress report on the NMFS ABC working group led by Rick Methot. Next, a representative from each SSC gave a presentation on the progress made and challenges faced in implementation and application of their ABC Control Rules. Presenters were asked to focus on 1) current status, content, and implementation

of ABC control rules, 2) issues faced in applying control rules and incorporating uncertainty, and 3) highlighting control rule modifications since the last National SSC meeting.

These discussions were followed by presentations on assessment programs and the role of the SSC. This segment of the workshop was organized by Region, beginning with a description of assessment development and review programs and followed by presentations from SSC representatives summarizing their roles and responsibilities in their region's assessment program. The workshop concluded with general discussions on common topics raised earlier, such as dealing with species groupings, the role of the SSCs in peer review programs, managing the peer review process, and better integration of social and economic sciences into SSC deliberations.

The Workshop was organized and coordinated by staff from eight Regional Fishery Management

Councils, led by John Carmichael of the South Atlantic Council. South Atlantic Council and SEDAR staff (Kari Fenske, Mike Collins, Julie Neer, Cindy Chaya, and Julie O' Dell) provided logistical and administrative support.

This report is based upon abstracts of presentations provided by workshop presenters. Subsequent discussions of the group were captured by rapporteurs from the regional Council staffs, including Mike Burner, Pat Fiorelli, Chris Kellogg, Sarah Pautzke, Rich Seagraves, and Dave Witherell. Special thanks are extended to these individuals for their efforts, which were crucial to this report. Kari Fenske and John Carmichael edited and formatted the submissions for consistency and assembled the final workshop report. The report benefitted from review comments made by Dave Witherell, Rick Methot, and Rich Seagraves. Photos are provided courtesy of Kari Fenske, Lee Anderson, Mark Fina, and the Alaska Scallop Cooperative.



## Progress Reports and Updates

### Reports on ABC Control Rule Implementation and Application

#### *Western Pacific*

Presenter – Bob Skillman, SSC Member

The WPFMC has five ecosystem management plans (FEPs): Hawaii Archipelago, Mariana Archipelago, American Samoa Archipelago, Pacific Remote Island Areas, and Pacific Pelagic. Staff began preparations of an omnibus amendment in early 2009, which was completely retooled in early 2010 to address a mechanism for determining ACLs, with actual ACL numbers being determined in subsequent specifications or amendments. The WPFMC has selected a 5-Tier ABC control rule for determining ABC from OFL. The risk of overfishing ( $P^*$ ) that will be applied to equations in Tiers 1-3 is determined through a qualitative construct in which various aspects of scientific uncertainty are weighted and the sum of the four weightings are reduced from a  $P^*$  of 50%. Tier 4 is for stocks/stock complexes with only reliable catch data and is based on the median of the long-term catch over a stable period of fishing. Tier 5 is unrelated to data quality and instead focuses on stocks or stock complexes that are fished infrequently, such as

deepwater shrimp (*Heterocarpus*) which is fished roughly every 7 years.

While the ecosystem classification has been agreed to, there are presently no stocks classified because that will be done in subsequent actions. Additionally, all pelagic stocks (except squids) are subject to the international exception provided in the NSI Guidelines due to language in the IATTC and WCPFC Conventions. Squids are subject to the one-year lifespan exception. Coral reef stocks are proving difficult due to the large number of species, thus they will be considered in a subsequent amendment option, such as an ecosystem ACL.

#### Summary and Discussion

The SSC representative for the WPFMC was asked questions about how the social, economic, and ecological factor and management uncertainty (SEEM) qualitative analysis would be structured, how the OY for various fisheries would be related to MSY, and for clarification of Tier 5. The SSC



representative explained that the SEEM analysis structure is the same as analysis done to determine P\*, except that the reduction will be from 100% ABC to determine the ACL and the actual method to address the dimensions of the SEEM analysis will be determined for each stock/stock complex by the SSC at a future date. At this point, examples are described in the amendment, but this is not the language that will likely be included in the analyses. It was clarified that the reduction of MSY to OY has not been adequately discussed by the SSC at this juncture. Regarding Tier 5, the WPFMC SSC representative explained that the majority of the resources do not fall in this category, but instead fall in Tier 4 (catch data only), and for Tier 4, the Council will utilize precaution first by utilizing a more restrictive multiplier for the long-term median catch when

establishing the ABC, as guided by Restrepo et al. 1998. Tier 5 was explained with respect to its source, McCall (2009), and the equation in Tier 5 has not, to date, been applied to the Tiers 1 and 2 stocks or stock complexes for comparison. The WPFMC SSC representative reiterated that the amendment establishes a process, and no numbers have been determined for ABCs or ACLs.

### *North Pacific*

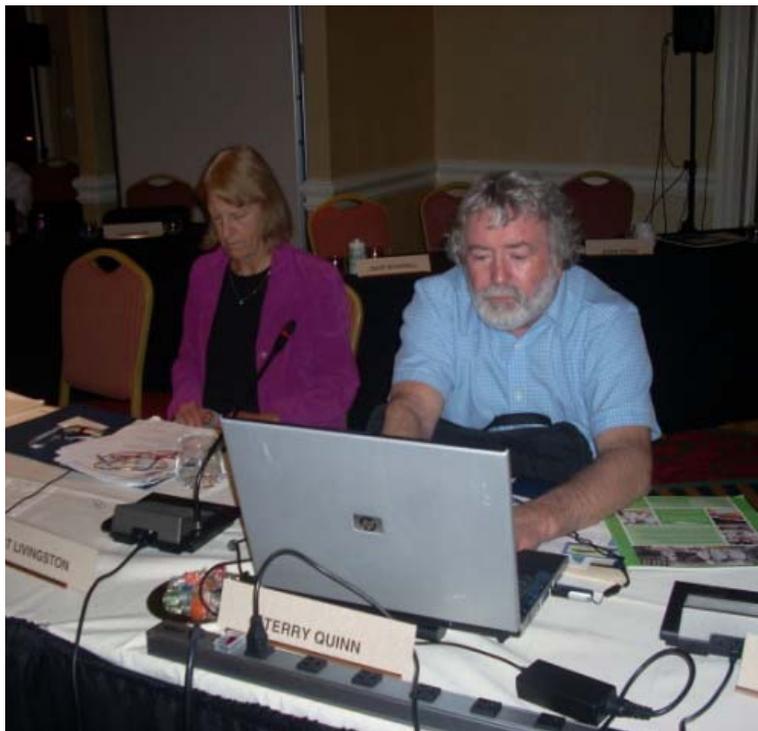
Presenter – Pat Livingston, SSC Chair

### **Groundfish FMPs**

The NPFMC's two Groundfish FMPs include a suite of catch limits for individual groundfish stocks and assemblages. These catch limits include an overfishing limit (OFL),

an acceptable biological catch limit (ABC) and a total allowable catch limit (TAC), where  $TAC \leq ABC < OFL$ .

There is a chain-of-review process, starting with the development of the SAFE chapter by the assessment authors, which contains recommendations of OFL and ABC. After internal agency review, the chapter and recommendations are reviewed by the appropriate Plan Team, which may result in revised



recommendations. The SSC provides a second level of peer review, which results in a final OFL and ABC. The TAC is then set by the Council.

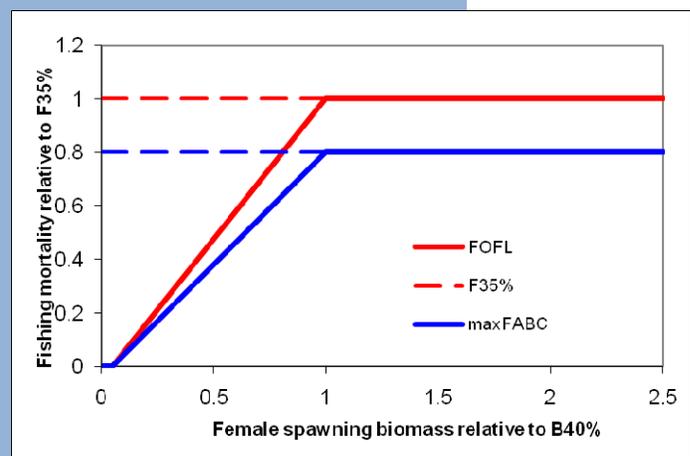
The OFL and ABC determinations incorporate a tier system for addressing scientific uncertainty. For groundfish, the annual catch limit (ACL) is the ABC, and TAC meets the definition of an allowable catch target (ACT) per the guidelines – it is a target set not to exceed the ABC. The initial OFL and ABC values (called “maximum permissible”) are based on a set of mathematical formulae as prescribed through a set of six tiers. These tiers are listed in 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 and thus the tier designation for a stock. The stock assessment authors and Plan Teams

provide recommendations on tier level to the SSC. In Tiers 1-3, fishing mortality is linearly reduced when the stock drops below its biomass target level ( $B_{MSY}$  or proxy) to a value of 0 when biomass is below a threshold coefficient  $\alpha$  multiplied by the biomass target level. The default value of  $\alpha$  is 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. In Tiers 2-4, a designation of the form “ $F_{x\%}$ ” 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.

## Groundfish Control Rules for OFL and *maxABC* based on data available

### Tier System Based of Quality of Data

- Tier 1 – Reliable  $B$ ,  $B_{MSY}$ , pdf of  $F_{MSY}$
- Tier 2 – Reliable  $B$ ,  $B_{MSY}$ ,  $F_{MSY}$ ,  $F_{35\%}$ ,  $F_{40\%}$
- Tier 3 – Reliable  $B$ ,  $B_{40}$ ,  $F_{35\%}$ ,  $F_{40\%}$
- Tier 4 – Reliable  $B$ ,  $F_{35\%}$ ,  $F_{40\%}$
- Tier 5 – Reliable  $B$  and  $M$
- Tier 6 – Reliable Catch History Data



Stock	ABC/OFL	Buffer	Tier
Pollock	83%	17%	1
Pcod	86%	14%	3
Sablefish	85%	15%	3
Atka	84%	16%	3
Arrowtooth	82%	18%	3
FheadSole	85%	15%	3
AKPlaice	78%	22%	3
POP	84%	16%	3
NrthrnRF	84%	16%	3
Rougeye rockfish	82%	18%	3
Other rockfish	75%	25%	5
Squid	75%	25%	5
Oflats	75%	25%	5
Shortraker rockfish	75%	25%	5

For the NPFMC, these six tiers have been sufficient to develop reference points for all managed groundfish 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  $B_{MSY}$  is the focus for reference points. In Tier 3, the term  $B_{40\%}$  refers to the long-term average biomass that would be expected under average recruitment and  $F=F_{40\%}$ . In Tier 4, a reliable estimate of  $B_{40\%}$  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, recommendations by the assessment authors, Plan Team, and public, and other factors. This results in the final ABC. The OFL is always calculated from the set of formulae, and not adjusted by the SSC.

Groundfish catch is monitored through comprehensive at-sea observer coverage, as well as an electronic catch reporting system. In-season accountability measures are designed both to prevent the TAC from being exceeded (e.g. directed fishing closures) and to respond if the TAC is exceeded (e.g. prohibition of retention). There are no recreational fisheries for groundfish in Federal waters, and commercial removals from state water fisheries and bycatch in non-target fisheries accrue towards the TAC in most cases. Research catches are included as a removal in the stock assessments.

Progress Report: No groundfish stocks are overfished or undergoing overfishing, so no rebuilding plans are required. The Groundfish FMP has been amended to describe how the current specification process meets the requirements of the mandatory NS1 Guideline provisions.

The Groundfish FMP was amended to include a description of the specification of minimum stock size thresholds (MSST) defining when a

stock is considered overfished, a description of measures that are taken if and when a stock drops below MSST, a description of accountability measures that are triggered if an ACL (i.e., the ABC) is exceeded, and a description of how catch from all sources – including bycatch, scientific research (including EFPs), and all fishing activities – is counted against the OY.

The FMP was also amended to include a description of how the tier levels for ABC and OFL are based on the scientific knowledge about the stock or stock complex and the scientific uncertainty in the estimate of OFL and any other scientific uncertainty. An analysis done by the AFSC indicated that for the stocks and sources of uncertainty examined, ABCs based on the existing tier levels would have a low probability of exceeding the real, but unknown, OFL (AFSC 2009). This analysis was based on both a P\* approach and a decision-theoretic approach.

For the P\* approach, analysts examined survey uncertainty for BSAI and GOA groundfish from different tiers. The current buffers are based on the ratio of  $F_{40\%}$  to  $F_{35\%}$  (Tier 3), 0.75 times M (Tier 5), or 0.75 times average catch (Tier 6). The values of P\* required to match the existing buffers between OFL and ABC were computed, given the respective levels of uncertainty (SSB or trawl survey biomass) of those stocks. The average of the buffers corresponding to the P\* values was 0.12. In other words, there is a 12% chance on average that the ABC for a groundfish stock is in excess of the

true OFL across these stocks, given that the assumptions about uncertainty of OFL are true. The decision-theoretic approach allows ACLs to vary with uncertainty given a specified level of risk aversion. The decision-theoretic approach showed that the average level of absolute risk aversion implied by the current tier system is 0.4. The average buffer size was ~8% for Tier 1 stocks, ~17% for Tier 3 stocks, and 25% (as prescribed by the tier system) for Tiers 5 and 6. Although additional effort is underway to examine more explicit use of uncertainty in the setting of groundfish ABCs, additional action will not be required to comply with NSI guidelines.

The Groundfish FMPs were also amended to define the stocks in the fishery and to add an Ecosystem Component category for certain species. The current target and some non-target species that are currently included in the “other species” categories are now defined as ‘in the fishery’, and ACLs would be set for them. The current forage fish category and prohibited species category are now included in the Ecosystem Component (EC) species category. The non-specified category is considered outside of the fishery and will be examined in the future to determine if any species in this category should be included in the target category or EC category (e.g., giant grenadier). Squid and octopus complexes will be evaluated for possible inclusion under the EC category under a future plan amendment. Individual species in the non-specified category not considered appropriate for inclusion

as EC species may be removed from the FMPs (e.g., sea anemones, barnacles).

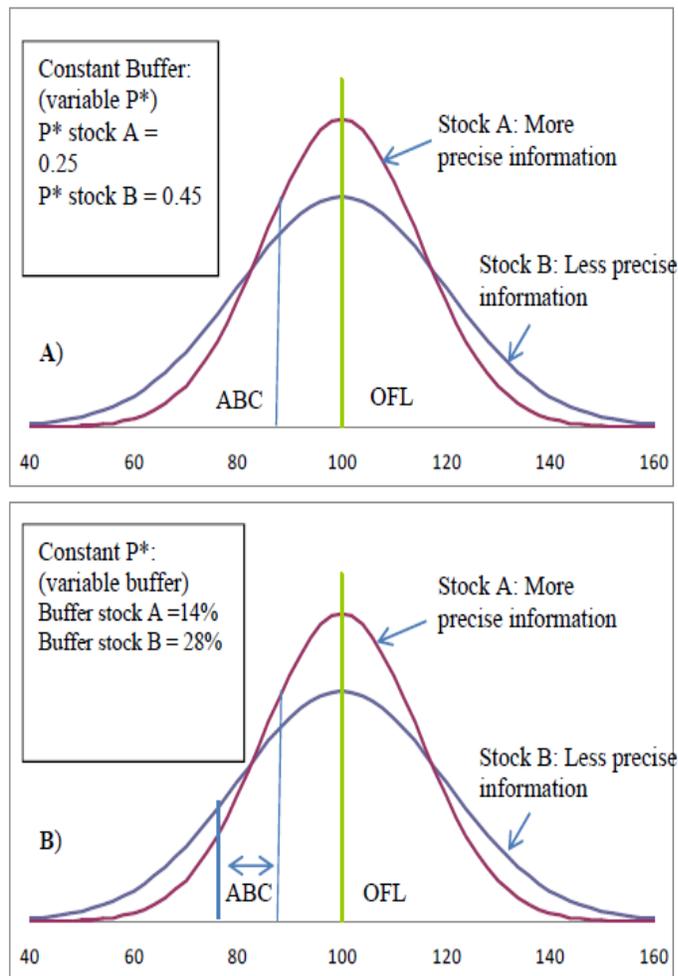
### BSAI Crab FMP

The State/Federal Bering Sea and Aleutian Islands Crab FMP currently specifies annual OFLs (set by the SSC) and TACs (set by the State of Alaska) for individual stocks, where  $TAC \leq OFL$ . Similar to the Groundfish FMPs, the OFLs are established by tier levels, based on the level of information available. The Crab FMP does not currently include ABC levels due to the delegated management system with the State of Alaska whereby no ABC is specified, but a TAC-level is established by the State below the OFL. ABC levels now have to be established to meet the NS1 requirements for an ACL.

Regarding AMs in the crab fishery, a portion of the fleet carries at-sea observers. A direct allocation of harvest shares prevents the TAC from being exceeded (catch is limited by individual quota shares). Any harvest over the allotted quota results in forfeiture and/or fines. There are no recreational fisheries for BSAI FMP crab species in Federal waters. Crab bycatch in groundfish fisheries is limited by regulation and the numbers of crab caught in all

fisheries (crab, groundfish, and scallop fisheries) will be incorporated into the assessment and calculation of crab OFLs. Catch is monitored through comprehensive at-sea observer coverage, as well as an electronic catch reporting system. The Council initiated an amendment analysis in June 2010 to establish bycatch limits (and evaluate appropriate time/area closures) to limit groundfish fishery bycatch of crab species. Action on this analysis is likely in 2011.

To date, there have been four crab stocks that were deemed ‘overfished’ (Bering Sea Tanner crab, Bering Sea



opilio crab, St. Matthew blue king crab, and Pribilof blue king crab) when the stocks fell below the minimum stock size threshold (MSST) following years of poor recruitment. Rebuilding plans were implemented for these crab stocks. Two stocks have achieved fully rebuilt status above  $B_{msy}$  (Tanner crab and St. Matthew blue king crab), however one of these stocks (Tanner crab) has since fallen below MSST and requires a new rebuilding plan. One stock is no longer overfished but not yet fully rebuilt to  $B_{MSY}$  (opilio crab). One stock, Pribilof blue king crab remains well below MSST ('overfished') despite not having a fishery since 1999, establishment of a no-trawl zone to protect the stock since 1995, and closures of other fisheries to limit bycatch.

Progress Report: The Council took final action on the Crab ACL analysis in October 2010. The Council considered two different approaches for establishing an ABC control rule by tier level for crab stocks. These approaches were to use a fixed buffer value (where  $ABC = (1-X\%)$  of OFL and X is the

selected buffer) or to set ABC using a  $P^*$  approach whereby the ABC is calculated based upon the annually estimated buffer value corresponding to a fixed level of risk (and estimated scientific uncertainty) characterized by a policy choice on the probability of overfishing. An extensive analysis was completed (NPFMC 2010) which characterized the short-term, medium-term and long-term implications of harvest under a range of buffer values and  $P^*$ s. A critical aspect of this analysis was the ability to estimate the scientific uncertainty in the OFL and calculate a corresponding probability density function (PDF) for estimating the appropriate buffer to correspond to the selected  $P^*$  values. A range of approaches to best characterize uncertainty by tier level were considered which included:

- 1) characterizing the uncertainty of the assessment model
- 2) characterizing uncertainty of modeled stocks by a retrospective assessment evaluation approach
- 3) characterizing uncertainty by tier by comparison with calculated variance in candidate groundfish stocks by tier level
- 4) characterizing total uncertainty in the OFL as a combination of modeled uncertainty and additional uncertainty not characterized within the assessment model itself.

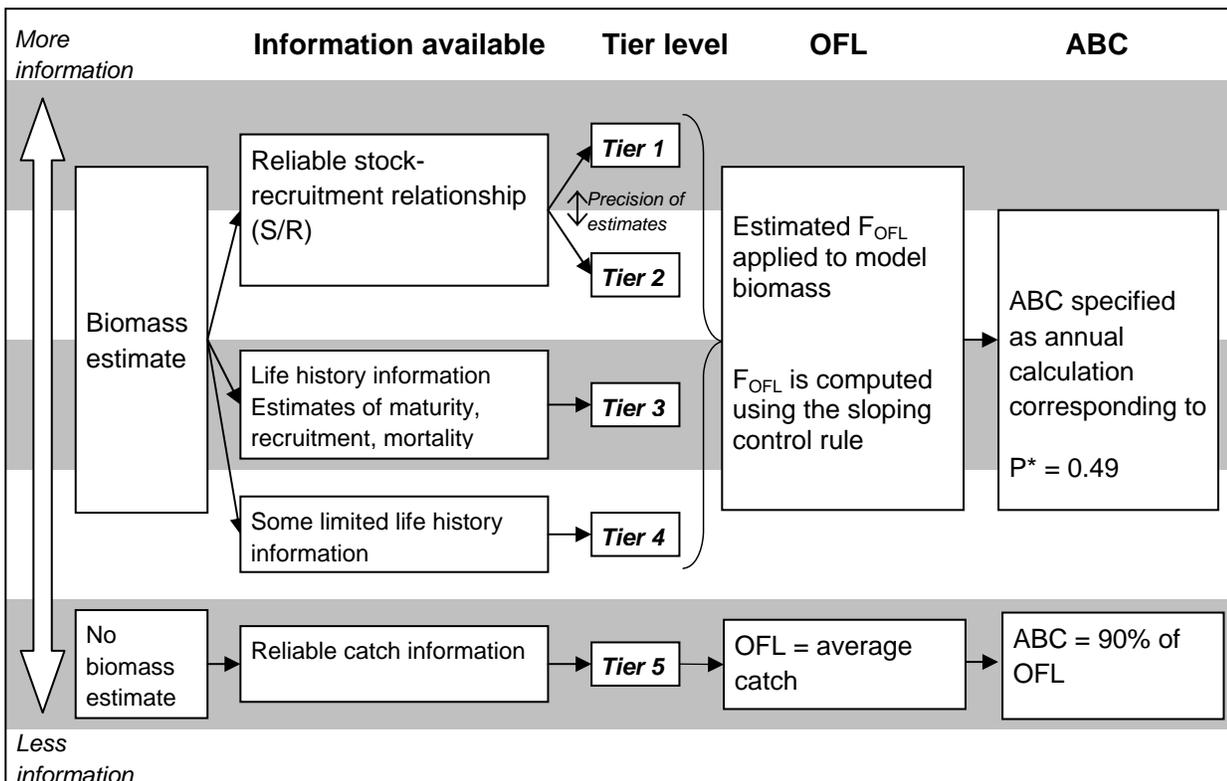
The Council's Crab Plan Team (CPT) and SSC determined that model uncertainty alone (called  $\sigma_w$ ) is insufficient to characterize the total uncertainty in the OFL estimate particularly for crab stocks



given limited information to validate some biological parameter choices and thus some additional means of considering uncertainty is necessary to capture the PDF of the OFL. Direct calculation of total uncertainty (i.e. through a retrospective evaluation approach) produced insufficient results for characterizing the PDF and alternative means were considered. After iterative review and recommendations by the CPT and SSC, a final system was proposed whereby total uncertainty was considered to be a combination of modeled uncertainty and additional uncertainty not characterized within the assessment model itself. This additional uncertainty (called  $\sigma_b$ ) was characterized by a range of constant values with stocks characterized into low, medium, and high categories of information based upon qualitative consideration of the information

available by stock for considerations not included in the model-based estimate of uncertainty. These include whether key population dynamics parameters are pre-specified, whether the survey catchability parameter is fixed, and whether there is uncertainty in the  $F_{MSY}$  basis and  $B_{MSY}$  estimation. The Plan Teams and SSC made recommendations on the methodology but did not recommend specific values for  $P^*$  or buffers, because those considerations were policy choices for the Council to make given its desired level of precaution.

