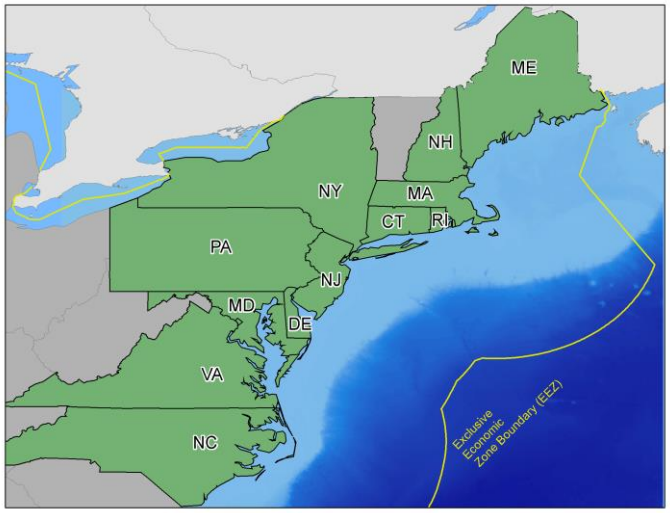
NORTHEAST REGION COORDINATING COUNCIL

SPRING 2015 MEETING

May 27-28, 2015

Westin Georgetown – Washington, D.C.



Meeting Briefing Book Table of Contents

(*hyperlinked*)

2015 SPRING NRCC MEETING AGENDA

Westin Georgetown, 2350 M. St. NW, Washington, DC

All times are approximate

Wednesday, May 27

0900

1. Welcome, introductions, modifications and additions to agenda, announcements (Bullard, Karp, Moore, Gilbert)

0910-1600

2. Stock Assessment Priority Setting: Scheduling and Specific Assessment Topics
   Discussion leader: Karp
   - Stock Assessment Efficiency Initiative, including a presentation on the Alaska Approach and update on Standardization Initiative (Rago and Weinberg) (Fall 2014 Action Item #1)
   - Update on Assessment Prioritization (Methot)
     i. Update of the document
     ii. Provide some prototype examples using data from the Northeast
   - Review Assessment Schedule for FY16 and FY17 (Rago and Weinberg)
     i. Update, as needed, previously established 2016 and 2017 schedules
     ii. Update on Spring 2016 SARC TORS (Action Item #3 from Fall 2014 meeting)
     iii. Discuss next year's discard methods review
   - Update on black sea bass assessment
     i. ASMFC data meeting, MAFMC RFP for stock assessment scientist, timing of assessment, etc.
   - Delivery of ACCSP data for the June bluefish and scup benchmark assessments
   - Incorporation of the MRIP Transition Plan into priority setting for 2016 and 2017
   - Update on fall 2015 operational groundfish assessment
     i. Where will they be held? What are the TORs? Will there be a preliminary meeting? When will assessment overview panel meet?
   - Update from SAW Working Group (Jim Weinberg)

Working lunch break 1200-1220

1220-1430

3. Continue Assessment Related Discussion
   Discussion leader: Karp

Break 1430-1445

1445-1600

4. Continue Assessment Related Discussion
   Discussion leader: Karp

1600-1615

5. NEFSC SSC Liaison Discussion
   Discussion leader: Karp

1615-1630

6. Update and Discussion of Center's Strategic Plan
   Discussion leader: Karp

1630-1645

7. NRCC SAFE Report Working Group Follow up Discussion
   Discussion leader: Weinberg

1645-Day 1 Wrap Up; Prep for Day 2 Discussions
1715 Adjourn Day 1
1800(ish): Happy Hour at Bóveda (located at the Westin Georgetown)

Thursday, May 28

0800-0820

8. Update on progress of reconstituting Trawl Survey AP
   Discussion to clarify membership, administrative details, and the NEFSC's suggested TORs
   Discussion leader: Weinberg

0820-0900

9. Report of the NEFSC Climate Ecosystem, Habitat and Assessment Steering Group
   Discussion leader: Karp (presenter – Jon Hare)