The Council considered a range of alternative  $P^*$  values from 0.1 - 0.5 (including 0.5 as an upper limit is for display purposes only since this option implies a buffer of zero – i.e.,  $ABC=OFL$  -- a 50% probability of  $ABC$  exceeding the true  $OFL$ ). An



extensive risk analysis was presented for all options, indicating stock status trajectories, estimated forgone revenue and probability of overfishing for all stocks under each scenario. The Council's preferred alternative was to select an ABC control rule based on a  $P^*$  of 0.49 for stocks in Tiers 1-4 and to indicate that only within-model ( $\sigma_b$ ) uncertainty was to be considered in estimating the PDF of the OFL. Understanding that this results in extremely small buffers (e.g. ABC = > 98% of OFL for all stocks), the Council indicated that additional uncertainty will be considered by the State of Alaska in establishing directed catch levels below this value. For Tier 5 stocks where OFL is based on average catch, the Council selected a constant buffer approach of 10% (or ABC = 90% OFL). The Council further directed the CPT and SSC to continue exploring factors influencing scientific uncertainty in the OFL, and which factors should best be addressed in the setting of ABC and TAC.

Implementation of this amendment package is anticipated prior to the crab assessment process in May 2011.

### **Scallop FMP**

The State/Federal Alaska Scallop FMP specifies an OFL for weathervane scallops and annual guideline harvest levels (GHL) for stock areas that cumulatively are set well below the OFL. The OFL is currently set equal to  $MSY = 1.24$  million pounds of shucked scallop



meats, and is set at a statewide level. The upper end of the GHL in each management area is analogous to a TAC set by sub-stock. The Scallop FMP does not currently include ABC levels, and thus these levels have to be established to meet the requirements for an ACL.

With regard to AMs in the scallop fishery, the fishery operates as a cooperative and has 100% at-sea observer coverage. The GHL is prevented from being exceeded by directed fishing closures. There is no recreational fishery. The state water commercial fishery is managed under separate GHLs. Catches are reported on fish tickets at the time of landing.

Progress Report: The Council took final action in October 2010 on the Scallop ACL amendment analysis. The Council's preferred alternative contained two main actions, defining an ACL for weathervane scallop

stocks and establishing which stocks are ‘in the fishery’ and which are to be contained in a new ecosystem component. The Council selected a maxABC control rule to establish a 10% buffer between OFL and ABC, such that  $ABC = 90\%$  of OFL. This is for the weathervane scallop stock only. In conjunction with this, the Council revised the current MSY estimate which is the basis for the Statewide OFL for weathervane scallops. The average catch estimate was revised upwards to account for estimated discards occurring over the time frame of the average catch calculation. ACLs (established as  $ACL = ABC$ ) will account for all removals. Additional removals are due almost exclusively to discards in the directed scallop fishery. This ABC level is set on a statewide basis given the lack of regional biomass information. The FMP management measures only apply to the commercial weathervane scallop fishery; there are currently no fisheries for the other scallop

species. Other scallop species under the FMP, rock, pink and spiny scallop were moved to an Ecosystem Component under the FMP. Currently no fisheries exist for these species and they are irregularly caught as incidental catch in the directed fishery as well as sporadically encountered during trawl and camera-sled surveys.

Implementation of this amendment package is anticipated prior to the start of the fishing year in June 2011.

### Summary and Discussion

The SSC representative from the NPFMC described the final action just completed for the crab stocks of the North Pacific, and described the five North Pacific FMPs (groundfish, Bering Sea-Aleutian Islands (BSAI) crab, scallops, salmon, and the Arctic). The NPFMC adopted the rule  $TAC \leq ABC < OFL$ . For groundfish stocks, the NPFMC has determined which stocks will remain in the fishery, and adopted a tiered

	BSAI and GOA Groundfish	BSAI Crabs	AK Scallops
<b>Stocks in the fishery</b>	Targets and vulnerable non-targets	Targets	Target: Weathervanes (only)
<b>Ecosystem Components</b>	Forage species, prohibited species	None	Non-Weathervane scallop stocks
<b>OFL/ABC control rules</b>	Status quo (tiers)	OFL tiers, $P^*=0.49$ (tiers 1-4), $ABC = 90\%$ of OFL (tier 5)	OFL = adjusted MSY $ABC = 90\%$ of OFL
<b>Uncertainty</b>	Status quo (tiers) for now. Meets NS1 requirements.	Resulting buffer accounts for uncertainty: $P^*=0.49$ (tiers 1-4), $ABC = 90\%$ of OFL (tier 5)	Buffer accounts for uncertainty: $ABC = 90\%$ of OFL
<b>AMs</b>	Status quo	Status quo	Status quo

system for the ABC control rule and an evaluation of uncertainty. While the NPFMC determined many of its groundfish stocks will remain in the fishery, forage fish and prohibited species were determined to be ecosystem component species. The 6-tiered groundfish control rules for OFL and maximum ABC were designed based on data availability. The 3-year average CV of the trawl survey biomass was used as a proxy for OFL uncertainty. The values of  $P^*$  were required to match existing OFL-ABC buffers. The average  $P^*$  was 0.12. In future groundfish amendments, the NPFMC will look at reclassification of octopus, squid, and grenadiers for ecosystem component or "in the fishery" consideration, and more explicit treatment of uncertainty by tier such that there will be explicit uncertainty treatment in Tier 1 only. In the interim, the resulting buffers are considered sufficiently conservative.

For BSAI crab, the Council established ACLs using a  $P^*$  and buffer. There is shared management of the crab stocks with the State of Alaska and the NPFMC deferred management to the State with Federal oversight. There are Federal measures fixed in the FMP, however the TAC is set at the discretion of the State of Alaska. A 5-Tier system was developed for the crab FMP in which the TAC can be equal or less than the OFL. The tiers progress from Tier 1 with high quality data to Tier 5 with catch history only. There were two approaches taken: 1) constant buffer with variable  $P^*$ , and

2) constant  $P^*$  with a variable buffer. The primary focus of the analysis was estimating total uncertainty in OFL in which iterative analyses were used to directly calculate total uncertainty in OFL. Comparative analyses to groundfish stocks in the North Pacific region and to other stocks of other Councils were also conducted, and the resulting conclusion was that model uncertainty alone was insufficient to characterize total uncertainty in the OFL. Two measures of uncertainty were included in the estimation of the true OFL: within-assessment uncertainty and additional assessment uncertainty. The SSC provided recommendations to the NPFMC about uncertainty including recommending that the initial default values be evaluated annually by the assessment authors, CPT, and SSC, and that the public process established by the Council for reviewing stock assessments through the plan teams and the SSC provides the best forum for determining the appropriate level of scientific uncertainty in OFL. The NPFMC, however, disagreed and the State of



Alaska will be in charge of incorporating scientific and management uncertainty into the TAC. The environmental assessment (EA) prepared for the BSAI crab stocks included the impact of varying total uncertainty, biological projections of stock size under various scenarios, an economic impact analysis, and risk characterization of management at various P\*s ranging from 0.1-0.5 and buffers from 0-90%. The NPFMC SSC representative presented the various estimated constraints on TAC in the short, medium, and long terms for each crab stock associated with the BSAI crab FMP based on its associated tier level. The NPFMC decided in October 2010 to adopt Tiers 1-4 with an associated P\* of 0.49 and within-assessment uncertainty will be considered in characterization of uncertainty in the OFL; all other scientific uncertainty will be considered in establishment of the TAC level sufficiently below the ACL. The NPFMC also adopted Tier 5, which has a constant buffer of 10% (ABC= 90% OFL).

The NPFMC determined which scallop stocks were considered in the fishery (non-weather-vane stocks were classified as ecosystem components) and established an ABC using a set buffer. The current management regime is  $OFL = MSY = 1.24$  million lbs with a TAC set by management area. The NPFMC reviewed the EA and increased the OFL to 1.29 million lbs, then set the ABC equal to 90% OFL. The ABC is set state-wide.



With regards to the salmon FMP, the NPFMC is reviewing language to determine what compliance is necessary with NS1. The Arctic FMP will remain in *status quo* because it was developed using the NS1 Guidelines.

The discussion at the workshop centered on the crab FMP. The NPFMC SSC representative was asked about the justification for an ABC so high relative to the OFL. The SSC representative was unsure if it was a State-Federal issue but commented that the Council ignored the advice to include it in Category 1 measures in the FMP because it is a required estimation. It was clarified that the harvest control rules are completely separate at the State level. There was a question about the inclusion of additional uncertainty because bias is a big problem in retrospective analyses. The question was how biases in biomass estimates were addressed in the development of the ABC control rule. The reply was that because

retrospective analyses proved uninformative, the Council had to address uncertainty from a different avenue.

There was a brief discussion about the difference between the two approaches of constant buffer/variable  $P^*$  and variable buffer/constant  $P^*$ . It was clarified that the SSC preferred the  $P^*$  approach, but the Council could choose a mixed approach if they preferred. Generally, the more information-rich stocks should have a  $P^*$  approach. Another comment was that there is a trade-off that depends on how stable the estimates of uncertainty are that are incorporated into the  $P^*$  calculation. A fixed  $P^*$  can be more stable.

It was also clarified for a member of the WPFMC SSC that the reason cephalopods are proposed to be classified as ecosystem components in the North Pacific is because there is little to no bycatch, they have a short life span and high productivity, and there is no directed fishery.

### *Pacific*

Presenter – Martin Dorn, SSC Chair

The Pacific Fishery Management Council (Pacific Council) has four Fishery Management Plans to guide its recommendations for west coast fisheries (Salmon, Highly Migratory Species (HMS), Coastal Pelagic Species (CPS) and Groundfish). Many HMS and salmon stocks are managed internationally and are therefore exempt from some of the

requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) such as annual catch limits. Application of the National Standard 1 guidelines is problematic for salmon because of their unique life history (i.e., short life cycle, semelparity), their sensitivity to freshwater habitat alterations and long-term climate shifts, their various sources of production (natural spawning vs. hatchery), and, for several stocks, their listing under the Endangered Species Act. The management processes for CPS and groundfish stocks use similar assessment methods and review procedures, and rely on established harvest control rules based on  $B_{MSY}$  and  $F_{MSY}$  proxies that already incorporate some precautionary characteristics.

The focus of this summary is on ABC control rule implementation in CPS and groundfish management, which is perhaps more straight forward and illustrative of the Pacific Council's general application of harvest control rules, though the same concepts are also utilized in HMS and salmon management. In groundfish and CPS management, harvest control rules are used to establish OY catch levels and serve to reduce removals at an increasing rate as spawning stock biomass (SSB) decreases. The degree of precaution varies between FMPs. Existing groundfish management uses a "40-10" control rule that establishes OY catch levels below the  $F_{MSY}$  harvest rate proxy when SSB decreased below 40% of unfished stock size (Figure 1). Under the reauthorized MSA, this harvest policy needed to be revised

to account for management and scientific uncertainties to further reduce the probability of overfishing occurring. The Pacific Council’s SSC followed the framework envisioned in the NSI guidelines and took the lead in quantifying the scientific uncertainty needed to formulate an ABC control rule to establish a buffer between the OFL and the ABC (Figure 2).

The revised ABC control rules for data-rich or Category 1 CPS and groundfish stocks use a combination of policy and science when determining the appropriate buffer between OFL and ABC. The SSC characterizes the scientific uncertainty in OFL using  $\sigma$  (scale parameter for a log-normal distribution obtained through meta-analysis of multiple assessments of all groundfish and CPS stocks). The Council selects a risk policy or  $P^*$  value that represents the probability of overfishing due to uncertainty in biomass estimates.

In this relationship between scientific uncertainty and risk policy, the higher the value of  $\sigma$ , the larger the required buffer between OFL and ABC for any given policy choice ( $P^*$ ). The Pacific Council employs two principal methods to achieve a higher level of precaution for data poor stocks, which have greater scientific uncertainty. Either the size of the buffer is simply increased substantially, or a similar result is obtained through an increase in the value of  $\sigma$  coupled with a more risk-

Figure 1. Existing Pacific Council Control Rule for Groundfish

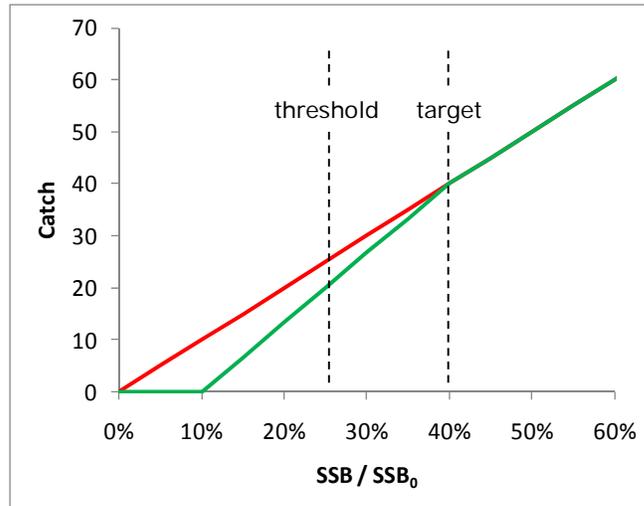
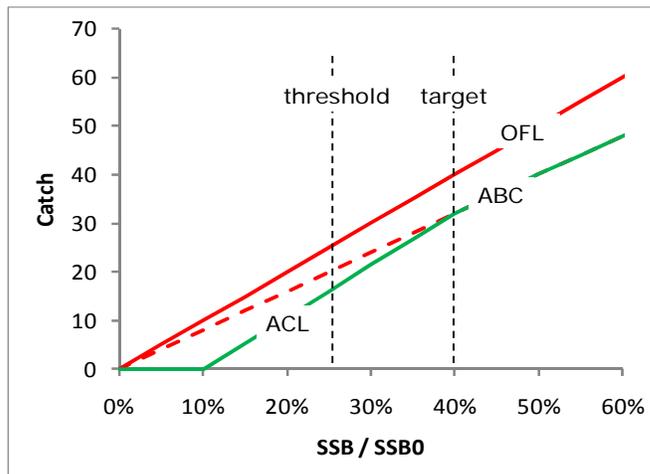


Figure 2. Revised Pacific Council Control Rule for Groundfish



adverse policy choice. The Pacific Council doubled and quadrupled the value of  $\sigma$  for Category 2 (data-moderate) and Category 3 (data poor) groundfish species respectively, and maintains a 75 percent reduction in OFL when setting an ABC for data-poor CPS. Both approaches result in substantially increased buffers between OFL and ABC for data-poor stocks.

The calculation of  $\sigma$  is a combination of estimated variance “among”

assessments (i.e. incorporating uncertainty from new data used from one assessment to another, new modeling software and specifications, new parameter priors, new assessment teams, new reviewers, etc.) and the variance “within” an assessment (i.e. the variance around a terminal year biomass estimate due to data quality/quantity, etc.; Table 1). The greater of the “among” and “within” variance was used as the estimate of  $\sigma$ . “Among” assessment variability was greater than “within” assessment variability for all of the species in the initial analysis except one (Pacific sardine).

The SSC tested pooled variance estimates by species groups using a linear mixed model with “species group” as a random effect. The

variance among species groups was low ( $<10^{-5}$ ) and did not support the application of distinct  $\sigma$  values by species or species group. Scientific uncertainty estimates were therefore pooled across all stocks resulting in a  $\sigma$  value of 0.36 (Table 2).

A back-transformed lognormal distribution function with a  $\sigma$  value of 0.36 was applied to generate the relationship between  $\sigma$  and the risk policy choice (P\*; Figure 3). This management framework was first implemented by the Pacific Council in 2010 for 2011 groundfish and CPS fisheries. The Pacific Council adopted P\* values of 0.45 (i.e. a 4.4% buffer) for Category 1 groundfish stocks and adopted a more conservative P\* choice of 0.4 for Category 2 (16.7 % buffer) and Category 3 (30.6% buffer)

Table 1. Summary results for 17 data-rich groundfish and CPS assessments

Group	Stock	Number of Assessments	Squared Deviations	log-scale $\sigma$	Hessian CV
Rockfish	Bocaccio	5	61	0.37	15%
Rockfish	Canary rockfish	7	85	0.38	15%
Rockfish	Chilipepper	2	22	0.35	14%
Rockfish	Darkblotched rockfish	3	45	0.10	13%
Rockfish	Pacific Ocean Perch	3	20	0.35	15%
Rockfish	Shortspine thornyhead	3	39	0.92	9%
Rockfish	Widow rockfish	5	61	0.24	31%
Rockfish	Yelloweye rockfish	4	58	0.49	14%
Rockfish	Yellowtail rockfish	6	66	0.27	24%
Roundfish	Cabazon	3	46	0.15	21%
Roundfish	Lingcod	4	56	0.26	10%
Roundfish	Pacific whiting	15	151	0.29	28%
Roundfish	Sablefish	7	82	0.34	10%
Flatfish	Dover sole	3	41	0.36	9%
Flatfish	Petrable sole	3	41	0.23	15%
CPS	Pacific sardine	3	51	0.21	41%
CPS	Pacific mackerel	4	65	0.42	25%

Table 2. Composite estimates of scientific uncertainty

Species Group	Species Weighted Equally	All Data Pooled (Unweighted)
Rockfish (n=8)	0.442	0.418
Roundfish (n=4)	0.269	0.281
Flatfish (n=2)	0.301	0.299
CPS (n=2)	0.328	0.339

Pooled residuals from all stocks yielded  $\sigma = 0.36$

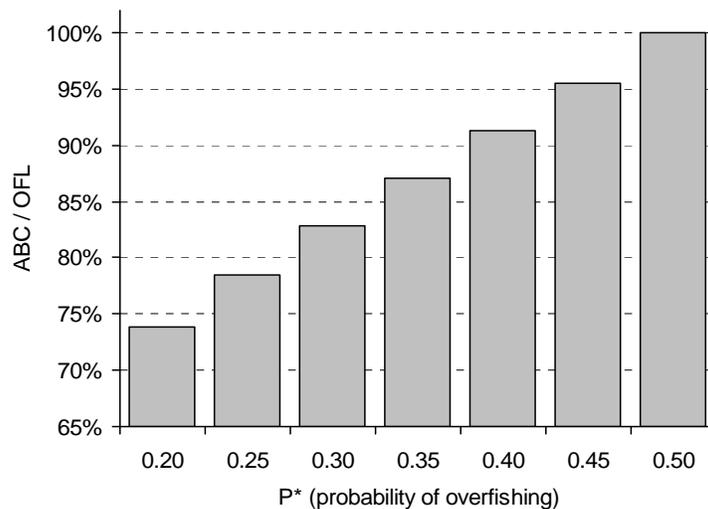
groundfish stocks and for Pacific sardine (8% buffer).

The Pacific Council and its SSC agreed that, due to the statutory deadlines, there was inadequate time available to fully develop and implement this new management framework. The SSC noted that the current characterization of scientific uncertainty only addresses variability in biomass estimates and other sources of scientific uncertainty (distribution/migration, MSY harvest rate, productivity, etc.) should be explored in the future. Additional work on data-poor species and the application of this approach to stock complexes is also planned.

It is anticipated that the Pacific Council will continue to improve and expand on this approach as new science becomes available and as an improved understanding of this complex framework

progresses. The Pacific Council will likely revisit its risk policies through the course of future management cycles, recognizing that as data availability and assessment methods evolve, so too will the need to buffer OFL levels to avoid overfishing due to scientific uncertainty.

Figure 3. Pacific Council ABC Control Rule for Data-Rich Stocks



## Summary and Discussion

There are four FMPs in the PFMCs jurisdiction including salmon, groundfish, coastal pelagics, and highly migratory species (HMS). The international exception will more than likely be applied to many stocks in the HMS FMP, as well as the salmon FMP. Salmon have proved problematic with respect to NSI guideline applications in that some are listed under the Endangered Species Act and there is a salmon treaty, as well as other management issues. The groundfish and coastal pelagics have comparable assessment and review cycles, and similar harvest control rules.

Groundfish and coastal pelagics are data rich stocks. The PFMC decided to utilize a  $P^*$  approach. The SSC characterized uncertainty in OFL using sigma, then the Council selects a  $P^*$  less than 50%, the combination of which is the buffer between OFL and ABC. Sigma is derived from a meta-analysis of multiple assessments. To assess uncertainty, the uncertainties in OFL were identified as those associated with estimating  $F_{MSY}$ ,  $B_t$ , forecasting, spatial processes, and the ecosystem. Variation among stock assessments captures various sources of uncertainty, including those associated with the data used, modeling software, model specification decisions, parameter priors, and the composition of teams doing and reviewing the work. The PFMC then compiled a summary of the results of the 17 data-rich groundfish and coastal pelagics

assessments including the number of assessments, square deviations, log-scale sigma, and CV. All the uncertainty was categorized to help define the risk of overfishing ( $P^*$ ) options available to the PFMC, from which they chose a  $P^*$  of 0.45 for Tier 1 stocks.

There are three categories (tiers) in the PFMC ABC control rules: 1) Category 1 is data rich with an ABC based on a  $P^*$  buffer, 2) Category 2 is data moderate in which an aggregate population model is fit to available information, and 3) Category 3 is data poor in which DB-SRA, DCAC, or average historical catch are used. While the  $P^*$  for category 1 is 0.45, the  $P^*$  for both Categories 2 and 3 is 0.40 (although the buffer percentages are different: 16.7% for Category 2 and 30.6% for Category 3). Data-rich stocks are typically managed with species-specific ACLs, while the data-moderate and data-poor stocks are grouped into complexes for which ABCs, OFLs, and ACLs are determined.

The PFMC took action to allow the  $P^*$  to be revised during every biennial specification process, however the methodology for determining how the updates will be done is not yet decided. The PFMC argued that the existing harvest control rules and in-season management system are working well and expressed concern that larger buffers would restrict the Council's flexibility. The PFMC also expressed frustration about making a decision when the long-term implications are unclear.

The PFMC SSC representative was asked about how stocks are grouped into stock complexes, and the response was that the complexes are grouped based on geography and depth and typically display some variation in life history in terms of growth. The OFL-ABC buffer should account for this variation. It was also pointed out that many West Coast groundfish stocks were classified as overfished because of uncertainty – the fact that stocks were declining was missed until it was too late. Therefore, the Councils were urged to deal explicitly with uncertainty in their stock complexes. The PFMC was commended for quantifying the among-model variation, but the PFMC SSC representative was asked about the implicit assumption that the estimate of variance is accurate for the P\* approach. It was confirmed that the estimation was good because the estimates were compared to decision tables and the average for the estimates was 0.35 when looking at between-model variance.

### *Gulf of Mexico*

Presenter – Harry Blanchet, SSC Chair

As of this presentation, the Gulf of Mexico Fishery Management Council (GMFMC) and its Scientific and Statistical Committee (SSC) were still in the process of developing the ABC Control Rule for the Council. This presentation



represents the draft rule as developed at the date of the 2010 National SSC Meeting, but has been changed since then.

The basis of the Control Rule was borrowed from the rule being developed by the South Atlantic Council at the same time, in order to attempt to retain some consistency in philosophy in the Southeast Region, as well as to keep from going through some of the same discussions that the South Atlantic SSC had already resolved. Both rules contain “Tiers” of stocks, based on the information available on those stocks, with “conditions for use”. The Gulf SSC modified the South Atlantic framework though, removing ‘Stock Status’ and ‘PSA’ as dimensions of the ABC control rule. It was reasoned that those issues were more directly related to management uncertainty than assessment uncertainty. Therefore, those issues were referred to the GMFMC to be considered as part of the Council’s ACL control rule (instead of within the ABC control rule).

The ‘Assessment Information’ dimension was used to “split” between ‘assessed’ (data-rich) and ‘unassessed’ (data-poor) stocks. The ‘Assessment Uncertainty’ dimension was expanded to include more detail as well as both observation and process error. The P\*-based approach is to be used for assessed stocks for which a probability density function (PDF) of MSY (or its proxy) can be generated. The SSC was still discussing how to handle unassessed stocks – waiting on more results/guidance from the National SSC’s ORCS (Only Reliable Catch Series) Working Group.

The draft rule contains three tiers – two for assessed stocks, and one for data-poor stocks. The top tier is for those whose stock assessment provides a PDF around the MSY estimate. There is a separate risk determination table to identify the appropriate level of risk (P\*) to apply to the PDF to determine ABC. The second tier stocks also have assessments, but the assessment does not provide the information to input into the risk determination table. At the time of the meeting, Tier 2 had a proposal to have the Council select P\* for each species or group, and apply that to the PDF to determine ABC.

The risk determination table provides a selection of several elements within several groups that can be used to estimate an appropriate risk level for a given stock, based on the quality of the assessment information available, and the characterization of the uncertainty within the information. The uncertainty is

separated into several aspects – including the derivation of the PDF around the OFL estimate, the characteristics of retrospective patterns, and the presence of known environmental covariates and their incorporation into the assessment. The overall range is established, and then decremented from the maximum by the scores within each factor.



The data-poor tier was split into two sub-tiers, based on criteria including scale of landings, trends in landings, and an evaluation of whether the stock was likely to be undergoing overfishing at levels around or moderately higher than current levels. Based on those criteria, the stock or complex would be assigned into a tier that would either fix OFL at current harvest levels, or allow more harvest than currently experienced. If there was a trend in

landings, an adjustment would be used to account for that additional uncertainty.

*Since the National SSC meeting, there have been several changes in the ABC control rule. One of these was to remove the concept of  $P^*$  from the second tier, and replace it with a “risk of overfishing” concept. Also, the consideration of trends in the landings data is no longer a part of Tier 3. The final rule is still in development, but has been applied to provide some recommendations to the GMFMC.*

### Summary and Discussion

The GMFMC developed, but has not yet adopted, a control rule that is a  $P^*$ -based table approach for assessed stocks for which a PDF of MSY or its proxy could be generated. The Council is still discussing how to handle unassessed stocks. The ABC control rule has three tiers based on data availability. The ABC will be set using a  $P^*$  approach or a buffer, depending on the tier:  $P^*$  for the top two tiers, a buffer for the bottom tier. Additionally, OFL will equal ABC for rebuilding stocks.

Tier 1 is for assessed stocks that have an MSY estimate and probability distribution around it. A risk determination table will be associated with it from which the GMFMC can determine the appropriate  $P^*$  to be applied to the determination of ABC. Tier 2 is for stocks without a full assessment, but for which another method can be used for determining OFL and probability distributions. Each stock would

have a predetermined  $P^*$  selected by the GMFMC from four options, which will be applied to the probability distribution to determine the ABC. For Tier 3, the PDF cannot be calculated in a sufficient way to convert  $P^*$  into a buffer between OFL and ABC. There are two options for Tier 3: 3a in which the annual landings are less than 250,000 lbs, are stable, and the stock complex is unlikely to undergo overfishing at current average levels or at levels moderately higher than current average levels, or 3b in which the current average landings may be at or near the yield at  $F_{MSY}$ . In Tier 3a, the OFL will be set to the recent 10-year mean of the landings data, plus two standard deviations. The buffer is then set based on an acceptable risk associated with scientific uncertainty, where the ABC equals the mean of the landings data plus a range of 0-1.5 times the standard deviation. The default is ABC equals the mean of the landings data plus 1.0 \* standard deviation. In Tier 3b, the OFL is equal to the mean of the recent 10-year landings data. If landings data are trending,



the OFL is adjusted to account for scientific uncertainty. The ABC is set using a buffer that represents an acceptable risk of overfishing associated with scientific uncertainty that ranges from 65%-100% of the OFL. The default is 75% OFL.

Various challenges and possible solutions were presented. First, species groupings are difficult due to different life histories and multi-species fisheries. The GMFMC can readdress the species groupings and determine whether to utilize an indicator stock in a group, although that may only prove useful for some complexes.

The GMFMC SSC representative was asked to elaborate on how a PDF could be determined on an OFL based solely on landings data. It was clarified that this is not about a measure of distribution for stock status, but instead a measure of

uncertainty about how the fishery is doing. For example, variability in the landings would lead to uncertainty in consistency of the fishery, whereas consistent landings would have less uncertainty associated with the fishery.

### *Caribbean*

Presenter – Barbara Kojis, SSC Chair

The Caribbean SSC could not develop control rules because none of the three SEDARs (analyzing a total of nine species) have produced a successful stock assessment. For most if not all species or species groups only unreliable catch history (OUCH) was available. There were a limited number of species in sub-geographic areas for which data may be sufficient to do ‘benchmark’ assessments or provide OFL advice. For all the species/species groups that have been designated overfished and/or undergoing overfishing in the U.S. Caribbean, the SSC determined that OFL and ABC could not be determined and that the focus should be to collect data so that these parameters can be determined based on accepted science-based methods. In the interim, to meet the requirements of the MSRA, the SSC did not object to using selected years of average annual catch to determine OFL for species/species groups.





Additionally, the SSC made other recommendations: 1) separating the three large parrotfish from the parrotfish species group and designing  $ACL = 0$  because of the decline that they have experienced and 2) recommending that federal regulations for queen conch be compatible with territorial regulations in the U.S. Virgin Islands (USVI). While harvest and possession of queen conch was prohibited in federal waters, except for Lang Bank on St. Croix, it was still harvested in territorial waters. The USVI have recently proposed regulations that extended the closed season and reduced the maximum daily catch in territorial waters. Compatible regulations would minimize difficulties in enforcing territorial regulations.

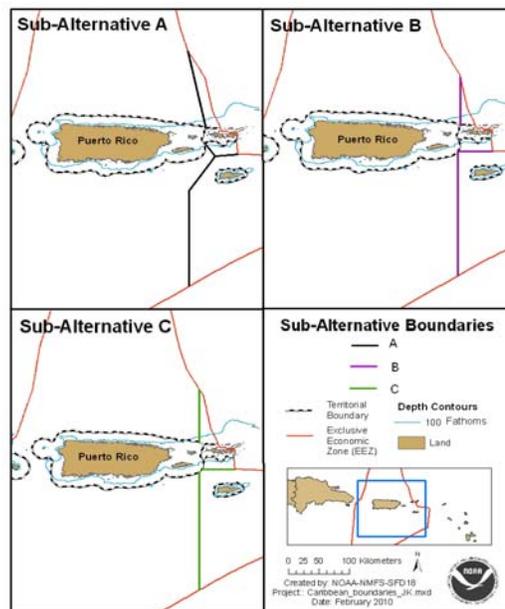
The CFMC approved the following at their last meeting:

- OFL (MSY proxy) = average annual catch based on the longest time series of pre-Comprehensive SFA Amendment catch data that was considered to be reliable across all islands.
- $ACL = 0$  for two species designated as overfished and undergoing overfishing: Nassau and goliath grouper.
- The three large parrotfish species were placed in a new unit and the  $ACL = 0$ .
- $ACL = OFL$  reduced by 15% for the remaining species designated as undergoing overfishing.
- Accountability Measures – The fishing season AMs will be triggered if the  $ACL$  is exceeded and the Southeast Fisheries Science Center (SEFSC) in consultation with CFMC and SSC determines overage occurred because catches increased vs. data collection/monitoring improved. Exceedance is defined as a single year beginning 2010 and then running averages will be employed for two years, and thereafter, three years. The length of the fishing season for that species or species group will be shortened the year following the trigger determination by the amount needed to prevent such an overage from occurring again. The needed changes will remain in effect until modified. There will be no payback of overages.
- Geographic allocation of  $ACL$ s
  - $ACL$ s are determined for the whole of the U.S. Caribbean for stock management, since

there is currently no evidence that stocks differ between island group.

- However, the CFMC approved allocating and managing ACLs by island group: Puerto Rico and subdividing the USVI into St. Thomas/St. John District and St. Croix District. The boundaries in the EEZ between the island groups will be determined using the mid-point or equidistant method.
- Recreational ACLs - The CFMC approved separate commercial and recreational catch limits for Puerto Rico (the only island group with MRFSS recreational landings data). To ensure the ACL is not exceeded, a bag limit for snapper/grouper/parrotfish was approved by the CFMC:
  - Five fish per fisher and 15 fish per boat
  - Maximum of 2 parrotfish per fisher and 6 per boat.
- Framework measures were established for the Reef Fish FMP and Queen Conch FMP. When the CFMC determines that management measures require modification, it will appoint an assessment group that will assess the condition of species in the relevant management units (including periodic economic and sociological assessments as needed). The Group will report to the Council. The Council will hold public hearings and may convene its SSC to provide advice prior to taking final action.

Data Improvement Workshops have been held to improve the data being collected so that stock assessments can be carried out in the future. The



SSC was asked by the CFMC and SEFSC to review the proposed improvements to the commercial trip tickets, port sampling, and validation of data. The SSC strongly recommended that the Caribbean Commercial Fishery Data Improvement Project be carried to completion and made a number of recommendations:

- Supported the improvement to the quality of trip ticket data of commercial catches.
- Recommended collecting sufficient and timely data on major species/species groups.
- Recommended developing a recreational data collection system. Effort should be commensurate with catch by recreational sector.
- Recommended implementing a single basic commercial catch reporting template for PR and the USVI.

- Recommended developing an aerial survey plan to validate fishing effort.
- Recommended increasing percentage of fishing trips port sampled.
- Recommended training fishers and dealers in fish taxonomy and metrics to increase accuracy and reliability of commercial catch reports.
- Recommended collecting biological data to determine maturity and length at age and length at harvest.

The target implementation date for the new commercial catch reports requiring species specific data for select species is January 1, 2011.

To try to determine the status of U.S. Caribbean fisheries, a fishery independent pilot trap study is being conducted on St. Croix by Todd Gedamke of the SEFSC in cooperation with St. Croix fishers.

### Summary and Discussion

There are four FMPs in the Caribbean: spiny lobster, shallow water reef fish, coral, and queen conch. Species and species groups that are classified as overfished and subject to overfishing include goliath grouper, Nassau grouper, and queen conch. There is no fishing/possession allowed for goliath or Nassau grouper in federal and territorial waters; there is no fishing for queen conch in federal waters except at Lang Bank on St. Croix, as well as seasonal closures and bag limits in Puerto Rico and the U.S. Virgin Islands (USVI), and quotas in USVI. The grouper unit 4,

snapper unit 1, and parrotfish are classified as subject to overfishing. The CFMC lacks reliable data for both commercial and recreational fisheries. Several SEDARs have been held to assess nine species/species groups, and have not successfully produced a stock assessment. SEDAR as of yet has not carried out any benchmark assessments or provided an OFL since a workshop held in January 2009, which was held to evaluate available data to determine if benchmark assessments could be developed or if OFL advice could be provided.

An SSC working group recommended that ACLs be based on average annual catch as well as which years to use in the calculations. Further, the SSC determined that data was insufficient to estimate values for OFL and ABC for most stocks/stock complexes, but did not object to using average annual catch as an MSY proxy. The SSC has provided management advice about the OFL, including whether it could be determined given



available data. The management advice, given that OFLs, ABCs, and ACLs cannot be determined for all five stocks/stock complexes that are designated as undergoing overfishing, was that fishing should be limited to what was needed for data collection. Additionally, for parrotfish, the SSC recommended separating the parrotfish unit into two units, the second of which would contain the three large parrotfish with ACLs equal to zero. Quotas should be established for the remaining parrotfish based on average catch for the respective territories. For queen conch, because it is primarily caught in local waters, the SSC recommended establishing compatible regulations with the USVI local government with the following caveats: 1) ACLs should be revisited after the territorial surveys are completed, and 2) the ACL amendment should include framework measures such that ACLs and other management measures can be adjusted promptly to stay in concert with the USVI regulations. The CFMC amended the stock complexes to group species by habitat or resilience, separating the grouper unit 4 into two groups (midwater and deepwater), switching two deepwater snapper species between species groups based on depth caught, and separating large parrotfishes into a new unit.

All CFMC management reference points are based on landings data averaged over various time series because data are insufficient to estimate biomass and fishing mortality rates. OFL corresponds to the MSY proxy, which is based on selected average annual commercial

landings. Overfishing occurs when annual catches exceed the OFL and the overage is determined to have occurred because catches increased (versus because data collection/monitoring improved). The ACL equals OFL reduced by 15% to take uncertainty into account. These ACLs apply across the Caribbean because there is no evidence that stocks differ between island groups, however the ACLs are allocated across the island groups (Puerto Rico, St. Thomas/St. John, and St. Croix). The EEZ ACL for queen conch is zero.

The recreational fishing charters requested a separate ACL for recreational fishers so that they could control the harvest of their share of the resource and not be penalized if the commercial fishers exceeded their ACL. Therefore the CFMC approved separate commercial and recreational bag limits in Puerto Rico. The CFMC adopted a recreational bag limit for snapper, grouper, and parrotfish of 5 fish per fisher and 15 fish per boat, with a maximum of 2 parrotfish per fisher and 6 per boat.

One clarification requested of another SSC member was whether the logic being used was that half the time overfishing is occurring if average landings are used as a proxy for OFL. OFL is used as the MSY proxy and the fishermen were not overfishing necessarily because they could have been fishing up to OFL. The ACL reduces the fishing level until the CMFC can determine the actual fishing level and new data can be collected. The one thing known through anecdotal information from

fishermen, based on pictures of large fish from over a decade ago, is that there are fewer large fish; however, this is not scientifically documented because no studies have been conducted. There have been a few bycatch studies as well as bycatch reported on catch report forms in the USVI. The catch report forms are collecting data on fish that are being taken home in addition to fish being sold. At times, bycatch levels are high, but bycatch mortality varies by species. Most of the catch is retained though, so is not counted as bycatch.

### *South Atlantic*

Presenter – Carolyn Belcher, SSC Chair

The first tier of the South Atlantic Fishery Management Council’s (SAMFC) ABC Control Rule was presented at the National Scientific and Statistical Committee Meeting last year. This first tier determines OFL and ABC for assessed stocks and uses a P\* approach to determine the ABC value. Since last November, the SAMFC Scientific and Statistical Committee (SSC) has further developed its ABC control rule to address data poor and unassessed stocks. The SSC considered potential approaches ranging from Restrepo et al. (1998) to more recently developed analyses including MacCall (2009) and Dick and MacCall (in prep). Additional approaches developed by committee members were also considered. A draft approach was developed at the SSC’s April meeting; however, the Council rejected the approach at its June meeting and provided further



guidance for the SSC to consider in developing the control rule. The SSC met in August to revisit the ABC control rule. Several SSC members are currently serving on the *ad hoc* ‘Only Reliable Catch Series’ (ORCS), and were able to discuss the current approaches being considered to address unassessed stocks. The SSC produced a more complete control rule by the end of the August meeting, which consisted of a tiered approach that was based on whether or not the stock had been assessed or the amount and type of data available. The full control rule was presented to the Council at its September meeting. Future plans include further development of the lowest tier, where only catch series data exist.

### Summary and Discussion

The SAFMC has adopted a four-tiered ABC control rule, with the upper two tiers using analyses that can produce a PDF for OFL and a P\*

## SAFMC SSC Recommended Tier Approach

- Level 1 Tier: Assessed Stocks
  - ABC recommendations conform to ABC control rule based on P\* approach
- Level 2 Tier: Depletion based stock reduction analysis (DBSRA) – (Dick and MacCall)
  - Allows for P\* or other risk level approach to derive ABC
- Level 3 Tier: Depletion corrected average catch (DCAC) – (MacCall 2009)
  - Provides provisional ABC – OFL is unknown
- Level 4 Tier: Catch only
  - Difficult to prescribe. Depends heavily on expert judgment

approach to determine ABC and the bottom two tiers providing a provisional ABC. Tiers are defined by the level of analysis and available data. Additionally an ABC may be recommended without an estimate of OFL, provided the SSC explains its rationale.

Uncertainty is incorporated into the control rule for assessed and “unassessed-but-data-rich” stocks via the P\* approach. Penalties are applied in a qualitative analysis to account for scientific uncertainty as a function of assessment information, uncertainty characterization, stock status, and productivity and susceptibility considerations. The penalties are then summed together and reduced from a max OFL of 50%. Tier 1 is for assessed stocks in which ABC recommendations conform to the ABC control rule based on the P\* approach. Tier 2

derives an ABC via a depletion-based stock reduction analysis (DBSRA) that allows for P\* or another risk level approach. Tier 3 provides a provisional ABC based on depletion corrected average catch (DCAC). Lastly, Tier 4 establishes an ABC when only catch data is available and depends heavily on expert judgment. The SAFMC still needs to adopt the final control rule, as well as develop the approach to determine ABCs for Tier 4.

There are three special cases in the SAFMC jurisdiction: wreckfish, golden crab, and sargassum. The wreckfish fishery consists of less than three harvesters, therefore there are data confidentiality issues. Also, the fishery is managed under an ITQ system that controls effort and fishing mortality. The last assessment was in 2001, prior to the ITQ system, and therefore does not

reflect the current level of fishing mortality. The peak of the wreckfish fishery was in the late 1980s, early 1990s, and now only a quarter of the quotas are being used. Because the level of fishing at that time is still acceptable, if the ABC were reduced to reflect the fishery reduction, current shares would have to be reduced to reflect the ABC reduction. Thus, fishermen would need to buy up the remaining quota shares to remain at the current harvest level. The SSC chose to set the ABC to average landings, essentially capping the fishery to current landings, and recommended a DBSRA or DCAC analysis to be conducted next year.



Golden crab is a developing fishery in which it is difficult to participate. Also, the resource cannot be targeted across its full distribution. The fishery is considered small and information from the last assessment showed there was possibly depletion early in the fishery. In this case, the ABC and ACL could be set above historical catch.

With regards to sargassum, the fishery has been inactive over the last 12 years, but it is a critical ecosystem component. The SSC recommended reclassifying sargassum as an ecosystem component species, but if the Council elects to keep the FMP for sargassum, the SSC classified the fishery as “small” and recommended setting the ABC to average catch (12,800 lbs wet weight). The

previous OY was set at 5,000 lbs wet weight because of concern for the ecosystem role. The SSC supports using 5,000 lbs as the ACL or ACT in future management.

The SAFMC representative was asked about double counting: if scientific uncertainty is incorporated via a Tier 1 stock assessment, it is potentially double counted during the vulnerability scoring. It was clarified that while double counting was discussed, the same methodology will be applied to all tiers. Incorporating vulnerability scores provides information that would be otherwise unavailable in data poor situations, and a means of quantifying multiple qualitative aspects of a stock.

### *Mid-Atlantic*

Presenter – John Boreman, SSC Chair

During the year since the last National SSC meeting, the SSC refined its proposed control rules for setting acceptable biological catch (ABC) limits and submitted them to the Mid-Atlantic Fishery



- The probability distribution function (PDF) for the overfishing limit (OFL) is a purely statistical calculation

#### Assessment Level 2

- Some population dynamics information is missing
- Some significant sources of scientific uncertainty are unquantified
- The OFL PDF is *ad hoc*, but considered an acceptable representation by the SSC

#### Assessment Level 3

- Similar criteria to Assessment Level 2, for the most part
- The OFL PDF is considered by the SSC not to be representative
- If the SSC cannot derive an acceptable alternative PDF for the OFL, it may use a default value of 75% of  $F_{msy}$

#### Assessment Level 4

- No reliable assessment exists
- *Ad hoc* methods are used, based on catch history or some other approach

So far, all of the MAFMC species assessments have been characterized by the SSC as either Assessment Level 3 or 4. For the Assessment Level 3 species, the default value of  $ABC = \text{catch at } F = 75\% F_{MSY}$  has been used. For Assessment Level 4 species, the SSC has used *status quo* catch or *status quo* plus a small percentage increase.

The Council added a risk policy to the control rules that set a  $p^*$ -value (acceptable risk of overfishing) for a given level of stock biomass in relation to the stock biomass that

Management Council (MAFMC) for consideration. The most significant refinement was redefining the criteria for information that determined the information content level for a given stock assessment, and adding a default value for Assessment Level 3, as recommended during the public comment period. The levels are now basically defined as follows:

#### Assessment Level 1 (Ideal)

- Accounts for all significant scientific uncertainty
- Biological reference points are generated within the assessment model
- No retrospective patterns (or very minor and non-directional)

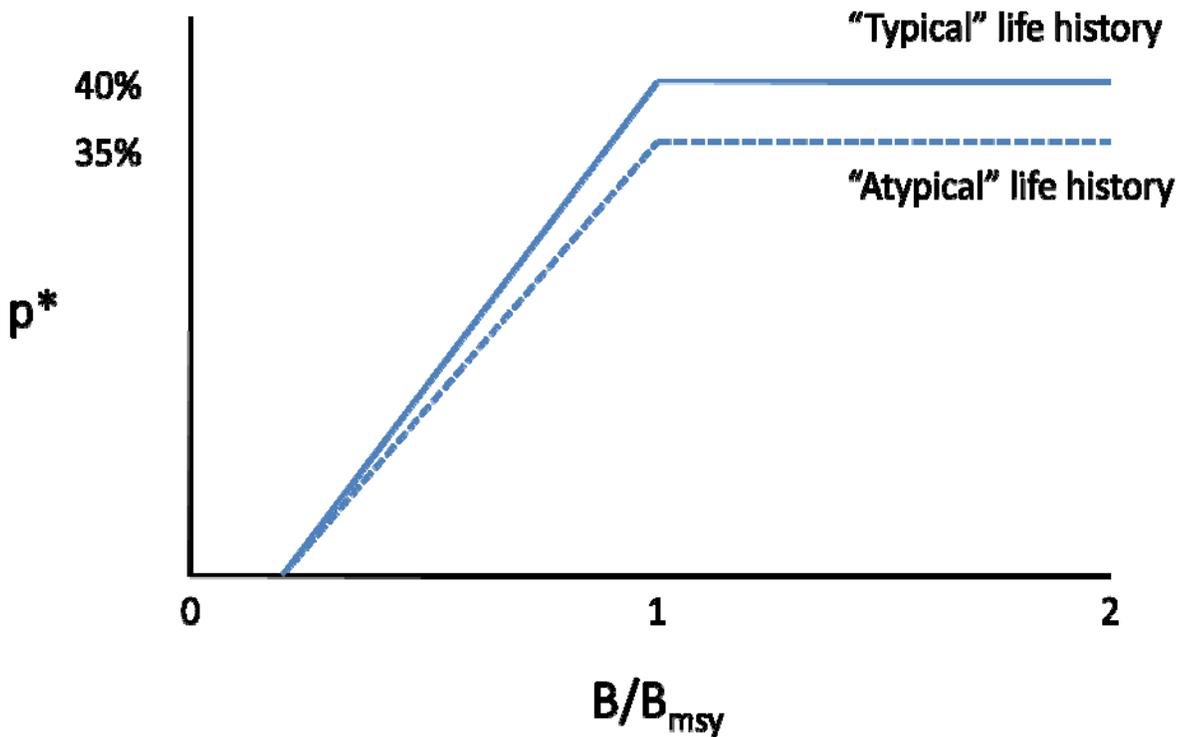
provides maximum sustainable yield (see figure below).

The ABC control rules and associated risk policy are now incorporated in an omnibus amendment that has been submitted to the Secretary of Commerce for approval.

Challenges facing the MAFMC SSC during the coming year include applying a uniform risk policy across all of the assessment levels as defined by the ABC control rules, and ensuring that the buffer between the OFL and ABC increases with increasing assessment level (the SSC is currently supporting a management and assessment strategy evaluation to determine how best to do this). Other challenges include avoiding penalizing assessments containing more information about

scientific uncertainty, and keeping NOAA Fisheries focused on the goal of moving toward Assessment Level 1 for all species managed by the MAFMC (i.e., no back-sliding as a consequence of the agency's efforts to conserve spending).

The next steps for the MAFMC SSC are to begin applying the ABC control rules and associated risk policy when the Secretary of Commerce approves the omnibus amendment; in the interim the SSC will use the current set of rules as a guide. The SSC will also be seeking formal input from the MAFMC's industry advisory panels during its ABC-setting deliberations. The input will be in the form of formal fishery characterization reports to be prepared annually by each advisory panel.