0900-0945

10. Discussion of efforts to coordinate with Councils and Commission plans for EBFM/EAFM
    Discussion leader: Nies

Break 0945-1000

1000-1045

11. Cod stock structure plan
    Discussion leader: Nies
    Discuss the 2012 initiative to review the cod stock structure
    Develop plan so this issue will more forward

1045-1215

12. Bycatch Monitoring Topics
    a. Marine Mammal bycatch – SceMFis (Russ Brown)

b. Lobster/cod bycatch issue: short progress update
   Discussion leader: Nies
c. Update on potential legislative changes for observer funding coverage and update on Industry-Funded Observer Amendment
   Discussion leader: Robins
d. Discuss plan for future bycatch monitoring in small mesh fisheries
   Discussion leader: Stockwell
   i. Background of request: ACCSP future funding is uncertain and the NRCC could discuss how to address monitoring in the future. The Industry-Funded Amendment may be part of the solution, but this needs to be explored.

Working lunch break 1215-1240

1240-1300

13. Update on Catch Limit Specifications Process (Fall 2014 Action Item #7)
    Discussion Leader: Pentony

1300-1430

14. Priority setting discussion
- Discuss prioritization and coordination of resources, as needed

Break 1430-1445

1445-1515

15. Meeting wrap up
- Complete any unfinished discussions or unresolved new business
- Review action items and assignments
- Identify mid-term call date/time
- Confirm 2015 Fall (NEFSC host; October 20-21, 2015, Providence, RI) and identify 2016 Spring (NEFMC host) meeting dates
- Adjourn meeting

Note: hard stop for all participants at 4:00 pm

NRCC Fall Meeting 2014 Action Items

October 21-22, 2014—Providence Marriott, Providence, RI

Color code key:	
ASMFC	MAFMC
NEFMC	NEFSC
GARFO	NRCC

1. Assessment Reports: Standardization Initiative
   -Appointees designated from GARFO, NEFMC, MAFMC, ASMFC
   -NEFSC provides template
   -Meeting or discussion to ensure streamlined document meets all immediate assessment needs
   Responsible parties: NEFSC (lead), MAFMC, NEFMC, GARFO, and ASMFC
   Due Date: Appointees designated by November 15, 2014
   Working draft by December 31, 2014
   Final recommendations to NEFSC by March 1, 2015
   Final report to NRCC at spring NRCC meeting May 12-13, 2015

2. Progress Report on Stock Assessment Process and Modeling Program Review
   -Engage NRCC stakeholders on action item response development
   -Update NRCC at spring meeting
   Responsible parties: NEFSC (lead)
   Due Date: Update at spring NRCC meeting May 12-13, 2015

3. Spring 2016 SARC Terms of Reference
   -Develop draft spring 2016 SARC terms of reference for skates, black sea bass, and ocean quoahog
   Responsible parties: NEFSC (lead)
   Due Date: Spring NRCC meeting May 12-13, 2015

4. Research Coordination
   -Ongoing discussion on how to better align research priorities
   Responsible parties: NEFSC and MAFMC
   Due Date: Spring NRCC meeting May 12-13, 2015

5. Reconstitute Trawl Survey Advisory Panel (joint Council AP)
   -Council priority setting and appointees designated by December 15, 2014, if supported by priorities
   -Appointees needed from NEFMC, MAFMC, ASMFC, GARFO(?) – Council members or gear experts
   -Early objective would be to develop terms of reference for the group
   Responsible parties: NEFSC (lead), MAFMC, NEFMC, ASMFC, and GARFO(?)
   Due Date: Report on progress at spring NRCC meeting May 12-13, 2015

6. SAFE Requirements
   -Adopt working group recommendation Option 2 (Table 3) and Option 1b (Table 4)

-Working group and Mike Pentony discuss with NEPA staff to determine if Option 3 (Table 3) or some variation thereof can be used to replace affected environments sections of management action documents

Responsible parties: Weinberg (working group Chair)
Due Date: Report at spring NRCC meeting May 12-13, 2015; redirect as needed in spring

7. Catch Limit Specifications Process Issues Resulting from Alaska Process Presentation
   -GARFO will follow up with NEPA staff and provide Councils with supplemental information report guidance
   -GARFO will examine regulations and highlight specification and framework authority in New England FMPs
   -Ongoing dialog with MAFMC and GARFO on potential process improvements
   -Consider optimal start time for fishing year and decoupling specifications from other measures
   -White paper?