## Summary and Discussion

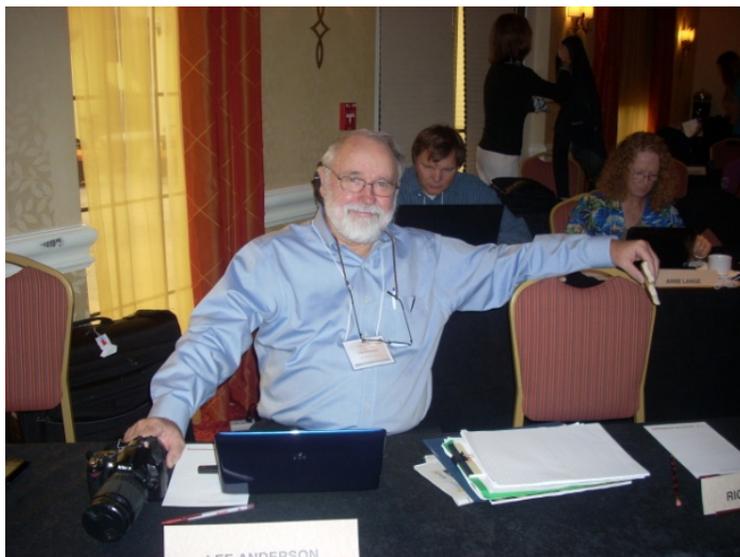
The MAFMC is operating under a 4-level approach, similar to the tiers developed by other Councils. Level 1 is for ideal stocks in which assessments account for all significant uncertainty, there are no retrospective patterns, and the OFL PDF is calculated purely statistically. In Level 2, there is some information missing and some uncertainty unaccounted for, and the OFL PDF is *ad hoc* but a good representation nonetheless. Level 3 is similar to Level 2 except that the OFL PDF is not representative, therefore a PDF alternative is needed. If there is no PDF alternative possible, then the MAFMC may use 75%  $F_{MSY}$  (or its proxy). There is no reliable assessment in Level 4, therefore *ad hoc* methods to determine the ABC will be based on catch history or some other approach.

Currently, all MAFMC species are either level 3 or 4. Typically, for Level 3, ABC has been equal to the catch at fishing mortality equal to 75%  $F_{MSY}$ . For Level 4, the MAFMC has used the *status quo* catch and *status quo* catch plus a percentage, but they presented that average catch could be used as well. The primary challenges the MAFMC noted were applying a uniform risk policy across the four levels, ensuring that the buffer between the OFL and ABC increases with the increasing level of uncertainty, and avoiding

penalizing assessments that have more information about uncertainties.

The MAFMC will begin applying the ABC control rules in 2011 when the omnibus amendment is approved. In the interim, the control rules are used as guidance. In the future, the MAFMC will conduct an assessment and management evaluation study to refine the control rule and risk policy, as well as seek formal input into the ABC process from industry advisors in the form of fishery characterization reports. For example, it was noted that the squid fishery is controlled by the market as much as it is by a limit on catch quantities. Additionally, the fishermen can provide insight into their view of what drove catches during particular years, which helps the SSC interpret CPUE trends.

It was clarified that a buffer should increase at lower tiers, but actually the evaluation of uncertainty should increase at lower tiers. However, a  $P^*$  may be greater for a lower tier



stock compared to a stock in the higher tier that is at a low stock level, thus requiring a lower risk of overfishing. It was also noted that the lowest tier that occurs in most Councils' systems is not represented. The MAFMC clarified that the Council has decent catch history and landings for species in the mid Atlantic, thus their first three levels correspond to the first level of the SAFMC. The depletion-based approach will only be used for Level 4 species. Further, Councils are customizing the tier system to fit their stocks.

There was brief discussion of how biomass ratios affect  $P^*$  values and whether an increased buffer would be necessary at lower biomass levels. One argument was that  $B/B_{MSY}$  will inevitably result in a lower  $P^*$  value and thus incorporate stock status. However, some Councils are choosing to characterize biomass differently, even if functionally the end result is the same. It was suggested that research should be done in which stocks from one region are plugged into the model of another to see what happens with respect to  $P^*$  and the buffer between ABC and OFL. It was also noted that hermaphroditic species may be more vulnerable while others may have an advantage using the system outlined by the MAFMC; the response was that the focus is on species that are more vulnerable.

## *New England*

Presenter – Steve Cadrin, SSC Chair

The New England SSC developed ABC recommendations to meet the 2010-2011 deadlines for Annual Catch Limits, but the basis of ABC recommendations and conformance to NS1 guidelines vary among FMPs, and formal ABC control rules have not been developed for all stocks. Eventually, all FMPs should include ABC control rules that account for scientific uncertainty in OFL and the Council's desired risk tolerance. In June 2010, the SSC reviewed all of its ABC recommendations with specific terms of reference:

1. Review ABC control rules or methods for deriving ABC in each FMP with respect to their expected performance for avoiding overfishing (i.e., conformance with the Act).



2. Identify the information needed to develop ABC control rules that account for scientific uncertainty in OFL and the Council's desired risk tolerance (i.e., conformance with NS1 guidelines).

Sea Scallop – The ABC is based on a stochastic estimate of  $F_{MSY}$ , projected probability of overfishing, and the projected loss in yield relative to  $F_{MSY}$  (Figure 1). The SSC recommended that ABC be based on 25% probability of overfishing. The optimal combination of risk and probability of overfishing is a management option to be determined by the Council, with input from the Scallop Plan Team and the SSC on scientific consequences of alternative degrees of risk. For illustration

purposes, alternative projections of fishing mortality and yield at alternative probabilities of overfishing were initially provided and  $P^*=25\%$  was accepted. ABC is based on a nominal probability of overfishing, but further scientific information is needed for a more strategic decision on risk tolerance, and Management Strategy Evaluation would help to quantify model error. A more comprehensive measure of risk ( $R$ ) would include multiple risks, expressed as the probability ( $P$ ) of an event  $i$  (e.g., overfishing, overfished, foregone yield, accountability measures) and consequences or costs ( $C$ ):

$$R = \sum_i P_i \times C_i.$$

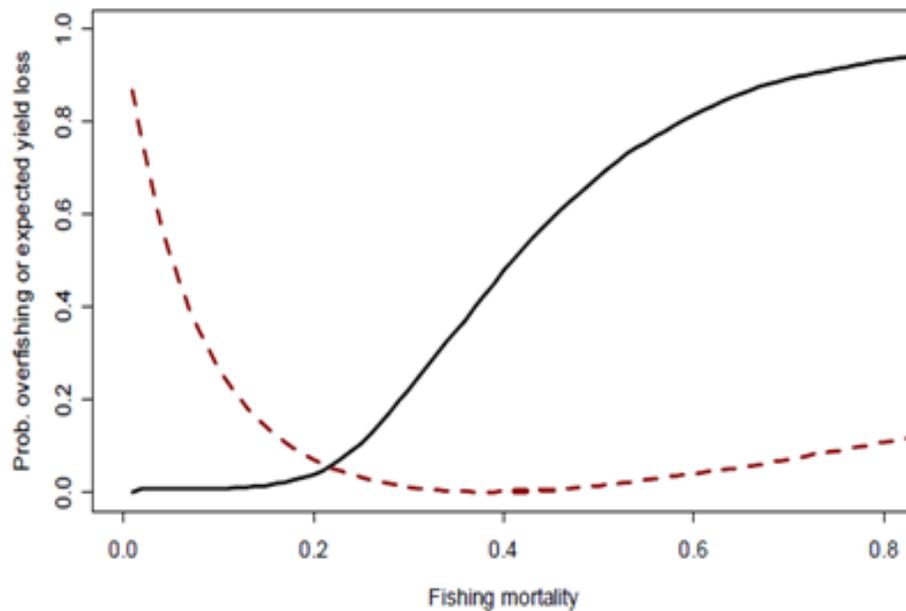


Figure 1. Multiple risks of probability of overfishing and foregone yield (from 50th Northeast Stock Assessment Workshop).

Groundfish – In the absence of better information on what an appropriate buffer should be between OFL and the ABC a relatively simple ABC was applied to all groundfish stocks. Retrospective inconsistencies in most groundfish assessments precluded a probabilistic approach to ABCs. Given the guidance for specifying ABC as the lesser of  $75\%F_{MSY}$  or  $F_{rebuild}$ , and the definition of optimum yield in the current Multispecies Fishery Management Plan as that associated with  $75\%F_{MSY}$ , the SSC recommended that the Council consider this ABC specification be applied to all groundfish stocks. Performance of  $75\%F_{MSY}$  has only been generically evaluated for other stocks and situations (e.g., principal groundfish in the late 1990s). A recent ‘benchmark’ assessment indicated a low probability of exceeding  $F_{MSY}$  (e.g., conditional  $P < 10\%$  for pollock). Most stocks need reliable stochastic projections (or MSEs) and a decision on risk tolerance from the Council.

Monkfish – Considerable uncertainties in the monkfish assessment model preclude its use to determine probability of exceeding the projected OFL. The SSC recommended an interim method for determining ABC based on average exploitation rate during the recent period of increase in both management units and the most recent estimate or index of exploitable biomass. Recommended ABCs were approximately twice the 2009 landings, so the SSC recommended that the Council consider Annual Catch Targets that



allow incremental increases in catch while monitoring stock response. The recent exploitation rate appeared to be sustainable, but the probability of overfishing is not well estimated. Projections from the updated assessment indicate low probability of overfishing in the southern area, but high probability of overfishing in the northern area if  $catch = ABC$  based on the previous assessment. Stochastic projections or MSEs are needed to initiate discussion about risk tolerance.

Skates – OFL of skates cannot be determined because overfishing reference points are survey proxies and estimates of  $F$  or  $F_{MSY}$  reference points are not available. Status of each skate species will continue to be monitored, but the fishery will be managed using a multispecies catch limit, supplemented with additional management actions. The interim ABC is derived as the multispecies skate catch associated with the median of the observed series of a catch/biomass exploitation index and the most recent 3-year average of the multispecies skate survey index. The multispecies ABC is being

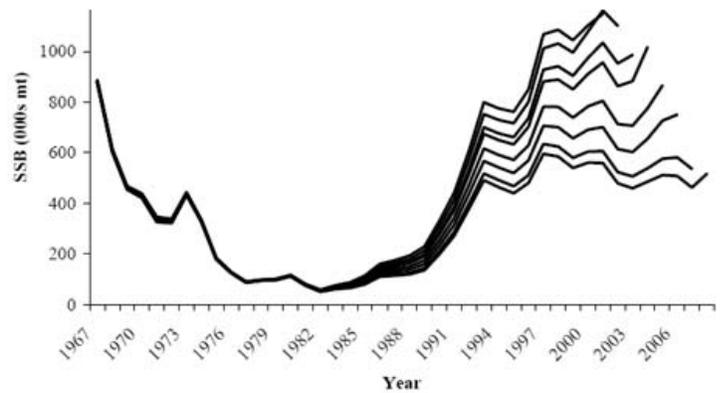
supplemented with a prohibition on possessing thorny skate. The expected performance for avoiding overfishing is unknown, but the recent exploitation rate appears to be sustainable for most skate species. Reliable assessment methods are needed or MSE of a simple ABC control rule.

Herring – The ABC recommendation was initially based on magnitude of retrospective inconsistency in exploitable biomass (40% buffer between OFL and ABC), but the Council asked the SSC to consider a smaller buffer (17%) based on recent retrospective inconsistency. The SSC responded that a 17% buffer was not appropriate. The SSC recognized that the stock complex does not appear to be overfished and overfishing does not appear to be occurring. In the context of uncertainties, it would not be appropriate to allow catches to increase, and recent catch was recommended as an interim ABC. Performance of the interim ABC for avoiding overfishing is unknown, but recent catches appear to be sustainable. Reliable assessment and stochastic projections are needed, and a benchmark assessment is scheduled for 2012.

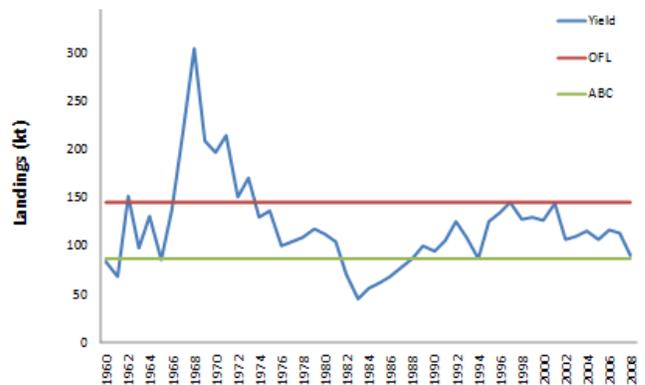
Deep-Sea Red Crab – MSY was initially approximated from depletion-adjusted average catch, OFL was defined as MSY, and 70%

OFL was recommended as an interim ABC. The Plan Team demonstrated that the depletion-adjusted average catch model developed by the Data Poor Stocks Working Group provides an estimate of sustainable yield that underestimates MSY. Therefore, the information available for red crab is insufficient to estimate MSY or OFL. In lieu of an estimate of OFL, the SSC recommendation for an interim ABC is based on the long-term average landings of males,

Herring Retrospective Inconsistency



Herring Interim ABC





which is the same result as provided by the Depletion Adjusted Average Catch model that assumes no depletion. Two exploratory survey estimates of abundance and their variance do not provide evidence of significant depletion from 1974 to 2003-2005. The SSC concluded that an interim ABC based on long-term average landings is safely below an overfishing threshold and adequately accounts for scientific uncertainty. Expected performance of the interim ABC for avoiding overfishing is unknown, but average catch appears to be sustainable. Reliable assessment and stochastic projections or MSE of a simpler ABC control rule are needed to inform a decision on risk tolerance from the Council.

Strategic options for New England ABCs are being considered in November 2010. The general options are:

1. Continue to provide ABC recommendations for each management action. This current practice is responsive to the

Council's needs, fishery and resource conditions, but may lead to inconsistencies among FMPs and management actions.

2. Develop ABC control rules that account for scientific uncertainty in OFL and the Council's desired risk tolerance for each FMP separately. This option includes more explicit risk decisions and conformance to guidelines, but requires improvement of many northeast stock assessments and interaction between the SSC and the Council on policy development.

3. Develop a common approach to ABC control rules for all New England stocks. This option would provide a consistent approach among FMPs and management actions, but would be less tailored to the strengths and weaknesses of science and management situations among fisheries.

### Summary and Discussion

Currently, the NEFMC has ABC recommendations that meet the 2010-2011 deadlines for ACLs. The basis of those recommendations, and conformance to NS1 guidelines, varies among the FMPs and formal ABC control rules have not been developed for all stocks. Eventually, all FMPs will include ABC control rules that account for scientific uncertainty in the OFL and that reflect the Council's desired risk tolerance.

The scallop fishery is the most data-rich, with a Monte Carlo estimate of  $F_{MSY}$  and a stochastic projection. Based on the probability of overfishing and the projected loss in yield relative to  $F_{MSY}$ , the SSC endorsed the proposal by the scallop Plan Development Team (PDT) that the ABC be based on a 25% probability of overfishing. For 2012, the Scallop PDT is looking into whether the ABC could be based on a nominal probability of overfishing. To develop an ABC control rule that accounts for scientific uncertainty in the OFL and the Council's risk tolerance, the Scallop PDT is providing further scientific information for a more strategic decision on risk tolerance, and possibly doing management strategy evaluation to help quantify model error.

With respect to groundfish, there are retrospective inconsistencies in most of the assessments, which precludes a probabilistic approach to ABCs. In the absence of better information on an appropriate buffer between OFL and ABC, a simple ABC was applied to all groundfish stocks. Given guidance for specifying ABC as the lesser of 75%  $F_{MSY}$  or  $F_{rebuild}$ , and the definition of OY in the FMP as that associated with 75%  $F_{MSY}$ , the SSC recommended the Council consider this ABC specification be applied to all groundfish stocks. A recent benchmark assessment indicated that there is a low probability of exceeding  $F_{MSY}$  (for example, a conditional  $P^*$  for pollock is 0.10, or 10%) when 75%  $F_{MSY}$  was evaluated for its ability to avoid overfishing. Most stocks need reliable stochastic projections or management strategy

evaluations and the Council needs to make a decision on risk tolerance.

There are considerable uncertainties in the monkfish assessment model that precludes its use for determining the probability of exceeding the projected OFL. The SSC recommended an interim method for determining the ABC based on its average exploitation rate during the recent period of increase in management units and the most recent estimate of index of exploitable biomass. Currently, ABCs are recommended that are twice the 2009 landings, therefore the SSC recommended that the Council consider ACTs that allow an incremental increase in catch while monitoring stock response. While the recent exploitation rate appears to be sustainable, the probability of overfishing is not well estimated. Projections in an updated assessment indicate a low probability of overfishing in the southern area, but a high probability of overfishing in the northern area when catch equals the ABC based on a previous assessment. Information is needed, either through stochastic projections or management strategy evaluations, to develop an ABC control rule that accounts for scientific uncertainty in the OFL and the Council's risk tolerance.

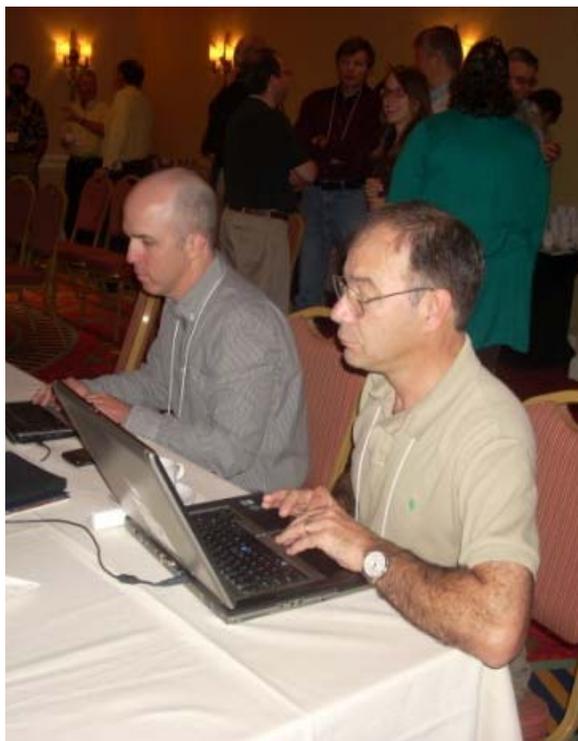
There are two target skate species and several skate bycatch species. The recent exploitation rate appears to be sustainable for most skate species. The OFL cannot be determined for skates because the overfishing reference points are survey proxies, and thus the estimates of  $F$  or  $F_{MSY}$  are not

available. Therefore the interim ABC is derived as the multispecies skate catch associated with the median of the observed series of a catch/biomass exploitation index and the most recent 3-year average of the multispecies skate survey index. The ABC is supplemented with a prohibition on possession of thorny skates. Skates have proven to be model resistant. A reliable assessment and stochastic projections are needed (or management strategy evaluation of a simple ABC control rule), as well as a decision on the risk tolerance acceptable to the Council.

With respect to herring, there are retrospective inconsistencies in the biomass estimates that are greater than the confidence limits. The ABC recommendation was initially based on the magnitude of inconsistency in exploitable biomass (40% buffer between OFL and ABC), but the Council request that the SSC consider a smaller buffer based on recent retrospective inconsistency. The interim ABC is the recent catch, but the time period for the catch depends on the Council's risk tolerance. The stock complex does not appear to be overfished and overfishing does not appear to be occurring. It would not be appropriate at this time to allow catches to increase due to uncertainties. A benchmark assessment is scheduled for 2012, including a management strategy evaluation. In addition to a reliable assessment, a decision on risk tolerance is needed by the Council.

Deep sea red crab has an MSY that was initially approximated from a

depletion-adjusted average catch model and the OFL is equal to the MSY proxy. ABC equals the recent catch, which equals 70% OFL. However, the model underestimates MSY, therefore the information available for red crab is insufficient to estimate MSY or OFL. In lieu of an OFL estimate, the SSC recommended an interim ABC based on the long-term average landings of males, which is the same result provided by the Depletion Adjusted Average Catch model assuming no depletion, as corroborated by two survey estimates, and is safely below an overfishing threshold. Additionally, the SSC concluded the interim ABC accounts for scientific uncertainty. In the future, a reliable assessment and stochastic projections are needed, as well as a risk tolerance decision by the Council.



There are strategic options for ABCs, including continuing to provide ABC recommendations for each management action, working with PDTs and the Council to develop ABC control rules that account for scientific uncertainty in OFL and the Council's risk tolerance for each FMP separately, or develop a common approach to ABC control rules for all New England FMPs. While the first option is responsive to Council needs, the fishery, and resource conditions, it may lead to inconsistencies among FMPs and management actions. The second approach has more explicit risk and better conformance to the guidelines, but requires scientific and policy development. The third approach provides consistency across FMPs and management actions, but is less tailored to the strengths and weaknesses of science and management situations.

It was pointed out that the third strategic option could be tailored to specific life histories of the various species instead of being completely uniform. The SSC representative



was asked why the SSC asked the Council to select the years of herring landings upon which to base the ABC control rule. It was clarified that the NEFMC did not choose the particular years, but instead chose to base the ABC control rule on 1-year, 3-year, or 5-year averages.

### **General discussion about ABC control rule implementation and application**

The group agreed that characterizing a stock as “data poor” does not mean nothing is known about the stock, or stock complex. In many instances such stocks have not been formally assessed, or the models and decisions used to develop their assessments may include assumptions of important characteristics.

It was suggested that the next important step to take in the development and evaluation of the control rule process is to address what happens when the decisions are wrong. For example, if a large, valuable fishery is affected by a bycatch species, greater attention may need to be given to the control rule of the smaller species. A scenario was put forth in which a large fishery could be shut down because a lesser species associated with it has a limiting catch allowance. In such instances, the decision may be put back before the Councils and Science Centers to revisit the assessments and control rules.

The hope is that data poor stocks will increase in priority,

thus moving many of them to a higher tier. It was suggested that actions should be tied to investing in data to determine the control rules in a tandem process with data collection.

It was also pointed out that the P\* approach is the most fully developed aspect in most of the tiered approaches as described. This method has received the most attention, but, overall, few stocks fit that approach. There needs to be more scientific investment in the intermediate and lower tiers. It was also noted that SSCs must find ways to advise Councils and the National policy makers that annual catch limits may not be the best way to manage stocks when there is difficulty measuring catch.

Overall, the Councils and SSCs have made considerable progress in

developing control rules. There are a lot of commonalities in the approaches being considered despite progress taking place simultaneously by eight separate Councils. Most Control Rules involve some type of a tiered approach that recognizes varying levels of assessments and data availability. The top tiers, representing the most data-rich stocks, typically include a statistical model addressing key uncertainties that provide a probabilistic evaluation of overfishing that can be selected by the Council. Tiers then move through the varying categories of data poor and unassessed stocks, ending with those situations for which the only information may be catch and the SSC may be forced to apply a large degree of expert judgment.



## NMFS ABC Working Group

Dr. Rick Methot provided an update on the ABC working group that was established to develop protocol recommendations for implementing National Standard 1 (NS1). The ABC working group consisted of representatives of each Science Center, including several who also serve on SSCs. The group compared and contrasted documents from each Council's SSC. A summary report will be completed in the next year and will complement the National SSC reports.

## NMFS Reports on National Standards

*Presenter – Rick Methot*

A working group is currently in the process of revising the National Standard 2 (NS2) guidelines. Guidance is needed about what constitutes Best Scientific Information Available (BSIA), peer review standards, and the role of the SSC with respect to peer review. The proposed rule was made available for comment in December 2009. Comments received throughout the spring were addressed in an August 2010 workgroup meeting and responses to comments are currently being drafted. The goal is to publish the revised NS2 guidelines as early as possible in 2011.

The National Research Council style of guidance will be used in developing the new NS2 guidelines. Based on public comment there is no objection to clarifying what BSIA means with respect to fishery management. Most comments received were against using an overly prescriptive approach to defining BSIA, suggesting that the science behind fisheries is very dynamic, and BSIA needs to be flexible, particularly when identifying 'best' and 'available' science in data poor situations. The public comments received also asked for clarification on the relevance of proxies in data limited situations, encouraged transparency of the process by which BSIA was determined, and also raised the issue of not losing local knowledge when determining BSIA.

A second major category in the NS2 revisions was in regards to peer review standards. The Information Quality Act states a need to enhance quality and credibility of scientific information. Peer review criteria are



not presently discussed in NS2. Advance Notice of Public Rule Making (ANPR) suggested that NS2 should not create a new peer review system, but should maintain flexibility and allow existing peer review processes (SARC, SEDAR, etc.) to be used. The recommendation was for NS2 to include clarification of uses of internal vs. external peer reviews for ‘highly influential’ assessments; ‘highly influential’ was a threshold for how extensive and external peer review needed to be.

Comments on the proposed guidelines showed continued support for optional peer review as stated in MSRA and strong support for existing peer review processes to be used in this regard. There was both support and disagreement for inclusion of OMB guidelines into the NS2, and requests for clarification on when and why science should be peer reviewed. Clarification was also requested on whether review was of the science or of the policies based on the science, and on avoiding duplicative reviews (i.e. review by SSC relative to review by another review body).

The third major category addressed in the revised NS2 is the role of the SSC in the review process. Current National Standards say the secretary shall establish advisory guidelines, and the MSA defines that the regional management Councils shall establish and appoint an SSC to assist in the development, collection, evaluation, and peer review of the scientific advice given to each Council. ANPR took up this issue of providing clarification of the role of

the SSC and recommended that the guidelines support the existing SSC role, maintain the SSCs, and not create a new body that would supplant the SSC as the Council’s advisory committee. Comments were received suggesting that the SSC should assist in the NMFS peer review. Comments also supported and disagreed with the idea that the SSC itself meet the OMB peer review standards. Further comments were received about conflicts of interest and bias in the SSC and on what happens when there is disagreement between SSC and external peer review findings.

The final main category addressed in the NS2 revision is Stock Assessment and Fishery Evaluation (SAFE) reports. The Councils get a summary of the science information going into their fishery management plans. The Secretary has the responsibility to ensure that a SAFE report or similar document is prepared, reviewed annually, and changed as necessary for each FMP. The SAFE report provides information to the Council and it must be scientifically based. These aspects of the MSA have been in place for a while. The ANPR highlights on the SAFE report recommend maintaining the existing language of the SAFE report. Comments suggested that there was a need for SAFE reports, that NS2 should provide standards for SAFE reports, and that the SAFE reports should have a certain amount of transparency and availability. Clarification was requested on who is responsible for the development of SAFE reports, particularly since they

are not consistently produced in all regions.

### Discussion

There was a question about whether there was resistance at NOAA Headquarters in moving NS2 guidelines along or if the working group was just stuck and not moving along as fast as it should be. The response was that there is no resistance; the delay in releasing NS2 guidelines is a work load issue. Staff were pulled off the NS2 project to work on the Deepwater Horizon event, and there was acknowledgement that it is time consuming to work through all of the comments.

Another panelist wanted more information about the interaction between SSCs and the review bodies (SARC, SEDAR, etc), and asked Methot to compare and contrast the ownership of the review process relative to ownership of review details (the task of writing TORs, assigning chairs, etc) for the different review bodies. It was reported that the various review bodies are similar in concept, but not identical. For instance, SEDAR and STAR are similar in that they operate somewhat independent of the Science Centers, while SARC is run by the Northeast Fisheries Science Center under direction of the Northeast Regional Coordinating Committee. SEDAR has a dedicated office operated by the SAFMC, whereas STAR is guided principally by the PFMC's SSC in coordination with the NW and SW Science Centers. All review bodies

ultimately work in the interface between their regional Science Centers and Council.

It was noted by a panelist that a lot of discussion has been on biological science, but there's a new trend towards more socioeconomic analyses and a need to review this information. The panelist wanted to know if other SSCs are facing the same issue and what the group thought about the present or future level of peer review required of socioeconomic advice.

The response was that the SSCs advise Councils regarding BSIA. A broader issue is what needs to be peer reviewed and to what degree is every aspect of science used in a management action in need of an explicit statement that this is BSIA. Each SSC likely takes up socioeconomic issues to different degrees, based on workload. Assessments and control rules move from science into a number for management; it was recognized that adding socioeconomic analyses to management makes review expectations of that information go up. At the Pacific Council items



come on the agenda that contain socioeconomic analysis, but the SSC tends to focus on the assessment perspective. One thing the Pacific SSC has discussed is splitting the agenda to make sure that when analyses of both types appear that they both get addressed as separate agenda items. The Pacific SSC has been working to improve the delivery of socioeconomic information. One challenge is ensuring that SSCs have people equipped to review the analyses. It was recognized that it may be difficult to find independent reviewers for some SSCs because the economists on the SSC are from the NOAA and are the same people who write the analyses.

A panelist noted that when SEDAR began there was discussion of bringing socioeconomic analyses into the assessments. Despite the intention, it became apparent that the timing of economic analyses differs from that of assessments and economic data offers considerable challenges even when compared to the issues with catch and biological data. Making progress on integrating the two areas has proven difficult.

The South Atlantic SSC once separated SSC members into distinct socioeconomic and biological sub-groups that met separately during SSC meetings and then came together for final resolution and recommendation. This approach allowed each group to hold detailed discussions, but resulted in logistical challenges for staff and presenters, and longer meetings because the sub-groups discussed issues individually and then rehashed much of the discussion once both convened

together. The sub-group approach was abandoned in favor of a single SSC. However, the need for detailed review of social and economic data by experts in those fields led the Council to revive a Socioeconomic Panel recently, as an advisory committee reporting to the SSC.

There was a discussion about the need for SSCs and other groups to trust other committees, panels, and sub-groups to have the expertise to conduct a thorough review of analyses, and to build on the efforts of such groups, because “if we don’t delegate, we’ll never succeed”. Methot suggested that we need to build processes that can build upon each other and expect or require SSCs to exhaustively review analyses and documents that have already received extensive review by other bodies. It was acknowledged that getting to the necessary level of trust will require time, effort, and experience.

Application of NS2 guidelines to the NMFS Highly Migratory Species (HMS) Division was questioned, with regard to peer review requirements in general and for shark assessments in particular. HMS



management is complicated by the international exemption of many of the species. SEDAR and the SEFSC are working together to discuss the peer review issue because HMS does not have an SSC. In some areas, such as the west coast, highly migratory species are under Council jurisdiction.

## Report of the *ad hoc* Data Poor Workgroup "ORCS"

*Presenter – Jim Berkson*

In 2009 following the 2<sup>nd</sup> National SSC meeting in St. Thomas, USVI, a working group was established to develop recommendations and best practices for dealing with data-poor species. The working group includes members from seven of the eight SSCs, five of the six Science Centers, NOAA Headquarters, one Council, academia, state/territorial fisheries, and one NGO. Jim Berkson gave a short presentation on the progress made to date.

ORCS stands for 'Only Reliable Catch Stocks' and refers to stocks where reliable catch is all that is available. Some stocks may have biological information such as M or age at maturation. Measures such as CPUE or age at length are not available for these stocks, thus they cannot be assessed by common assessment models. Despite the lack of data, these stocks are not exempt

from having ABCs specified unless they are ecosystem components.

There are two primary challenges in ORCS; determining overfishing limits or proxies and characterizing scientific uncertainty in OFL to come up with an ABC recommendation. The workgroup recognized that a precautionary approach would be to have larger buffers for unassessed stocks than for assessed stocks.

The workgroup identified the Restrepo et al. (1998) paper as commonly used guidance for data poor species. This method uses a scalar that is dependent on stock status. Average landings are calculated from a time when a stock was not in decline then a scalar is applied. If the stock is above MSY the scalar should be 0.75. For stocks between MSST and  $B_{MSY}$  the scalar should be 0.5. If the stock is below MSST (thus overfished) then the scalar should be 0.25. The status of the stock and the time period from which to draw the average landings are both determined by informed



judgment. It appeared to the workgroup that sometimes the ‘Restrepo method’ was used without proper attention to the stock status and to the time period for calculating average catch, ignoring the scientific basis for the approach.

The workgroup reviewed current approaches and looked at regions across the world to see how they were dealing with ORCS. Many proposed approaches used PSA-type analyses, and there was also frequent use of depletion corrected average catch (DCAC) and depletion-based stock reduction analysis (DBSRA) methods. PSA analysis uses multiple indicators of productivity and susceptibility to suggest appropriate buffers for ABC, or on how to modify a scalar based on PSA results.

The DCAC method is gaining favor; it allows for changing population abundance during the period when the catches are obtained. DCAC requires average catch, an estimate of  $M$ , an estimate of the ratio of  $F_{MSY}$  to  $M$  and an approximate estimate of depletion. Monte Carlo simulations provide estimates of precision. One drawback to DCAC is that it is only appropriate for stocks with moderate to low  $M$  ( $M \leq 0.2$ ).

Depletion based stock reduction analysis (DBSRA) is another method the workgroup frequently encountered. DBSRA is an extension of DCAC that incorporates full

stock dynamics; the method relies on specifying a plausible range of production parameters and depletion levels in the form of prior distributions. However, DBSRA requires a comprehensive catch history, which may be lacking for many data-poor stocks. There is an updated version of DBSRA that is bias corrected.

The concept of stock complexes was another topic the working group

### Depletion-Based Stock-Reduction Analysis

- Extension of Depletion-Corrected Average Catch that incorporates full stock dynamics.
- Relies on specifying a plausible range of production parameters and depletion levels in the form of prior distributions.
- Requires a comprehensive catch history.

$$B_t = B_{t-1} + P(B_{t-a}) - C_{t-1}$$

### Depletion-Corrected Average Catch

- Allows for changing population abundance during the period when catches are obtained.
- Requires an average catch, estimate of natural mortality, estimate of the ratio of  $F_{MSY}:M$ , and an approximate estimate of depletion.
- Monte Carlo simulations provide precision.
- Only appropriate for stocks with moderate to low values of  $M$  ( $\leq 0.2$ /year).

$$DCAC = \frac{\sum_{t=1}^{t=n} C_t}{n + [(B_0 - B_t)/(0.2B_0M)]}$$

discussed. The group thought that stock complexes may be a useful tool but stressed that the groupings must be appropriate for them to work. OFLs and ABCs for stock complexes could be based on indicator species or the complex as a whole and average catch methods could be used (i.e. scalar type approaches) for the complexes. The group highlights that the most vulnerable species in the complex cannot be lost in the process.

The workgroup noted that the collection and compilation of historical catch data serves an important purpose, even if it cannot be used for a traditional assessment model. With historical data you can use a DBSRA approach, so the effort of gathering this info is not wasted. The collection and incorporation of biological information is also beneficial because it can go into PSA-type analyses.

One of the things the group hasn't resolved is whether these methods discussed so far result in an ABC or an ACL. DCAC and DBSRA both result in distributions around OFL and then asks managers to select a P\*. But, how do SSCs bring in risk with the scalar approach? Is the output an ABC or an ACL if you're multiplying average catch times a scalar? How do you separate the role of the SSC from the role of the Councils? The workgroup has not come up with concrete recommendations and input is welcome.

In summary, the workgroup identified a lot of potential options for setting ABCs for ORCS. With

all of the methods discussed, it was clear that informed judgment becomes necessary in every approach; you cannot get away from subjective decisions when it comes to ORCS. There are choices about which factors you will be required to make informed judgments and how many informed judgments you wish to make. The methods used for ORCS are currently in flux and are continuing to be developed, documented and reviewed.

The workgroup recommendations are not finalized, and there was the recognition that the group is struggling to agree on any recommendations. The current recommendation was that ABC for ORCS should be based on tiers of information. Tier 1 is to do an assessment if possible. Tier 2, DBSRA (preferably with bias correction) should be used if you have catch history. Tier 3 is used if a series of catch and a perception of depletion are available, use DCAC as a provisional basis for ABC; OFL would be unknown. If you know something about vulnerability this may also help you do a DCAC. Finally, Tier 4, calculate an ABC based on a proportion of catch. It was noted that Tier 4 was the tier that has been giving the workgroup the most trouble.

During the National SSC meeting, members of the ORCS working group met to discuss preparation of the ORCS Report. It was decided that a full report draft will be ready for the SSC workshop to review in 2011.



NMFS-SWFSC-460) will be available. It describes the application of DBSRA (the bias corrected version) to 45 groundfish stocks. There is also a manuscript in preparation that compares the application of the DBSRA method for 27 data rich stocks.

The DBSRA technique produces an estimate of OFL through a Monte Carlo sort of process, resulting in an OFL distribution. The OFL distribution is predicated on priors for input parameters. The one parameter going into the assessment that a lot of

people struggle with is the depletion estimate – i.e. what is the status of the stock. You need to make this assumption and it was pointed out that this assumption is also part of the Restrepo method so this isn't new and people shouldn't shy away from making it. You don't need a tight estimate; the depletion estimate could be a diffuse, uninformative prior. Given this input you end up with a posterior distribution from the Monte Carlo that gives you a PDF of the OFL values and in principle you could use that in a P\* approach. In the Pacific Council they didn't do that, they adopted the quadruple sigma value for data poor stocks. However the panelist encouraged the group to think about using the DBSRA method.

One panelist noted that additional assessment techniques have been developed that were not discussed by the ORCS group. Clay Porch's catch

### Discussion

A panelist began by clarifying that the original intent of Restrepo et al. (1998) was for scientists to pursue analyses that are specific to each FMP and build upon the general guidelines provided. However, the authors also recognized that time was short and offered an alternative option to use until the required analyses could get done. Restrepo et al. was offered as a way forward, not the way forward forever. In the twelve years that have passed, temporary approaches or 'rules of thumb' proposed have become fixtures. It was also noted that the simulation studies used in the report were not related to data poor stocks.

Clarification on the DBSRA was provided. A technical memorandum "Estimates of sustainable yield for 50 data-poor stocks in the Pacific coast groundfish fishery management plan" (NOAA-TM-

free method relies on trends in CPUE without requiring full catch information, and is similar to DBSRA. The ORCS group has not evaluated the Porch catch free approach. It was considered beyond the group's charge, which was looking at catch only stocks, not stocks with CPUE information or without catch.

There was a comment that in the past there was reliance on average catch as a metric for determining OYs for a large number of species on the west coast. Averages were calculated from periods generally in the late 1980s and early 1990s when catches were not really constrained by an appropriate understanding of stock productivity. The commenter noted that using half of the average landings was often more consistent with the ABCs that we currently recommend for data rich stocks. This may be an approach that could be used today, with the acknowledgement that it may be specific to local regions. Using data poor techniques on data rich stocks and comparing the results was noted as a research recommendation of the ORCS workgroup.

A panelist questioned what was meant by a 'scientific opinion' and at what point does a 'scientific opinion' just become an opinion? There are a lot of assumptions in fisheries and either the fishermen or the Councils should be the ones making these assumptions because that's where the responsibility lies. Perhaps the

question should not be what is the best estimate of OFL, but what is the best probability of not overfishing to use? The panelist thought that there needs to be shared responsibility for these decisions with the Councils.

Another topic of discussion was the role of the Council vs. the SSC when using a scalar approach based on average landings. Does the scalar approach give an ABC or an ACL or something else and how does the council evaluate risk when using that approach? A response was that you need to be clear when you look back at historical catch. Are historical catch levels a limit, a target, or a starting point that can increase, and can local knowledge help inform the decision? Knowing this will help decide whether historical averages represent an OFL or ABC. It must be a partnership of scientists and local fishermen when making these determinations based on historical data. Scientists can draw on knowledge from other areas and parallels.

A panelist noted that the MAFMC SSC is struggling with consistency between control rule levels when there isn't the same information available for the different levels. The MAFMC would like a consistent probability of overfishing regardless of the level of information that is available. It was acknowledged that no one rule will fit all because Councils each have different tolerances of risk.

## Peer Review Process

### Regional Peer Review Program Reports

The 2010 National SSC workshop included an exchange of information about the peer review programs used by the different regions. Four peer review programs have been developed and are used by a subset of regional Councils. The North Pacific Council uses an integrated peer review process that combines plan teams and their SSC. A representative of each peer review program presented an overview of the review procedures and policies.

- SARC (Stock Assessment Review Committee) is used in New England and the Mid Atlantic.
- SEDAR (SouthEast Data, Assessment, and Review) is used in the Gulf of Mexico, South Atlantic, and Caribbean.
- STAR (Stock Assessment Review) is used by the Pacific region.
- WPSAR (Western Pacific Stock Assessment Review) is the peer review body for the Western Pacific.

Following the presentations on each peer review program, an SSC representative discussed the role of the SSC in that Region's peer review program. The SSC presentation focused on the role of the SSC in peer review programs, how assessment findings were received,

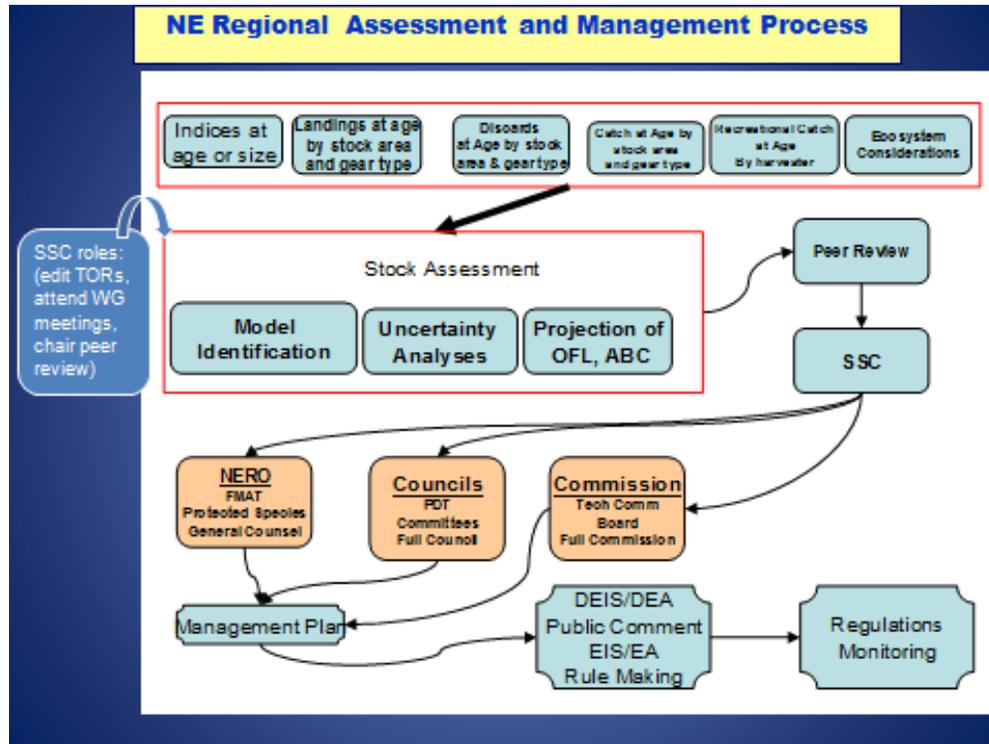
and criteria for deviation from the assessment or rejection of the assessment.

### *SARC – Stock Assessment Review Committee*

Presenter – Jim Weinberg

This presentation summarized: 1) history of the fishery stock assessment review process at the NEFSC, 2) administration of the process, 3) how the process works, 4) what it provides, 5) what roles SSC members fill, and 6) how it feeds into the Council system. The Stock Assessment Workshop/Stock Assessment Review Committee (SAW/SARC) is the primary formal scientific process for benchmark stock assessment preparation, peer review, and presentation of results to fishery managers in the NE region. The SAW/SARC, which is run by the NEFSC, began in 1985 and there have been over 50 SARCs. The US-Canada Transboundary Resources Assessment Committee (TRAC) is similar in purpose to the SAW/SARC, but is only applied to





certain shared U.S.-Canada resources. Other review processes in the NE region have included the Groundfish Assessment Review Meeting(s), and Data Poor Stocks Working Group. The Northeast Regional Coordinating Committee and US-Canada Transboundary Management Guidance Committee oversee the SAW/SARC and TRAC, respectively. The SAW/SARC is a sequential peer review with independent external reviewers from the Center for Independent Experts and sometimes from the Mid-Atlantic (MAFMC) and New England (NEFMC) Fishery Councils' Scientific and Statistical Committees (SSC). The TRAC, on the other hand, is an integrative peer review. Both review processes produce scientific reports, which are then used for making stock status determinations for US fish stocks. In addition to detailed assessment

reports, each SARC produces several reviewer reports which describe whether the science is acceptable as a basis for crafting management advice. SSC members often attend SAW Working Group meetings to observe and become familiar with the assessments, and SSC members participate as members or chairs of SARC review panels. The SSC evaluates peer reviewed products generated by the SAW/SARC, TRAC, etc. SSCs may also be tasked by their Councils to reconsider peer reviewed analyses. Based on peer reviewed stock assessments, the SSCs make ABC recommendations to the MAFMC and NEFMC.

### Discussion

Discussion began with a reminder that the original SAW/SARC format did not include the SSC in the



process. The SSC now plays more of a role. There also was a conscious decision to move away from requiring the SAW/SARC process to provide management advice in order to separate management and policy from science. Emphasis in the SAW/SARC process is on providing scientific advice only. New requirements of the MSRA are placing new burdens on stock assessment scientists to produce more assessments with static resources.

The Northeast region is considering modifying the current SAW/SARC process to meet the increased demands for scientific advice as a result of MSRA. Two separate assessment tracks are being considered – an operational track to provide the scientific information necessary to set ACLs and ABCs and a research track to develop new methods or models within existing (operational) or new stock assessments.

A representative from the Southeast asked how other Regions deal with the peer review of regulatory

analyses contained in specification packages. In response, the issue is handled differently by the Mid Atlantic and New England Councils. Analytical work is most often done by NEFSC staff in conjunction with the PDTs or staff. The New England Council requests participation and analyses from NEFSC scientists in the areas of biology, economics, and sociology. The MAFMC convenes Fishery Management Action Teams for FMPs, regulatory amendments, and framework amendments (NEFSC scientists participate at this level).

Peer review of management actions to achieve ABC, and post-season evaluation of actions was also questioned. Several participants commented that this is the responsibility of the SSCs. In the Pacific region, management teams do the analyses and the SSC might review these analyses but not to any great extent. In the case of HMS, OMB determines if the level of an action is significant enough to warrant peer review of the action. If the answer is yes, then the Science Centers and outside reviewers participate in the review. The North Pacific SSC gets heavily involved in review of all Council documents including EAs, RIRs, and IRFA analyses. The group generally agreed that analyses of many Council management actions are not currently undergoing outside peer review, and probably should be, but time and manpower resources prohibit extensive review in many cases.

## ***New England SSC role in SARC***

Presenter – Steve Cadrin

The New England SSC interacts with the regional peer review process in several ways. The SSC has input to generic and specific terms of reference for peer reviews, has members participate in peer reviews, and is involved in developing an operational approach to supporting requirements of the ACL management strategy.

In coordination with the Northeast Fisheries Science Center and the Mid Atlantic SSC, the New England SSC helped to develop generic terms of reference for northeast peer reviews. In addition to the traditional terms of reference for updating surveys and survey data, estimating stock size and fishing mortality, evaluating reference points, determining stock status and example projections, revised terms of reference include:

*“Develop and apply analytical approaches and data that can be used for conducting single and multi-year stock projections and for computing candidate ABCs. a) Provide numerical short-term projections (3 years). Each projection should estimate and report annual probabilities of exceeding threshold reference points for F, and probabilities of falling below threshold reference points for biomass. In carrying out projections, consider a range of assumptions about the most important uncertainties in the assessment (e.g., terminal year abundance, variability in recruitment). b) Comment on*

*which projections seem most realistic, taking into consideration uncertainties in the assessment. c) Describe this stock’s vulnerability to becoming overfished, and how this could affect the choice of ABC.”*

During the planning stage of each peer review, the New England SSC also has input to specific terms of reference to address previous issues in ABC recommendations. SSC members participate in all peer reviews of New England stocks. SSC members chair the Stock Assessment Review Committee (SARC) and serve as members on the Transboundary Resources Assessment Committee (TRAC).