   Responsible parties: **GARFO** (Pentony), **NEFMC** (Nies), **MAMFC** (Moore), **NEFSC** (Rago and SSB tbd) to develop working group
   Due Date: Appointees designated by November 15, 2014
   Progress report at spring NRCC meeting May 12-13, 2015

Upcoming Meeting Dates
Spring 2015 – **MAFMC** – May 12-13, 2015 Baltimore, MD
Fall 2015 – **NEFSC** – October 20-21, 2015 Providence, RI

An overview of the NMFS Alaska Fisheries Science Center/North Pacific Fishery Management Council groundfish assessment review process

Compiled by Mike Palmer and Chris Legault
Population Dynamics Branch
Northeast Fisheries Science Center
National Marine Fisheries Service

Last update: May 1, 2015

Executive Summary

The National Marine Fisheries Service's Alaska Fisheries Science Center (AFSC) and the North Pacific Fishery Management Council (NPFMC) utilize a single formalized assessment review process for the groundfish stocks of the Alaska Region. This review process provides updated stock assessments of some forty-plus stocks annually. The assessment products are reviewed internally by members of the AFSC and then by both the NPFMC Plan Teams and Scientific and Statistical Committee (SSC). The Plan Teams and SSC constitute the formal stock assessment review bodies.

In support of the ongoing NEFSC Stock Assessment Process Efficiency Initiative, two staff members from the Population Dynamics Branch were sent in the fall of 2014 to observe the Alaska Region's groundfish review process. One staff member attended the NPFMC Groundfish Plan Teams in Seattle, WA and the other attended the SSC meeting and one day of the NPFMC meeting in Anchorage, AK. The intent of these trips was to understand and document the assessment review process.

This report summarizes the AFSC/NPFMC assessment review process, notes system limitations, and highlights both the strengths and weaknesses.

Introduction

The National Marine Fisheries Service's Alaska Fisheries Science Center (AFSC) and the North Pacific Fishery Management Council (NPFMC) utilize a single formalized assessment review process for their groundfish stocks that provides updated stock assessments of some forty-plus stocks annually. In the AFSC/NPFMC groundfish assessment review process, the NPFMC's Plan Teams and SSC constitute the formal review bodies of stock assessments. It should be noted that the NPFMC also has scallop, crab and salmon plan teams, though this document will focus exclusively on the groundfish assessment review process. The AFSC is the principal producer of the North Pacific groundfish assessments, with responsibility for over 22 species or species groups listed in the groundfish fishery management plan (FMP) for the Gulf of Alaska (GOA) and approximately 26 species or species groups in the Bering Sea/Aleutian Islands (BSAI) FMP. Alaska Department of Fish and Game (ADFG) is responsible for one stock assessment in the GOA groundfish FMP.

The BSAI and GOA FMP each have a separate dedicated Plan Team. The Teams meet concurrently twice per year - once in September to review new assessment products and a second time in November to provide a final review of all assessment products and assemble the final Stock Assessment and Fishery Evaluation (SAFE) reports. The September meeting serves as an initial review of any new data products or assessment modelling approaches; stocks that have no major changes are typically not presented at the September meeting. These preliminary results are reviewed and feedback provided by the NPFMC's SSC meeting during their October meeting. During the November meeting, the Plan Teams evaluates the sufficiency of stock assessment approaches, provides recommendations on future research and makes acceptable biological catch

(ABC) and overfishing limits (OFLs) recommendations. The final products of the annual Plan Team process are the SAFE reports. Following the November meeting, a co-chair of the Plan Team will present the findings to the NPFMC's SSC, the Advisory Panel (AP) and NPFMC in early to mid December. The SSC determines the final scientific recommendations for ABC and OFL levels and the AP makes initial recommendations on total allowable catch (TAC). Final catch specifications are set by the NPFMC at their mid December meeting.

The NEFSC has launched a Stock Assessment Process Efficiency Initiative which, among other things, seeks to streamline the review process while ensuring adequate oversight and quality control. The ultimate objective of these efforts is to provide more timely information for management. In support of this initiative, the NEFSC sent two staff members from the Population Dynamics Branch to observe the groundfish review process employed by the NPFMC. One staff member attended the November 17-21, 2014 meeting of the NPFMC Groundfish Plan Teams in Seattle, WA and the other attended the December 8-10, 2014 meeting of the SSC and one day of the NPFMC meeting on December 11, 2014 in Anchorage, AK. The intent of these trips was to understand and document the assessment review process.

The NPFMC and AFSC process

The AFSC and the NPFMC utilize a formalized assessment review process for their groundfish stock. This process provides updated stock assessments of some forty-plus stock annually, though not all stocks undergo a full update on an annual update cycle. The primary groundfish stocks (e.g., Eastern Bering Sea pollock, sablefish, Eastern Bering Sea cod, Atka mackerel) are updated annually, though some of the minor stocks, particularly those in the Gulf of Alaska (GOA), are updated bi-annually in the off-years of the GOA survey which has been conducted every other year since the early 2000s. For off-year stocks, the SAFE reports will include partial updates in the way of executive summaries documenting existing stock status and newly available data.

Stock assessments are conducted by members of the Alaska Fisheries Science Center's Seattle (WA) and Auke Bay (Juneau, AK) labs with occasional support from other agencies (e.g., Alaska Department of Fish and Game). The review of the groundfish assessments are split between two Plan Teams – the Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA). The rationale for the split Plan Teams appears to be primarily related to work load as much as regional differences in data availability (surveys) and biology (e.g., growth). The single exception to this is the sablefish stock which is reviewed in plenary by both Plan Teams.

The assessment products are reviewed internally by members of the AFSC and then by both the NPFMC Plan Teams and SSC. The intensity of these three reviews varies by stock and the focus of the review varies among the three groups. Sections of each review specifically ask for how the assessment addressed concerns raised previously in the process, thus creating a feedback cycle of interactions among the groups.

Plan Team function and membership

The primary function of the BSAI and GOA Plan Teams is to compile the Stock Assessment and Fisheries Evaluation (SAFE) reports (see Appendix A for the full Plan Team TOR). The format of the SAFE report will be described in the next section. While the TOR state that the Plan Teams may be asked to play a role in the development and evaluation of management actions, from discussions with Council staff and long-standing Plan Team members, this appears to be uncommon. The development and evaluation of management actions is primarily conducted by Council and Alaska Regional Office (AKRO) staff outside of the Plan Team process; however, individual AFSC staff may be occasionally tasked to assist. This contrasts with the NEFMC and MAFMC process where NEFSC staff are members of plan development teams and

fishery management action teams which produce scientific evaluations for management options. These appointments can be quite demanding of staff time.

Plan Team members are appointed from government and academic institutions having expertise relating to groundfish fisheries. The current membership of both the BSAI and GOA Plan Teams includes members from the Council staff, AKRO, AFSC, as well as other state, federal, intergovernmental agencies and academic institutions (Table 1). Each Plan Team has three to four members with high-level population dynamics and assessment modelling expertise. Given the assessment review responsibilities of the Plan Teams, these members are critical for the review of model diagnostics and performance. Plan Teams also include members familiar with Council processes, ecosystem considerations, fish biology, observer deployment and data collection, and in-season catch accounting. More than one Plan Team member has highlighted that the Plan Teams would benefit from inclusion of a member from the AFSC survey group. Nominations for new members may be made by the Council, SSC, Advisory Panel (AP) or the Plan Teams themselves, though the Council retains final appointment authority. There does not appear to be a limit on the size of the Plan Team, though there are likely functional and resource limitations on size. More than one member of the Plan Team noted that while members can be added with relative ease, removing non-contributing members from non-groundfish Plan Teams has proven problematic in the past.