The New England SSC also provides technical review of information that is not a product of the official peer review process. For example, the SSC served as a peer review at several stages of the development of swept-area seabed impact analysis for the habitat plan. The SSC is working with the New England Council to develop and implement an ecosystem-based fishery management plan. The SSC has also provided peer reviews for socioeconomic analyses and various analyses to support management actions for FMP specifications. Over the last two years, New England SSC members have been involved in a working group to develop an operational approach to supporting ACL requirements.

ABC recommendations for each fishery management plan illustrate information provided to the SSC from the regional peer review

process as well as information that is developed by Plan Development Teams (PDT) and peer reviewed by the SSC.

- The pollock assessment was developed through SARC 50. The SARC determined stock status (i.e., overfishing? overfished?), provided example projections ( $F_{40\%MSP}$ ,  $75\%F_{MSY}$  proxy,  $F_{status\ quo}$ ), and described or quantified uncertainties in the assessment. After the SARC, the PDT produced F-based projections with alternative 2010 catch assumptions, catch-based projections, probability analyses (e.g., probability of  $F > F_{40\%}$ ), alternative risks requested by the Council and sensitivity analyses under different selectivity assumptions.
- An assessment of sea scallop was also developed by SARC 50 that determined stock status, provided example projections with spatially varying F, and described or quantified uncertainties. After the SARC, the PDT updated the stock assessment with 2010 catch and survey data, and provided revised projections and risk analyses.
- Monkfish was also assessed by SARC 50. The SARC determined stock status, provided example projections ( $F_{status\ quo}$ ), and described uncertainties in the assessment. The PDT calculated OFL ( $\mu_{max} \times$

2010  $B_{exp}$ ) and ABC ( $\mu_{ABC} \times 2010 B_{exp}$ ) and provided stochastic projections and probability analyses.

- Georges Bank Yellowtail Flounder was assessed by the 2010 TRAC to update stock status, provide catch projections, and evaluate uncertainties. The PDT provided revised projections to evaluate alternative rebuilding scenarios (Figure 1).
- Atlantic Herring were assessed by the 2009 TRAC, but stock status was 'unknown' and uncertainties were described. The PDT evaluated alternative ABC methods, updated fishery and survey data and provided ABC calculations.
- Skates were last assessed by the Data Poor Stocks Working Group in 2007. The Working Group determined stock status and described uncertainties. The PDT evaluated alternative ABC methods, updated fishery and

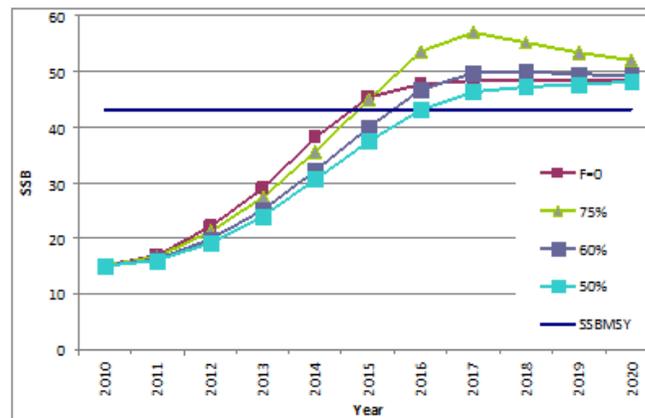


Figure 1. Projected spawning biomass of Georges bank yellowtail flounder under different rebuilding scenarios (no fishing, 50%, 60% and 75% probability of rebuilding by 2016 (from the Groundfish Plan Development Team).

survey data and provided ABC calculations.

- Deep-Sea Red Crab were also assessed by the 2007 Data Poor Stocks Working Group, but stock status was ‘unknown’ and uncertainties were described. The PDT evaluated alternative ABC methods and provided ABC calculations.

Some aspects of the Northeast peer review process present difficulties for ABC recommendations. Recent peer reviews provided inconsistent decisions among peer review panels with respect to providing information from assessments with retrospective patterns, assessment of data-poor stocks, problematic assessments and model error. External reviewers are not as accountable for implications of decisions, and there is not always a comprehensive understanding of the OFL-ABC-ACL-ACT system. There is also a need for formal peer reviews of topics beyond stock assessments (e.g., socioeconomics,

habitat, ecosystems).

In summary, the primary information needed by the New England SSC is provided by the official peer review process (e.g., stock status, OFL projections, and associated uncertainties). However, workloads and timeliness preclude formal peer review of all information needed for management. Therefore, some of the essential information needed for ABC recommendations is provided by PDTs, with peer review by the SSC. The extent of information provided after the peer review varies from plan to plan; some only require updated projections, but other are much more extensive, including updated assessments and reference point estimation.

### Discussion

Clarification was requested on membership of PDTs and the overall process. PDTs are populated by personnel from the states, Council staff, NEFSC and the Regional Office. PDTs conduct post-assessment analyses without major revisions to the assessment methodology. They are able to build on the assessment and its output, but must stay within the bounds of the peer reviewed science. The process needs to allow for some flexibility (to allow for re-allocation among fleets for example). Timing often becomes an issue, as the assessment scientists may begin to move on to other projects as the PDT receives assessment findings and begins its process.



## *Mid-Atlantic SSC role in SARC*

Presenter – John Boreman

Members of the MAFMC SSC are fully engaged in the SAW/SARC process. SSC members are designated as leads or alternate leads for each species under the MAFMC's purview. The species leads (or their alternates) are expected to participate as observers in the SAWs and SARCs for their respective species, and SSC members may also serve on the SARC review panel, or even chair it. There may be a conflict of interest (real or perceived) if SSC members actively participate in the SAW/SARC process and then assist the other SSC members in specifying an ABC based on the results of that process, but the MAFMC considers such a conflict negligible as long as the extent of the SSC member's participation is recognized.

Any assessment information that is to be used by the SSC for setting its ABC recommendation must be submitted to the SSC at least 15 working days before its decision-making meeting. Between the submittal of the information and the meeting (usually within 10 working days of the meeting) a webinar is conducted during which the SSC members have a chance to discuss the assessment information with the lead assessment scientist(s) from NOAA Fisheries and the states. Information submitted less than 15 working days before the decision-making meeting may be considered "unavailable" for the purposes of setting an ABC, since the SSC members may not have been given

sufficient time to evaluate its content before deliberations.

The SSC members may or may not use the biological reference points and estimate of the overfishing limit (OFL) and its uncertainty presented in the assessment. If the SSC selects an alternative OFL, a justification for not selecting the value provided in the assessment must be provided.

The MAFMC SSC is also involved in the SAW/SARC process through drafting of a statement of research and monitoring needs for each of the MAFMC-managed species, which is updated annually. The SSC also includes advice on research and monitoring needs in its ABC recommendations to the MAFMC. The SSC provides advice to the Northeast Region Coordinating Committee on the scheduling of future benchmark assessments for species under the MAFMC's management purview.





relative to the consideration of new data.

The need for greater evaluation of model error in assessments was identified. Particular attention needs to be paid to determining if significant scientific progress has been made before a new benchmark assessment is scheduled. Assessment models are highly complex and we need to get the model right before we embark on routine activities.

### Discussion

The issue was raised of how to deal with new information regarding stock assessments if it becomes available to the SSC after the review process. The MAFMC SSC recently adopted new SOPPs which stipulate that any information to be reviewed by the SSC in making an ABC determination must be received by the SSC 15 working days in advance of the SSC meeting. A situation was described in the Gulf of Mexico where there were significant delays between when an assessment was completed and when it was presented to the SSC, and as a result two years of discard data became available. The Council remanded the ABC recommendation back to the SSC to consider the new information, which led to a revised assessment incorporating the new information. It was suggested that such circumstances will continue, and at some point the SSC must draw a line

Some regions noted a need to clearly define, and possibly update, the language describing assessment types. There is talk of routine updates and benchmarks, and an implied difference, but in fact, assessment updates have become very time consuming and require significant resources. A major issue that needs to be addressed is the degree to which changes can be made in an update before independent peer review becomes necessary.

There was general discussion about the need for the SSCs to coordinate and develop research needs and priorities for the Councils. Longer term research needs are described in the Council's five year research plans but these plans may not address immediate research needs. Another issue is the receipt of new data after an assessment is well under way.

## *SEDAR – SouthEast Data, Assessment, and Review*

Presenter – John Carmichael

SouthEast Data, Assessment, and Review (SEDAR) is a cooperative Fishery Management Council process initiated in 2002 to improve the quality and reliability of assessments of fishery resources in the southeastern United States, including the South Atlantic, Gulf of Mexico and US Caribbean. SEDAR is managed cooperatively by the three Regional Fishery Management Councils in the Southeast (Caribbean, Gulf and South Atlantic); NOAA Fisheries Southeast Regional Office, Southeast Fisheries Science Center, Highly Migratory Species Division; and the Gulf and Atlantic States Marine Fisheries Commissions.

SEDAR was designed to improve the quality and reliability of stock assessments, improve the quantitative basis of fishery management actions, increase the relevance of research and monitoring programs in the Southeast Region, and provide independent peer reviews of fisheries assessments. SEDAR intends to provide the best available science for use by each partner in developing management actions. Key components are a multi-step workshop-based approach, increased constituent and stakeholder participation at each step, and a rigorous and independent scientific review of completed stock assessments.

SEDAR stock assessments are prepared through a process

consisting of three separate and sequential workshops:

- 1) The Data Workshop – involves the assembly and review of all available fishery data and life history information, resulting in consensus databases to be used in stock assessments. Analytical techniques and models appropriate for the available data are also suggested.
- 2) The Assessment Workshop – data compiled by the Data Workshop are used with population dynamics modeling techniques to determine the status of stocks, estimate population parameters, and predict future conditions.
- 3) Review Workshop – a rigorous review of the stock assessment by independent peers, including representatives of the CIE and Council SSCs.

Oversight and management is provided by a Steering Committee composed of representatives from



each Partner. This Committee primarily determines how the process operates and what stocks will be assessed. As SEDAR is ultimately a Council process, meetings and operations are handled similar to other Council procedures and SEDAR is governed by the administrative rules and requirements that influence other Council activities.

SSCs also play a key role in SEDAR, from the planning to development of final recommendations. SSCs are involved in development of assessment Terms of Reference and identification of data sources and research findings. SSC members are important participants at all three workshops, with the SSC providing a chair for the review workshop. Final assessment reports are provided to the SSC for consideration as adequate for use in management and to support their fishing level recommendations.

### Discussion

Comparisons were made between the SEDAR approach and the SAW/SARC of the Northeast. It was noted that SEDAR was initially modeled after the SAW/SARC, and has evolved over time to best address the circumstances in the Southeast. A possible criticism of the 3-step process is that documentation becomes very burdensome as each group adds content. Assessment reports often become hundreds of pages. SEDAR hopes to streamline the process over time, and expects this will happen as more stocks are put through their first benchmarks.



Clarification was requested on the source of outside experts for SEDAR. Independent or outside experts are currently brought in at each step of the SEDAR process (at the data, assessment, and review workshops). These individuals are provided by the CIE and serve as reviewers. Other outside experts who can take a more active role in the process can also be included, and may be appointed by either a Council or the agency. One of the limitations is finding skilled individuals with the time and interest to participate given that resources do not exist to compensate them for their efforts. SEDAR would like to find a way to get the CIE reviewers more involved in the assessment process and to ensure that reports are provided in time for consideration at the appropriate steps in the process.

It was noted that outside reviewers can add a lot of value to an assessment process. Engagement of the industry at the data workshop phase is appropriate and useful. There is a need to match expertise of participants for each stage of the process.

## *Caribbean, Gulf of Mexico and South Atlantic SSC roles in SEDAR*

Presenter – Luiz Barbieri

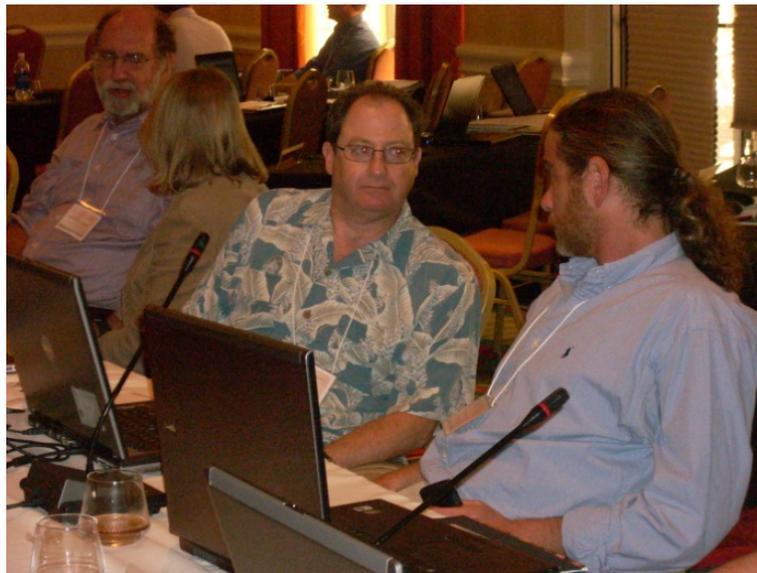
SouthEast Data Assessment and Review (SEDAR) represents the regional stock assessment and peer review process in the southeastern United States, including the South Atlantic, Gulf of Mexico and US Caribbean. SSCs play a key role in SEDAR, from process and planning input—which allows for expanded SSC feedback into the program—to development of final recommendations. SSCs review the SEDAR schedule and suggest species for assessment, participate in the development of assessment Terms of Reference (including evaluation of necessary reference points and uncertainty characterization), and help identify relevant data sources and research findings. SSC members are also important participants at all three SEDAR workshops (Data, Assessment, and Review workshops). For benchmark assessments SSC members participate in Data and Assessment workshops and provide a Chair for the Review workshop. SSCs play an even bigger role in update assessments, being responsible for the Assessment Panel (one SSC member serves as Panel Chair and 3-4 additional members participate in the panel) as well as having sole

responsibility for assessment review (i.e., no CIE participation). Final assessment reports (for both benchmark and update assessments) are provided to the SSC for consideration of adequacy for use in management and to support their fishing level recommendations. As part of this process SSCs may deal with unresolved data or analytical problems and request additional projections, additional sensitivity analyses, or more detailed uncertainty evaluation.

### Discussion

Responsibilities of the South Atlantic SSC were described, including reviewing the SEDAR schedule, reviewing assessment Terms of Reference, suggesting species for assessment and participants for workshops, and evaluating biological reference points.

SEDAR Update assessments are reviewed by the SSCs and not a separate, independent panel. The SSC considers the adequacy for



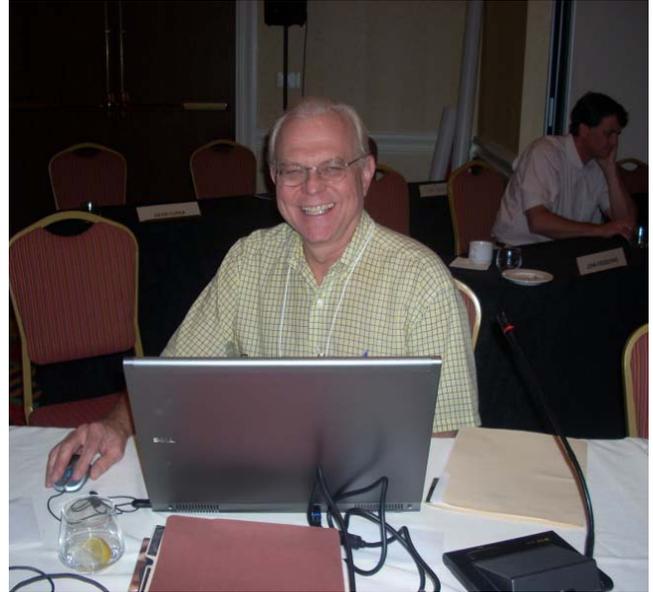
management and deals with unresolved problems and major sources of uncertainty. The Caribbean SSC has not had any assessment products to review, although some procedural workshops have been held. Assessments have been pursued in the Caribbean, but data deficiencies have prevented their acceptance by peer review panels.

Determination of required elements to be included in a stock assessment was discussed. It was noted that this was an issue in the Southeast. For example, the South Atlantic SSC has not defined a set of required elements for assessments. Products received are based on the SEDAR TORs and can be a function of the lead assessment scientist and the analytical team involved. The SSC needs to strike a balance between allowing flexibility and maintaining consistency across assessments.

### *STAR – Stock Assessment Review*

Presenter – Ray Conser

The Pacific Fishery Management Council's stock assessment review (STAR) process is the primary peer review process for stock assessments within the Groundfish and Coastal Pelagic Species (CPS) Fishery Management Plans, and is the focus of this informational report. Assessments in the Pacific Council's Salmon and Highly Migratory Species FMPs are generally conducted and reviewed by outside



technical bodies or Regional Fishery Management Organizations in the international Pacific arena. The Pacific Council's SSC has the ultimate responsibility for stock assessments used in west coast fisheries management, and is charged with resolving disagreements and approving final assessment results.

The STAR process was first implemented in 1997 in response to increasing assessment demands and declining groundfish stocks. The STAR process was designed to enhance SSC review capabilities and to bring in more outside, independent review of increasingly contentious and often constraining assessment results. The STAR process was extended to CPS stock assessments in 2004 and to CPS and groundfish methodology reviews in recent years. In the early years of STAR process development, formal meetings were held at the end of the (then) annual review cycles to discuss lessons learned and to refine and improve the

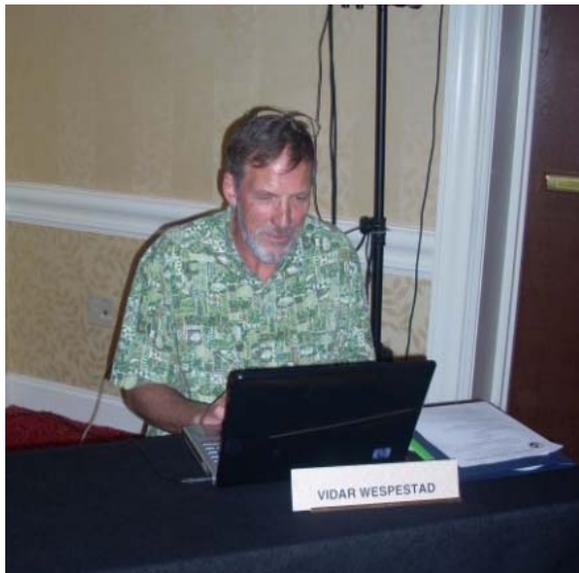
process. Although formal meetings are no longer held, the terms of reference for the STAR process continue to evolve based on feedback from each biennial review cycle.

Full stock assessments and corresponding STAR panels are generally conducted biennially with the exception of Pacific hake which is fully assessed annually. Updated assessments (those limited to previously accepted models/methods with data updates) are conducted for CPS stock in each interim year between full assessments. Groundfish STAR panels typically review two species per panel while CPS STAR panels typically focus on a single species. Stocks to be assessed in future STAR panel cycles are adopted by the Pacific Council with input from its Advisory Bodies, the SSC, and the National Marine Fisheries Service (NMFS). STAR panel logistics are a shared responsibility of the Pacific Council staff and NMFS. SSC responsibilities include the

development of the terms of reference for the reviews, chairing STAR panels, review of STAR panel reports and final assessment documents, and review of all updated assessments.

STAR panels are generally a mix of stock assessment experts with a solid understanding of local fisheries and fish stocks and external, independent stock assessment experts from other regions. Independent experts are usually arranged by one of the west coast NMFS Fisheries Science Centers in coordination with the Center for Independent Experts (CIE). Members of the appropriate Management Team and Advisory Panel attend the meeting as advisors but are not members of the STAR panel. STAR panels strive for consensus findings but STAR panel reports can include minority opinions, if necessary. Disputes between the STAR panel and the stock assessment team rarely occur but when they do, they are resolved by the full SSC. A “mop up” panel composed of SSC members is typically scheduled at the end of the groundfish assessment cycle. This allows for more time and additional review for assessments for which substantial data and/or modeling difficulties arise in the original STAR panel review meeting that cannot be resolved in the short review time available to the full SSC.

The terms of reference include explicit recommendations on the responsibilities of the participants, the content of the stock assessment and STAR panel reports, and the “rules of conduct” for the review

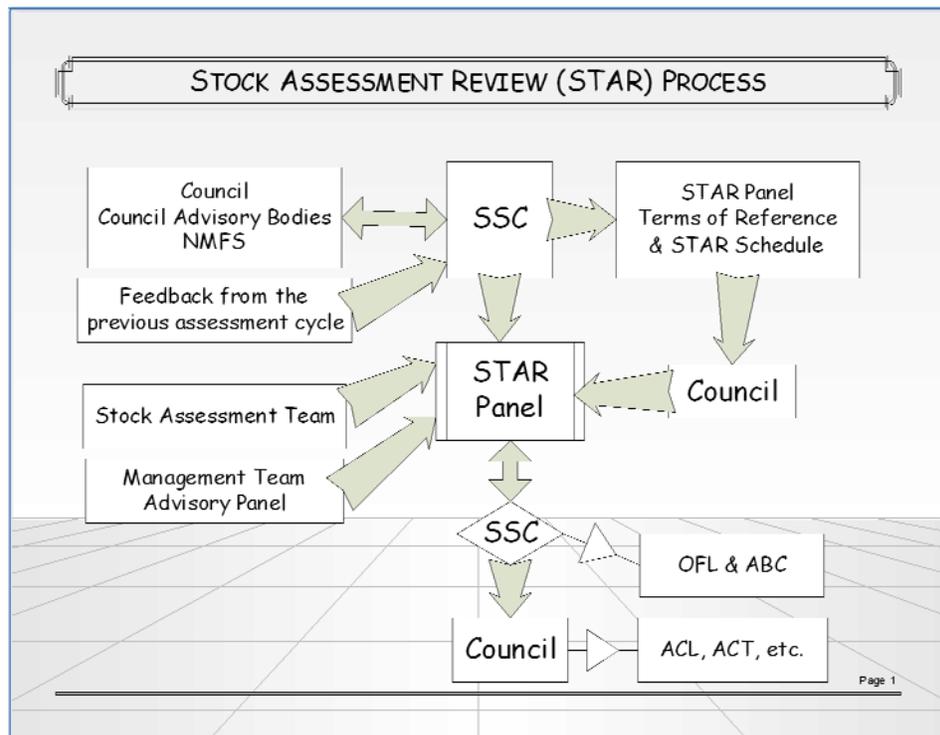


meetings. STAR panel reports should include the comments and requested analyses of the STAR panel, a description of major areas of uncertainty, a consensus on whether the assessment should be used for management, a documentation of disagreements and minority opinions (if needed), and future research recommendations.

The figure below displays the general flow of information in the STAR process. The SSC is integral to the entire process, from the development of the terms of reference and schedule of reviews, through the STAR panel itself, to the approval of the final assessment and management reference points (OFL, ABC). These findings are ultimately presented to the Council as the best scientific information available leading to informed management decisions.

## Discussion

There was discussion of the circumstances when the SSC recommends that information is not suitable for management, and whether it is incumbent upon the SSC to determine what is useful. The response noted that this situation has occurred, and in those cases the assessments were referred back to the "mop-up" panel that is convened to deal with unresolved assessment issues. If the mop-up panel is unable to resolve the issue, then the SSC reverts back to the most recent stock assessment. "Mop-up" panels are scheduled to give them time to address issues and provide timely advice to the Council. The STAR is now working on a two year biennial cycle and the mop-up panel timing allows time for the assessment author to make changes before the mop-up panel starts.



### *Pacific SSC role in STAR*

Presenter – Vidar Wespestad

The PFMC has four FMPs and an ecosystem plan. The SSC can accept a STAR report or reject it. If rejected, they can roll over a previous assessment or send it to the mop-up panel with new TORs. The SSC reviews full assessments and updated assessments through the groundfish subcommittee. STAR panels are also established to review new models or data collection programs to insure that the results will address management needs. The SSC's role in salmon is limited as it is a joint plan with states and tribes. HMS was granted an international fishery management exception. The SSC has a limited role in HMS, primarily advising the Council on the quality of science and management recommendations from international bodies. An Ecosystem Plan is in development and the SSC has an Ecosystem Committee to interact with the ecosystem plan PDT. Thus far the SSC has had a limited role in the Ecosystem Plan.