From a quick review of recent Plan Team meeting minutes, the absentee rate of Plan Team members appears low. Additionally, a notable feature of the Plan Team membership is the consistency of membership over time with many of the Plan Team members having served for over a decade. The stability in membership appears crucial to maintaining consistency in process and decision making and reducing the review time associated with each assessment given the relative familiarity. The level of participation among Plan Team members during the course of the meeting was variable, as is common among any large review body.

Assessment preparation and timing

The preparation and review process for the normal schedule of North Pacific groundfish assessment updates is compressed into the second half of the calendar year. The annual stock assessment process begins with a memo from the AFSC Resource Ecology and Fisheries Management (REFM) supervisors to assessment staff listing the stock assessment lead assignments along with the dates for completion of the stock assessment chapters for internal review, and preliminary and final submission to the Plan Teams. Within the annual updates, there are two preparatory tracks. If assessment authors expect any changes in the stock assessment either resulting from the incorporation of newly available information or changes in modelling approaches, the expectation is that authors will prepare a draft SAFE chapter for consideration and review by the Plan Team at their late September meeting and the SSC at their October meeting. Authors are strongly encouraged to collect and analyze new information well in advance of the September meeting to ensure that the implications of such information are thoroughly evaluated. The September meeting serves as an initial review of any new data products or assessment modelling approaches. If there are no new information or changes in the modelling approach it is not necessary to prepare a draft SAFE chapter for the September meetings; however, in all cases, a chapter should be produced for the November SAFE report. Generally, no new information or modelling approaches (other than updated survey and catch information) can be introduced at the November meeting, though this rule varies by Plan Team.

Based on discussions with AFSC staff, when a September SAFE chapter is required the preparatory work typically begins in mid to late summer and early fall for all other assessments (Figure 1). For those stocks in an off-year where only an executive summary of updated data are required, preparations may begin slightly later. The start of the preparatory work for the November meetings is typically contingent on the availability of survey data.

The AFSC maintains an internal review process to ensure the sufficiency of the stock assessment and completeness of the SAFE chapters (Figure 2). The AFSC-REFM supervisors will send out a second memo listing the assigned internal reviewers for each assessment. Internal reviewers pay particular attention to the content of the SAFE chapters to ensure that each chapter contains all of the required information (see Appendix B). Of particular note is the section of each SAFE report that explicitly responds to SSC comments from the previous year. This section allows a quick overview of how the assessment has changed, or not, and provides documentation of the feedback cycle within the NPFMC process. From discussion with AFSC staff, the thoroughness of the internal review varies considerably, ranging from a simple check of report format and content to an in-depth review of model diagnostics, though the latter appears to be less common. After the internal review and subsequent revisions, the draft SAFE chapters are released to the Plan Teams for pre-dissemination review.

During the November meeting, the Plan Team evaluates the sufficiency of stock assessment approaches, provides recommendations on future research and makes recommendations on levels acceptable biological catch (ABC) and overfishing limits (OFLs). The final products of the annual Plan Team process are the SAFE reports. Following the November meeting, a co-chair of the Plan Team will present the findings to the NPFMC's Scientific and Statistical Committee (SSC), the Advisory Panel (AP) and NPFMC in early to mid December. The SSC determines the final scientific recommendations for ABC and OFL levels and the AP makes initial recommendations on total allowable catch (TAC). Final catch specifications are set by the NPFMC at their mid December meeting.

Both the Plan Team and SSC review processes will be described in more depth in subsequent sections.

SAFE Report

The SAFE reports serves as the official summary of stock history, current conditions, and projected future status. SAFE reports are similar to the Stock Assessment Review Committee (SARC) report used in the Northeast Region. With the exception of the SAFE summary chapter, which is authored by the Plan Teams, individual subject chapters are authored by the stock assessment teams. In addition to the groundfish SAFE Report, two additional SAFE reports are produced dealing with ecosystem considerations and economic status; these reports are authored by AFSC-REFM staff and bound separately from the assessment SAFE reports.