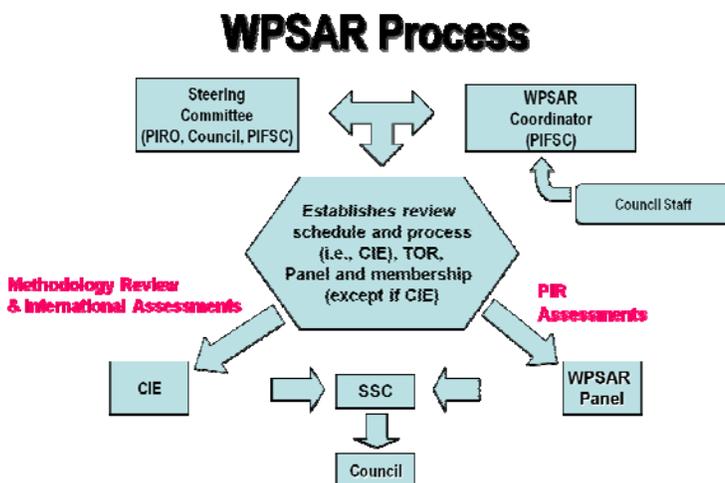
### *WPSAR – Western Pacific Stock Assessment Review*

Presenter – Bob Skillman

The slide presentation was prepared by WPFMC staff Sarah Pautzke and SSC member Robert Skillman from two previously given presentations by the Pacific Islands Fisheries Science Center (PIFSC). This abstract is based on the presentation by Skillman and not written by the PIFSC.

WPSAR was developed by Gerard DiNardo at the PIFSC and the Science Center is the lead agency. Heads of the PIFSC, Pacific Islands Regional Office (PIRO), and the Council comprise a Steering Committee which provides oversight and management of the WPSAR process, including approval of review panel TORs. Fiscal and logistical responsibilities are shared by the three agencies.

The figure below shows the relationship between the Steering Committee, the PIFSC WPSAR Coordinator, the stock assessment review panel, the SSC, and the Council. The WPSAR process includes two review cycles; one for internationally managed stocks receiving CIE review only and one for insular stocks. These components alternate annually, up to 2 assessments per year, with the timing allowing for input to the SSC. Panel membership for insular reviews consists of a chair and 1-2 other members



from the SSC, and 2-3 independent reviewers, usually with one being a CIE reviewer. The presentations of the stock assessment, biology and the data used as well as responses to panel requests for additional material and other queries are open to the public. Deliberations of the review panel are not open to the public.

The PIFSC provides the coordinator, selects panel members, develops TORs, and conducts assessments. The SSC provides a chair and 1-2 other members, ensures compliance with the TORs, reviews the panel report, and advises the Council of results. The Council staff provides logistical support, publishes, and maintains copies of reports.

Some problems identified with the WPSAR process were typical of starting up a new project and conducting the first assessment review, including coordination between the three supporting agencies, work load involving provision of published background material, and responding to review panel requests for additional work and information. Other issues included finding qualified independent reviewers, participation of SSC members independent of the program conducting the assessment, funding, and roles of the review panel and the SSC (as a body).

### Discussion

The Science Center works in consultation with Council staff to develop the assessment schedule. The Council sponsors the process to comply with FACA. The Council, PIRO and Center share fiscal and

administrative responsibilities. The Panel reviews up to two assessments per cycle. The Science center provides the WPSAR coordinator and completes the assessments. An SSC member acts as Chair of each WPSAR panel. The Chair presents the panel report to the Council and SSC. The SSC reviews stock assessments and panel findings. There has been only one stock assessment review conducted thus far (for bottomfish). It was opined that there is insufficient SSC participation, excessive independence in the review process, and indecision. In addition, several problems were identified, including a lack of Federal Register notification, a lack of public participation, difficulties with availability of reviewers, uncertainty in the post-review role and responsibilities of the SSC, and a lack of transparency in decision making.

### *North Pacific Peer Review Process and the role of the SSC*

Presenter – Terry Quinn

The North Pacific Fishery Management Council has a multi-tiered peer review process employing first fishery management plan (FMP) teams and then the Council's SSC. There is a plan team associated with each of the following FMPs: BSAI groundfish, GOA groundfish, BSAI crab and Alaskan scallop. The function, role and membership of these plan teams are very different for the FMPs with full federal management (BSAI and GOA

groundfish) and those with shared management with the State of Alaska (BSAI crab and Alaskan scallop). For the fully federal plan teams, members have a higher proportion of stock assessment expertise than those on the shared management plan teams. The membership of shared management teams may be broadened to include more stock assessment scientists in the future to accommodate an expanded assessment review role for these teams related to ACLs and AMs. Previously they had provided mostly management advice to the Council.

Common issues amongst all of the Council's plan teams include no set terms for membership, thus turn-over of members is generally limited to retirement or a specific expansion of the team for additional expertise. This is distinctly different from the SSC where all members are elected to one-year terms, however there are also no term limits. For the SSC, new members are generally recruited by the SSC as well as by an annual call for nominations. There is no annual call for nominations to plan teams.

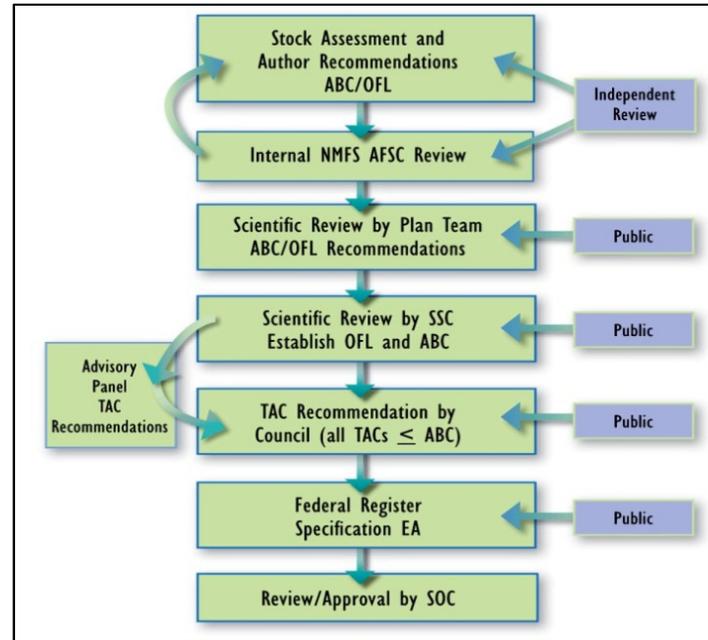
For BSAI and GOA groundfish assessments, the review process begins with an internal review of assessments by the Alaska Fisheries Science Center (AFSC). Following that review, assessments are reviewed annually by the groundfish plan teams who both provide comments to the assessment authors on revisions to the assessment as well as to make recommendations to the SSC

regarding OFL and ABC levels for each stock. The majority of the plan team members have expertise in stock assessment and fisheries biology with some additional members bringing in expertise in fishery management, in-season catch accounting, seabirds, marine mammals, and economics. The assessments as well as the plan team recommendations are then subsequently reviewed by the SSC who make the final OFL and ABC recommendations to the Council. The SSC may modify the recommendations from the Plan Team based upon additional considerations, such as large increases in ABC due to a new assessment model whereby the SSC has recommended a precautionary stair-step procedure to increase the ABC over a period of multiple years rather than abruptly in one year. The Council sets total allowable catch (TAC) levels at or below the ABC recommendations of the SSC. The Alaska Fisheries Science Center periodically requests a more comprehensive review of groundfish



or crab stock assessments by the Center of Independent Experts (CIE). These reviews are intended to lay a broader groundwork for improving the stock assessments outside the annual assessment cycle. CIE recommendations are provided to the stock assessment author, the AFSC, the plan team, and the SSC for review, comment, and consideration of priorities for improving the assessment.

For BSAI crab stocks the current Council process establishes only OFLs on an annual basis. The State of Alaska establishes TAC levels not to exceed OFLs under a deferred management regime established by the FMP. Under ACLs, ABCs must be recommended to the Council by the SSC in addition to OFLs; thus this process will be modified to accommodate this. Since 2008 the team has been reviewing annual stock assessments. Currently draft assessments are reviewed by the Crab Plan Team (CPT) in May of each year in order to recommend appropriate Tier levels and model parameterizations for the annually surveyed stocks as well as to recommend OFL levels for those stocks which have a summer fishery or which employ an average catch calculation (Tier 5) in the determination of the OFL. The CPT makes recommendations to the assessment authors and the SSC which are contained in the introduction to the draft SAFE report. The SSC recommends final



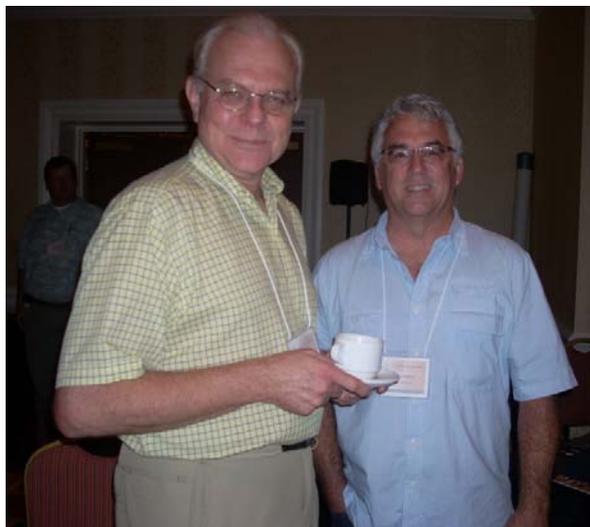
OFLs for the summer fishery stocks (and Tier 5 stocks) and makes final Tier determinations for the remaining stocks at its June meeting. These remaining stocks are annually surveyed in the summer; thus final assessments include the survey data as soon as it becomes available in August. Final assessment chapters are then provided to the CPT for review in September. At that time the CPT reviews the status of stocks and recommends the final OFLs for those stocks. Due to the timing of TAC-setting by the State of Alaska, TACs are established prior to the SSC review of the assessments thus the SSC does not make the final OFL recommendations for those stocks. In 2011 with the implementation of ACLs, TAC-setting will be delayed in order to allow the SSC to make the final ABC and OFL recommendation to the Council at their October meeting.

Unlike the groundfish plan teams, the CPT membership has a larger

component of fishery managers than stock assessment scientists. This is primarily due to a recent modification in the function of the team from a management plan team to a stock assessment plan team. Membership and expertise on the plan team has expanded in recent years to accommodate this new role and will continue to evolve. However, at present less than half of the plan team members have stock assessment expertise.

For the Statewide scallop stock there is no annual assessment due to a lack of sufficient biomass information. The SAFE report is compiled annually by the Scallop Plan Team and contains information on harvest levels by registration area, biology of scallops, and emerging management issues when appropriate. The OFL for scallops is currently set at average historical catch and is fixed in the FMP. The annual setting of catch levels below the Statewide OFL is delegated to the State of Alaska under the shared management regime of the FMP. In 2011 with the implementation of ACLs, a revised OFL incorporating discards into the average catch calculation will be fixed in the FMP with an ABC control rule which establishes the max ABC = 90% of the OFL. The SSC will then recommend a Statewide ABC to the Council annually prior to the State establishing harvest levels by registration area.

Membership on the Scallop Plan Team is dominated by managers as the team has yet to function as a stock assessment review panel. As



assessment information improves for Alaska scallops more emphasis may be placed on broadening the expertise of the Scallop Plan Team to improve the peer review role of the plan team at that time.

*North Pacific SSC Review of Management Measures and Other Material Considered by the Council*

In addition to providing recommendations to the Council on stock assessments, the SSC also reviews every amendment analysis that comes before the Council for action. In the process currently followed, each amendment analysis has at least an initial and final review by the SSC. Typically at initial review there is a comprehensive review of the analysis itself by the SSC to review and comment on the scientific validity of the analysis. Both biological and socioeconomic issues are examined in the review. The SSC then provides recommendations for the analysts to address prior to releasing the analysis for public review. It is the

public review draft that is in front of the Council at final action when they make their final selection of a preferred alternative. On some occasions the SSC reviews an analysis a second time at final action to ascertain that previous issues were addressed satisfactorily.

The Council also asks the SSC to review other material for its scientific validity. Examples include biological opinions of endangered species, research priorities for North Pacific fisheries research, stock assessment peer reviews by outside scientific groups or individuals, and new scientific methods in the peer-reviewed literature and their applicability to NPFMC. The SSC also convenes half-day to one-day workshops to review scientific progress in specific areas, such as multispecies models and fishery genetics.



## Discussion

The status of CIE reports in the North Pacific was discussed. Reports are presented to the SSC and are posted on the web, so the information is publicly available. The Science Center sets up CIE reviews for every assessment every 5 years or so, with 3-5 reviewers per assessment. The reviewers look at the model and data going into the assessment. This does not interfere with the assessment process because the information resulting from CIE review is considered in the next assessment cycle. In addition, the SSC makes recommendations to assessment authors for next year's assessment. Very seldom does an assessment get rejected.

A recognized strength of the approach used in the North Pacific is that lots of people are involved in the assessment process, and they bring a lot of talent to the table. Plan team members consider it a badge of honor to fill their role and therefore do a good job of getting into assessment details and making constructive criticisms. The SSC helps to ensure consistency of approach among all analyses and develops general policies to make the process more transparent.

## General Discussion on Assessments, Peer Review, and Resource Issues

The group started the morning with a planning session for how to best use the remaining meeting time. The following topics were identified for the morning discussions; the structure and format of future National SSC meetings, workload and limited resource issues at NMFS Fisheries Science Centers, and the grouping of species into complexes. The group also expressed a desire to discuss socioeconomics and the role of external reviewers and the Center for Independent Experts.

### Benchmark vs. Update Assessments

The panel held a rigorous discussion of the regional differences between benchmark and update assessments and how different assessment types are developed and peer reviewed. The PFMC SSC has specific guidelines and criteria as to what constitutes an update assessment. Clearly, new models and model formulation can be considered a benchmark assessment. In other cases, there is discretion and unforeseen situations do occur. Given onerous review procedures, participants felt there was a need for more flexibility to determine what constitutes an update assessment. It may be up to the SSC chair to make this determination.



The NPFMC process doesn't distinguish between types of assessments, but does provide additional reviews of assessments that would be considered benchmark assessments in other regions. The NPFMC SSC reviews new models prior to their use in an assessment, and often considers several iterations and reviews of a new model before it becomes a basis for catch limits and management advice. This process reduces pressure to set catch limits based on an entirely new assessment. In cases where the SSC still has an issue with the new model or its outcomes, the SSC retains the ability to revert back to the original assessment model or set catch limits using a different tier level of the control rule. Because assessments are reviewed annually, these issues are infrequent, and there are more gradual revisions to assessments over time. Annual reviews also make it more practical to review new modeling approaches several times before implementation.

The PFMC SSC has specific criteria as to what is permissible to do with

an assessment update. The criteria are well defined and the SSC follows relatively rigid rules as to what can be deemed acceptable. This process allows for quicker reviews of updates relative to benchmark type assessments. The PFMC SSC can review updates in just a few hours whereas new assessments take substantially more time.

There was considerable discussion over the boundaries between benchmark and update assessments. Most regions recognize benchmark assessments as major efforts evaluating new data, new methods, and including some level of peer review. Most also provide for a more timely and streamlined approach that is often termed an update. In most regions, changes to model structure or inclusion of a new data source require a new benchmark assessment. There was much discussion about how far an SSC can go to include changes in an update, perhaps even including addition of new data sets in some circumstances. Similarly, there was discussion about how changing weighting of inputs, such as for a survey, would trigger the need for a new benchmark assessment. It was noted that while there is the temptation to get and use the latest data, a standardized process may preclude incorporation of this data, especially if the goal is to provide timely assessments for a large number of stocks. There was general agreement that a valid process would include deadlines for data, and details of rules and process to get out of a perpetual cycle and minimize disagreements. SSCs need to be clear about what is allowed.

Many workshop participants agreed that best practices guidelines could assist SSCs with establishing what is allowable in an update assessment. While some discretion is necessary, specific protocols or a roadmap should be developed. An update is generally described as a ‘turn of the crank’ using the same model, same data sets, etc. However, it may be useful to convene a national group to develop some consistent guidelines for assessment terminology. It was suggested that a national SSC workgroup, like the ORCS workgroup, could be assembled to develop these guidelines.

There was general agreement that each region could make its own definition of what constitutes an assessment update. The thought was that this should be regional specific given the volatility of the data used in the regional models, noting that a few years of data may make a big difference in how the assessment model performs. As such, each region could develop a process that would define what is allowable for an assessment update. It was noted however, that sometimes what seems to be straightforward isn’t and a backup plan may be required, such as using the prior model.

Participants agreed that a comparison table describing how each Council deals with updates versus benchmark assessments would be useful. Each Council could review the different processes and consider ways to improve efficiencies in assessment preparation as well as efficiencies in peer review.

## Workload and limited resource issues at NMFS Science Centers

Several NMFS Fisheries Science Centers (FSCs) have expressed concerns about increasing workload with insufficient human resources. It was noted that there is a lot of expertise within SSCs that could ease the burden on FSCs. Many SSC representatives are academics with students that could help with the workload. However, there is a risk that critical independence in the SSCs core review responsibilities would be lost if SSC members began conducting such analyses.

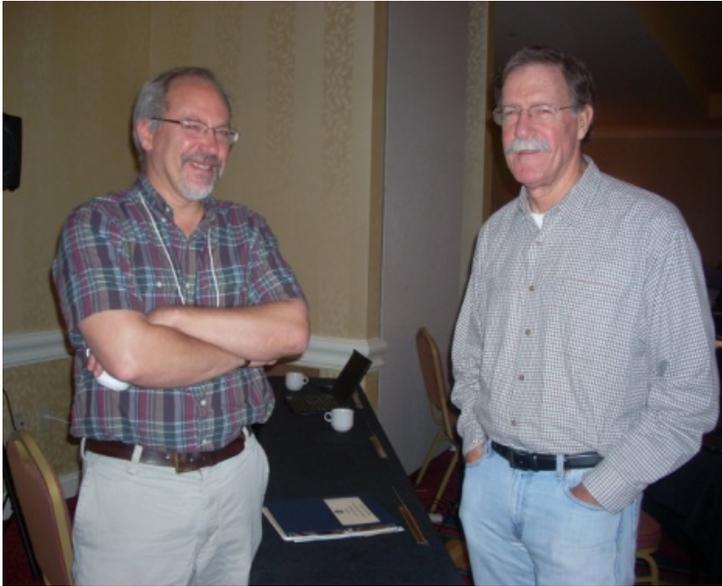
Another concern raised was data confidentiality. Although confidentiality agreements can be effective, spreading analytical work beyond the FSC could involve a large number of people with a range of backgrounds. On the west coast, the use of graduate students, academics, and State agency employees have been used efficiently for various analyses. This process has been very useful and productive to the benefit of the FSCs as well as the academics and students as a way to complete the required analyses and provide application experience.

The Southeast has had a different experience. A student effort was organized to develop assessments for four data-poor species. The

assessments were not released by the FSC and therefore not brought forth to the SSC due to concerns that doing so would set a precedent for formal review of many independently derived assessments from a variety of interests. Issues such as data confidentiality, funding, oversight, and the delivery of post-assessment review documents for use in management often make State or Federal employees efficient options for assessments where funding exists. The use of academics has had mixed results.

The Stock Assessment Intern Program has been training graduate students for future assessment and fisheries science work and sets the stage for increasing the pool of assessment experts. There were two sablefish assessments done recently, one by NMFS and one by academics and both were peer reviewed. The assessments were ultimately successfully converged and used for management. One key to these types of success appears to be strict





adherence to the peer review process. Assessment guidelines can allow for a broad range of input so long as the assessment is peer reviewed and final approval is done by the Council and/or the Secretary. It was also noted that there is a great deal of data analysis and organization that precedes assessment work and there are efficiencies to using academics for this pre-assessment data work.

Workload issues at FSC vary by region and several wondered why the SSCs should be involved with easing the burden. Issues tend to arise in regions where a FSC works with multiple Councils and representatives from these regions felt that SSC recommendations on how to resolve the issues would be helpful. Dr. Methot reported that the only real growth in the overall NMFS budget in recent years has been in support of stock assessment work. This has resulted in funding increases of nearly \$50 M and the addition of two stock assessment experts at each FSC in 2010, with the

exception of the SEFSC where seven people were added. NMFS and the Councils are in a partnership to get assessment science done and NMFS is making a concerted effort to expand the capabilities of the FSC. Dr. Methot noted that not all of the positions are filled, but of those positions that were filled, new personnel were hired rather than hiring existing personnel from other regions so the pool of assessment authors has recently increased. The group agreed that this effort

should continue to be supported and expanded.

## Stock Assessment Capacity

One of the most important challenges facing the SSCs is the limited number of assessments that can be prepared given existing resources. Although additional assessment scientists are being hired by the NMFS science centers, the need for assessments greatly exceeds the output in the foreseeable future. This is particularly important for new assessments. The bottom line is that there are inadequate resources relative to the number of managed stocks, many of which are in dire need of assessments.

Participants discussed ways to address this limited assessment capacity. In the long term, more assessment expertise must be developed. In the short term, the



## SSC Peer Review Capacity

Another challenge is providing an adequate scientific peer review process. A peer review process takes time and people, both of which are in limited supply. It was suggested that one way to meet this challenge was to make the peer review of data limited assessments a more automated process. Further, easing back on level of review and scrutiny of each assessment would allow more assessments to be reviewed. Similar to the issue of determining which stocks to assess first, triage is needed to determine priority assessments in need of peer review.

problems must be triaged; priority decisions are required to be more efficient and effective. It was suggested that simpler assessments, rather than data intensive age structure models, be considered to address assessment shortfalls. Another suggestion was to use other, non-agency assessment expertise in the region. Another suggestion was to take a year off from benchmark assessments and address the data limited stocks.

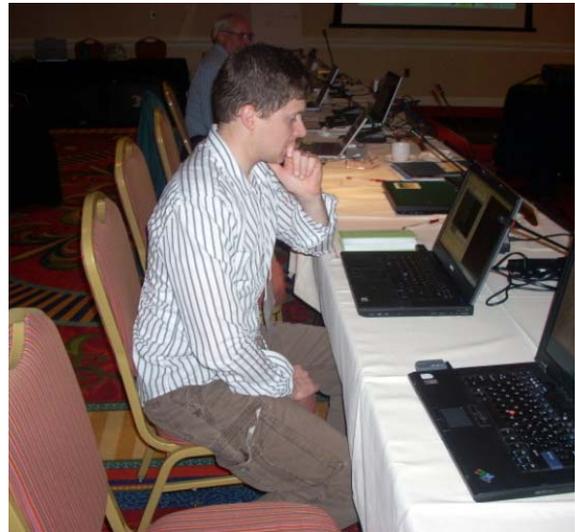
Participants also discussed the scientific peer review of regulatory analyses. This review falls to the SSC as it is the group that determines best scientific information available for councils. It was opined that this is a necessary task of an SSC. The NPFMC SSC reviews all biological and socioeconomic analyses for plan and regulatory amendments, including data and models used, and interpretation of the results. The PFMC SSC also evaluates models used in environmental and economic analyses. The NFMS HMS analyses are reviewed by the NMFS Science Centers, and by the public with notice in the Federal Register. It was noted that the Council can make decisions that move away from analyses that were reviewed by SSC. It was suggested that a clear protocol may be needed.

The workgroup discussed how the schedule of assessments was developed and determined in each region. The SAFMC spends more time with stocks that already have benchmark assessments. In the Pacific region, the two science centers consult and coordinate what assessments will be done, and a draft priority list for assessments is developed and finalized after conferring with the SSC, AP, and Council. It was suggested that NMFS could take more of a leadership role in setting the priorities for assessments.

Participants discussed tasking for these regulatory analyses. Clearly, analyses that include projection models will require assessment authors to run them, further taking their time away from completing assessments. Participants discussed who is responsible for determining management alternatives to be evaluated. In some cases, it has been left up to the scientists, but this is clearly a responsibility of the Council to determine alternatives to be analyzed.

Balancing workloads is an issue for all SSCs. SSCs only have so much time and the demands are even higher with the new ACL requirements. It was noted that the PFMC SSC members already spend about ten weeks per year on SSC issues, so it is unlikely that members have additional time to devote to SSC activities. Most SSCs are struggling with the demands of providing peer review of assessments, providing fishing level recommendations including ABC values, and providing adequate scientific peer review of FMPs, amendments, and other regulatory analyses developed by the Councils. It is possible that workload issues may require each Council and SSC to be selective about which analyses or sections of analyses need SSC review. Another way to ease the burden would be to use SSC subcommittees, as done by the PFMC SSC.

There was discussion of the role of SSC in evaluating prior Council actions and accountability measures. Most SSCs expect to play a review role in such activities, as part of the



overall regulatory review process. It was noted that there needs to be an annual post-season comparison made as part of ACL requirements, but it is not clear who will do this and when.

### **The role of CIE experts and external reviewers**

The use of the individual reports prepared by Center for Independent Experts (CIE) representatives was discussed. Not all SSCs make use of these reports, which at times may not be disseminated by the time the SSC reviews the assessment. It is also not clear how the individual reports should be considered in terms of the broader review role of the SSCs. One particular problem identified with the participation of the CIE and consideration of their reports is the amount of time it takes for their reports to be vetted through the CIE system and to become available to the SSC or Council for consideration. It was noted that the CIE does not encourage consensus, in order to allow each reviewer to be

independent and take the opportunity to make their respective views known.

A comment was made indicating that the CIE process currently in use is based on a contractual agreement between NMFS and the CIE. Once the individual reviews are completed by the reviewers participating in stock assessments, the CIE determines whether the CIE representatives have addressed the Terms of Reference and adequately fulfilled the terms of their contracts. The individual reports are not issued until these items are addressed and approved by the CIE.

A suggestion was offered that the CIE panelist reports could be provided soon after review activities concluded, and that ensuring that the CIE appointees fulfilled their contractual obligations should not delay dissemination of their technical advice and recommendations. Some members felt this would be appropriate, given that all CIE reviewers are viewed as independent and hence provide useful input. The issue of concern among the SSC representatives is ensuring that their advice is received in a timely manner.

The Pacific Council SSC meeting participants commented on the role of the CIE in the development of their STAR Reports. The CIE assists in the preparation of final reports, which are developed fairly

quickly. NMFS receives the individual reports from the CIE reviewers, but they are not generally distributed, especially if a reviewer's lack of familiarity is the cause of an unwarranted concern about some minor aspects of the assessment.

CIE review panelist's reports include comments about each TOR, leading to the conclusion that the review workshop report and the individual reports should reflect similar views. It is not clear that the review of individual reports is structured to address discrepancies between them and any other workshop reports developed by a panel as a whole. There are also regional differences in the linkages between individual reports and workshop panel consensus reports.

In a discussion about conflicting reports from individual CIE reviewers and based on an account from the WPFMC and SEDAR experiences, a concern was raised that the individual CIE reports could



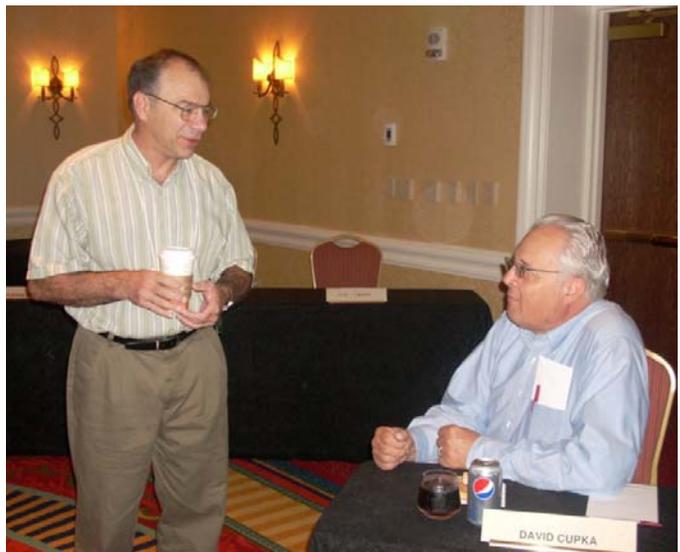
set up a competing administrative record and could form the basis of a legal challenge. It was suggested that the SSCs work through NMFS to resolve any of these issues, rather than deal with the CIE independently. Most participants agreed that the consensus reports were the most useful in their processes. The core outcome the SSCs would like to see from a review report is a consensus report and a description of the issues on which there was not a consensus.

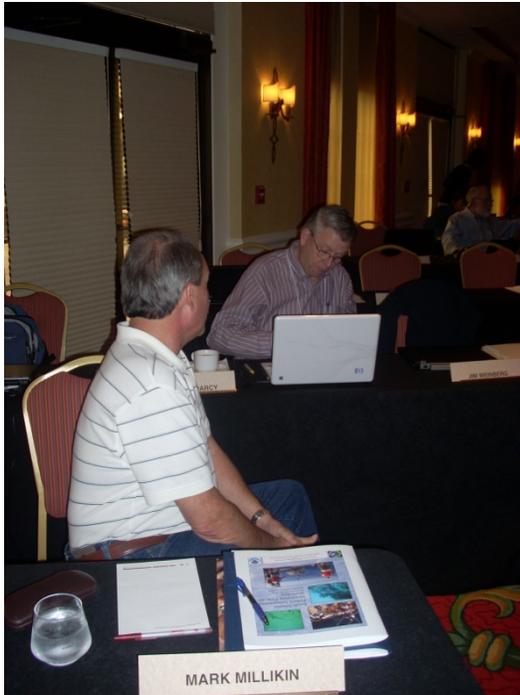
National meeting participants pointedly asked the question, “Can we review the CIE contract to determine if it meets our needs or contributes to our processes and also what is the rationale for three CIE reviewers?” The answer was not clear. The contract is between NMFS and the CIE. Some suggested a call for improvements, in particular to see what flexibility there is to develop exactly what the SSCs want from the CIE, versus a structure that is imposed upon them and does not address actual needs. Confusion over the use of individual reports is one example of products not always meeting needs.

It was noted that the CIE panelists also review the process by which the reviews occur. This is an opportunity to examine the nature of the review itself, which in turn is a good check on the overall process.

Recapping the discussion regarding use of the CIE, one of the speakers added that the

individual CIE reports are used differently in different regions. The CIE reviews add strength to the process. However, making the most of the CIE products can be challenging when a Council is anxious to receive assessment findings. The panel assembled in this meeting was encouraged to collectively inform NMFS that the SSCs are not getting what they need in the CIE reports as they are currently structured. In articulating what the SSCs would find useful, the suggestion was made that they may need to request consensus reports only, while individual reports would be limited to comments on the review process itself. Finally, there was also an acknowledgement that these issues may need to be addressed as part of the contractual process and at a fairly high level within the agency. Some members of the group are interested in pursuing this, including meeting with appropriate representatives of NMFS to consider modifications of future CIE contracts.





Later in the workshop the issue of consistency in review panel recommendations was raised. It was recognized that different groups of independent individuals can reach different conclusions upon review of common uncertainties. While this may help foster scientific advances, it causes issues within a management framework. The use of “outsiders”, who lack familiarity with customary regional assessment processes, history of the assessments and the fisheries under consideration, was mentioned as one common source of inconsistency. Others commented that different views can and should be tolerated and that the occasional misstep is part of the overall review process. This is a challenging issue that most areas have faced at some time. One possible solution may be to carefully consider the objectives of the review and to carefully craft TORs to meet those objectives. It was noted that reviews satisfy different objectives within each

system. For one example, they add credibility and provide a check on the science that advises management. These reviews could, and perhaps should, be structured in different ways depending on the objectives of the review.

## **Developing fishing level recommendations**

### **Dealing with species groupings**

NMFS NS1 guidelines contain several recommendations on the grouping and management of species as stock complexes. The key to the use of stock complexes is a high degree of similarity among stocks within the complex and the ability of at least one of the species to serve as an indicator of fishery impacts and productivity for the entire complex. It is important to note that a stock complex should not be simply a “catch-all” group of mismatched species that are grouped together simply because they are not managed individually. There needs to be commonalities of biology and response to management. Species in the complex can be data-poor, but they must be expected to respond similarly to changes in productivity and fishing pressure and one or more indicator stock should serve as a reasonable representation of the status of the complex as a whole. The fishing mortality rate of the indicator species must correlate with the components so that fishery

mortality and effort trends can be used for all stocks.

There are currently few examples of stock complexes that have more than one indicator species. Neither an indicator species nor other species in the complex should be ignored as individual stocks. The use of stock complexes as a management tool can provide efficiencies and Councils should not move too quickly to remove a relatively data-rich indicator species from a complex. Indicator stocks can be managed as an individual stock as well as part of a complex and can have two separate sets of status determinations, one for its own status and one used as a proxy for the rest of the complex.

The group discussed potential problems associated with stock complexes. It is relatively easy to lose track of stocks within a complex that are most vulnerable to exploitation and these stocks deserve tighter monitoring while being managed in a complex. Dr. Quinn reported a process observed in Alaska where a species becomes the dominant target species in a complex and in response the available science and fishing pressure increase. Eventually this dominant species is split out of the complex and becomes fully utilized. Fishermen then move on to a new species in the complex and the process begins anew until another species is removed from the complex. This can lead to an increased assessment burden as the management framework moves



towards individual species management with fewer species in complexes.

Either removing species from a complex or identifying additional indicators for a species complex is consistent with the NS1 guidelines. Not only can removing species from complexes increase management complexity, but accounting adjustments need to be made at the national status tracking level every time there is a revision to the species in a complex. Although it is not necessarily a reason to keep a species in a complex, there is some desirability of constant complex determinations. Councils and SSCs should consider creating more indicators in a complex instead of splitting out more and more species.

The group discussed the lack of scientific criteria available for identifying indicator stocks in a complex noting that species within a complex can frequently have divergent trends in CPUE, natural mortality, vulnerability, and other

characteristics. There will always be differences between species in a complex and an indicator species within a complex is moderately useful for broad management and monitoring, but each species should be monitored, at least for catch, to ensure that the indicator is still adequate for all of the species in the complex and that no species are experiencing divergent conditions. The primary purpose of a complex is in the development of Status Determination Criteria and status level and it is difficult to identify an indicator that will ensure appropriate management across the complex. NOAA published a Technical Memorandum in 2005 on the subject of stock definition and the use of complexes.

The group recommended that it would be useful to review the NS1 Guidelines, the NMFS Technical Memorandum, and National Standard 3 implementation to create a combined and comprehensive document on the definition of stocks



and the use of species complexes. The group also recommends that this topic be considered for a future National SSC meeting so that regions could report on applications and the group could then discuss best practices, recognizing that unique regional approaches may still be appropriate.

## Role of the SSC in ACL & AM Development and Social & Economic Issues

Presenter: Rick Robins, MAFMC Chair

The goal in developing Fishery Performance Reports is to get more structured input from constituents, starting with the Advisory Panel (AP), as opposed to the more typical *ad hoc* approaches. The Ilex squid fishery in the Mid-Atlantic is the basis for this initiative. Ilex is short lived and has no ACL requirement. The recent stock assessment did not produce any reference points, and data are very limited on the species. Ultimately, the SSC's ABC recommendation came from an interpretation of a landings time series. However, there is a complex global market for Ilex which is driven by supply and demand. The SSC struggled to interpret the landings, which may have been influenced by the complex economics of the fishery, the species biology, or some combination of both. Public comments were given, but were very *ad hoc*, and history is often subject to interpretation.

The idea behind Fishery Performance Reports is that they would provide structured supplemental information but not replace a stock assessment. This information would be particularly useful in cases where catch is driven by non-biological factors. There are many layers to the report but a primary goal would be to assist the SSC in developing ABC recommendations, especially in their Tier 4 stocks (data limited situations where catch and landings data are available). The AP would be integrated into the ABC and ACL specification setting process, giving the AP a formal role and gaining additional perspective from “on the water” participants. The report format would be standardized to provide structure. These reports would also serve as an archive record that the SSC could use in the future and would guard against revisions of history. Another benefit to the report would be in providing additional transparency to the science and management process.

The MAFMC and SSC are currently developing the report format. They are proposing that an AP member take the lead for each species. For species with additional complexity, it may be necessary to have a species leader for each sector. They propose to have TORs and SOPs to guide the development of the performance reports. A number of report formats are being considered. One might

involve polling of the AP members, another would require working through the AP species lead to develop a consensus report. It is expected that the complexity of the individual reports would vary depending on the complexity of the fisheries.

The metrics being considered for inclusion in the fishery performance report include:

- Consumer preference of price (fishing for dollars vs. fishing to build history of landings)
- Changes in market opportunities and alternatives (because Mid-Atlantic has some mixed trawl fisheries) and effort may shift based on availability of fish or market opportunities
- Spatial and temporal resource availability
- Management induced effort shifts and changes in fishing practices (changes in areas fished, gears, or techniques)
- Changes in the economics of



production, fuel costs

- Regulatory changes
- Other externalities such as bycatch of prohibited or protected species that might limit effort
- Changes in gear-, size-, or yield selectivity
- Environmental meta-data (i.e. fishing season truncated or extended due to weather).

Initially the report would look back 3-5 years in fairly good detail, with annual updates after that. A historical overview of the fishery beyond the 3-5 year detailed report would also be useful. Another option being considered is just starting with the present year for the performance report and only adding information for future years as time goes on. Updating of the reports could also be done on a periodic basis instead of annually.

The SSC and a socioeconomic sub-panel are working on the report format. They hope to have the report ready for the 2012 quota-setting cycle. A side benefit to the development of these reports may be the ability to look at socioeconomic information and inputs on the front end of the quota setting process, instead of after the recommendations are made. Economics are often a big part of catch that are overlooked.

### Discussion

It was suggested that these Fishery Performance Reports would be largely used to get information about species targeting economics. While such information is already available in some areas from agency sources,

many regions lack such data. The presenter commented that the intent is to get at the relationships between economics, management, and catch, and to reflect how fishermen's decisions are affected by those factors. At this time, there are no formal analyses that currently give the region this information.

This type of information could be very useful in evaluating catch-based ACLs, as derived for stocks lacking formal stock assessments. Participants indicated that using a method such as this to get information from the fishing sector, prior to making ABC recommendations, would be beneficial to the ABC process.

A benefit identified for these reports is that they are essentially neutral – they are independent, descriptive documents that are developed prior to setting ABCs and outside of specific management actions. Therefore, they may alleviate some of the arguments offered by those trying to influence ABCs up or down. Ideally, economic constraints that drive recent catches should be encompassed in these documents each year, rather than being brought out near the conclusion of ABC or assessment deliberations as a means to sway outcomes. The group agrees that this approach offers an appropriate way for the constituents to get involved in a timely manner.

## **Social and Economic Sciences Discussion**

The workshop Chair asked each SSC to report on the composition of its

membership, whether composed of biologists, assessment analysts, sociologist, economists, or others. Responses indicated that every SSC includes biologists, social scientists, and ecosystem specialists as members to varying degrees. Some Councils maintain socioeconomic subcommittees, although several reported being largely inactive. The expectation is that the less active groups should be reinvigorated or reconstituted, given the mandates in the reauthorized Magnuson-Stevens Act.

A follow-up question asked whether the SSCs considered the number of social scientists on their respective committees adequate, most representatives answered “no.” Several attendees expanded on this reply by noting that, given the recent workload associated with the SSC’s charge of developing ABCs, the social sciences are, or have been, neglected. Others discussed the utility of creating an outside sub-panel of social scientists (defined in this conversation as both social

scientists and economists) to serve as a resource to the SSCs without becoming formal committee members.

The Committee discussed addressing social and economic issues in detail at the next National SSC workshop. One proposed topic of discussion is socioeconomic objectives of management and their integration in management plans. Each SSC was encouraged to become familiar with the social and economic information currently available in their respective regions, as well as the review process through which data is vetted and how it is incorporated into the fishery management plan process. In some areas, such as the North Pacific, economic data collection is mandated in FMPs and a detailed economic Stock Assessment and Fishery Evaluation (SAFE) document is prepared.

To help prepare for the next national meeting, the planning body for the next meeting was encouraged to appoint a sub-group of SSC members to ask questions of a social and economic perspective rather than just a biological perspective. This group should define parameters for discussion at the workshop and identify critical data gaps.

Some regions feel addressing social and economic issues at the SSC level is difficult, as little information comes forth for social scientists and economists to review.



In a reflection of the regional difference in data availability and analysis, other regional representatives disagreed, remarking that there are social and economic issues associated with OFL and ABC-setting, in addition to the impacts of management actions on other fisheries and alternative

economic trade-offs. Most representatives agreed that interest in these issues will increase in the future and the SSC's need to be prepared to address them once the initial hurdles of establishing biological OFLs and ABCs are cleared.



## Recommendations for the 2011 Workshop

Workshop participants discussed the need and agenda for another meeting. It was agreed that SSC workshops should be an annual event, and relationships across regions and momentum have developed that are just beginning to bear fruit. The Mid-Atlantic Council has volunteered to host the next National SSC workshop next year, possibly in Williamsburg, Virginia. Potential agenda items include:

1. Incorporation of socioeconomic information in the SSC process
2. Ecosystem-based management
3. Species groupings and complexes
4. SSC workload management

These agenda topics and the meeting structure were discussed in more detail. It was suggested that the meeting format could be improved by limiting presentations to just introductory talks for a specific subject. Break out groups were suggested as a means of maximizing meeting productivity. A focus topic or case-study could be chosen for the overall session, and breakouts for specific issues could be organized as work sessions to not only hear about efforts in other regions, but also to work out solutions. With expertise from around the nation, the group is at its best during brainstorming discussion sessions. Others felt the presentation format was helpful, but could be streamlined. It was

suggested that for each major topic, a single presenter, working with others, could make one comprehensive presentation that focuses on the primary successes and difficulties from each region. This could save a substantial amount of time while providing an overview that would lead to the “compare and contrast” discussions that have proven to be productive.

Relative to the socioeconomic topic on the proposed agenda, participants wanted to review how each region assessed economic consequences of different alternatives. It was noted that this may be a good opportunity for case studies on how economic impacts and analyses are done and reviewed in each region. It was further noted that social impacts are important to consider as well. Perhaps workshop organizers should query the social scientists and fishery economists directly to find out from their perspective what role they play in analysis and SSC review. Fishery management decisions include a balance of conservation and economic information. At the level of ABC control rules, for example, socioeconomic consequences should be taken into account in selection of P\* values.

There was interest by some in having an in-depth treatment of ecosystem-based fisheries management at the next workshop. It was suggested that a guest speaker from Australia would help to demystify the issue as this approach is already implemented in that country. Others felt that this issue was not fully ripe for scientific review by the SSCs, and could be limited to regional reports. It was



recognized that the interest in socioeconomic analyses is increasing while the level of peer review of these analyses has remained low relative to the review of analyses of population dynamics or biological characteristics. Therefore, the group tentatively agreed to focus the next meeting on socioeconomic and recommended that early efforts should be made to ensure that the appropriate experts in the field were present. If all of these topics are covered it will be difficult to send only three SSC members and have the requisite expertise present. Perhaps videoconference or webinars could be used to get some discussions done in advance of the full meeting to help focus the main meeting on hot topics or areas of particular concern.

There were concerns about the increasing NMFS participation at these meetings, which are intended to be a forum for SSC discussions.

This is the only forum where SSC members can hold unique and focused discussions amongst SSC representatives. The group discussed reducing the size of the head table to minimize the NMFS presence and to facilitate dialogue. It was suggested that the head table format should go back to the model used at the first meeting, two SSC representatives per Council and very few NMFS staff.

Lastly, participants suggested that staff organizing the meeting and developing the agenda should provide more communication and coordination with SSC chairs. It was noted that the agenda for the next SSC workshop could be modified if something develops relative to ACL implementation. The Council Coordination Committee is also tracking progress towards implementing ACL control rules, and this information could be shared among the SSCs.



## Appendix 1. Meeting Agenda

### **SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL**



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David Cupka, Chairman  
Brian Chevront, Vice Chairman

Robert K. Mahood, Executive Director  
Gregg T. Waugh, Deputy Executive Director

#### Third Annual National Regional Fishery Management Council Scientific and Statistical Committees Workshop

October 19-21

Charleston Marriott  
Charleston, South Carolina

### AGENDA

#### **Tuesday, October 19, 2010. 9 am – 5 pm**

Welcome and Introductions

Session 1. Progress Reports and Updates

1. SSC Reports on ABC Control Rule Implementation and Application
2. NMFS Reports on National Standards, Final and Proposed Rules
3. Report of the *ad hoc* Data Poor Workgroup "ORCS"

#### **Wednesday, October 20, 2010. 9 am – 5 pm**

Session 2. Peer Review Process

1. Regional Peer Review Program Reports  
SARC, SEDAR, STAR, NPFMC Plan Teams, WPSAR
2. Reports from each SSC on their role in Regional Peer Review programs

Session 3. Developing fishing level recommendations

1. Control rule applications
2. Incorporating uncertainty and confidence intervals

**Thursday, October 21, 2010. 9 am – 5 pm**

Session 3. Developing fishing level recommendations (*Continued*)

3. What happens when the SSC cannot provide recommendations
4. Dealing with species groupings
5. Ensuring consistency and objectivity

Session 4. Next Steps and Issues for the 2011 Workshop

1. Role of the SSC in ACL and AM development
2. Role of the SSC in Social and economic issues

Session 5. Wrap-up and final discussions

## **Appendix 2. National SSC Workshop Participants and Observers**

### **New England Fishery Management Council**

Steve Cadrin	Jake Kritzer
JJ Maguire	Chris Kellogg
Bob O'Boyle	Pat Fiorelli

### **Mid-Atlantic Fishery Management Council**

John Boreman	Rich Seagraves
Mike Wilberg	

### **South Atlantic Fishery Management Council**

Carolyn Belcher	Scott Crosson
Luiz Barbieri	John Carmichael

### **Caribbean Fishery Management Council**

Barbara Kojis	Jim Berkson
Richard Appeldoorn	Graciela Garcia-Moliner

### **Gulf of Mexico Fishery Management Council**

Joe Powers	John Froeshke
Harry Blanchet	

### **Pacific Fishery Management Council**

Martin Dorn	Meisha Key
Ray Conser	Vladlena Gertseva
Tom Jagielo	Mike Burner
Vidar Weststad	John DeVore

### **Western Pacific Fishery Management Council**

Bob Skillman	Sarah Pautzke
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### **North Pacific Fishery Management Council**

Pat Livingston	Diana Stram
Terry Quinn	Dave Witherell

### **National Marine Fisheries Service**

Fred Serchuk	Donald Kobayashi
Jim Weinberg	Jim Hastie
Erik Williams	Jason Cope
Todd Gedamke	Grant Thompson
Steve Ralston	Martin Dorn
Ray Conser	Rick Methot
Dean Courtney	

## **Observers**

Lee Anderson, MAFMC Member

Myra Brouwer, SAFMC

Julie Creamer, UGA

David Cupka, SAFMC Member

George Darcy, NMFS NERO

Kari Fenske, SEDAR

Claudia Friess, Ocean Conservancy

Chad Hanson, PEW Trust

Laurie Jodice, Clemson University

Sarah Jones, PEW Trust

Pat Kurkul, NMFS NERO

Anne Lange, SAFMC SSC

Bob Mahood, SAFMC

Anna Martin, SAFMC

Mark Millikin, NMFS

Julie Neer, SEDAR

Mark Nelson, NMFS

Genny Nesslage, ASMFC

John Pappalardo, NEFMC Member

Wes Patrick, NMFS

Marcel Reichert, SAMFC SSC

Rick Robins , MAFMC Member

Ken Stump, Ocean Conservancy

Emily Susko, VA Tech

Katelin Shugart-Schmidt, VA Tech

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