Each SAFE chapter is intended to have a consistent format with prescribed sections and content (see Appendix B). The overall format of the SAFE report has remained relatively constant over the past decade, though changes are occasionally made such as the recent requirement to include retrospective analyses as part of the model evaluation criteria (not reflected in Appendix B). Of particular note is that authors are strongly encouraged to give careful consideration to all applicable SSC comments from the previous assessment(s). It was clear from discussions with both authors and Plan Team members, that compliance with this requirement varies. The report format for the draft September format is less rigid than the November report given that it is a preliminary draft. For the November report, the following guidance is provided in "A Guide to the Preparation of Alaska Groundfish SAFE Report Chapters":

A chapter should be produced for the November SAFE report in all cases, and should include all sections listed in the "Outline of SAFE Report Chapters" below. The Outline is intended to provide a consistent structure and logical flow for stock assessments conducted at the Alaska Fisheries Science Center for the groundfish fisheries of the BSAI and GOA. Some variation from this outline is permissible if warranted by limitations of data or other extenuating circumstance. However, it is particularly important that all of the items listed under "Projections and Harvest Alternatives" be included to the maximum extent possible, in that many of these are critical to the fishery management process.

While the chapter content is standardized, there is little standardization in the presentation of tables and figures. As is common among Northeast Region assessment reports, there is considerable variability in table and figure content and layout from assessment to assessment. More than one Plan Team member expressed frustration with the lack of consistency, though some acknowledged that consistency in format comes at the cost of stifling innovation with respect to developing novel approaches to presenting and visualizing data.

Each assessment SAFE report contains a summary chapter authored by the Plan Teams which provides a quick reference of changes from past assessments, current stock conditions and status and recommended ABC and OFL levels. For each SAFE chapter there is a primary and secondary Plan Team lead assigned for the November meeting. The primary lead's responsibility is to take minutes and draft the assigned section(s) for the summary chapter. The role of the secondary lead is to take notes that can be used to cross-check those of the primary leads. Lead responsibilities are often established in advance of the November meeting and subject leads are encouraged to prepare an initial draft of their respective chapter summaries before the meeting.

Plan Team review process

The groundfish Plan Teams meet twice a year, though there have been exceptions to this which are covered in a subsequent section (see section: *Alternate models and external participation)*. The initial Plan Team meeting occurs in September to review new assessment products produced by the Alaska Fisheries Science Center (AFSC). This meeting serves as an initial review of any new data products or assessment modelling approaches. Assessments that have no major changes are typically not presented at the September meeting. A final Plan Team review of all stock assessments in conducted in November. During the November meeting, the Plan Team evaluates the sufficiency of stock assessment approaches, provides recommendations on future research and makes recommendations on levels of acceptable biological catch (ABC) and overfishing limits (OFLs).

The Plan Team reviews in excess of forty stocks/stock complexes during their November meeting. The number of reviews makes for an intense and demanding meeting agenda (Appendix C). The Plan Team was described by one member as being more of a compilation team and less of a review team (i.e., it is their responsibility to compile and synthesize all of the assessment chapters into a single SAFE report that can be used to inform management decisions). While this is to some degree true, the Plan Teams do serve as the primary assessment review body of the NPFMC. The level of review intensity at any individual Plan Team meeting is often less than assessments are subjected to in the Northeast Region through the Stock Assessment Review Committee (SARC) process. The major strength of the NPFMC Plan Team process is that since many of the assessments are reviewed annually, they have been developed with direct participation by the Plan Team, as well as the SSC, over long periods of time. There is a high degree of familiarity with each stock assessment among Plan Team members, thus the annual review does not require the level of intensity that would be required of an external review body seeing a stock assessment product for the first time (e.g., a CIE-type review).

Generally, the Plan Team, as well as the assessment authors, appeared wary of models with major changes that were being brought forward for the first time. There was an inclination to retain the base models while the new models are investigated further and their performance evaluated over several years. In some cases the results between models varied substantially. There are no firm criteria by which a Plan Team will accept/reject a particular model. For example, during discussions on retrospective patterns, members highlighted a decision previously made by the BSAI Plan Team that it cannot disqualify a model solely because of retrospective bias, but rather it should be one of many criteria for rejecting a model.

Plan Team members take an active participation in write up of meeting minutes. It is considered to be a shared responsibility, though this has varied over time depending on the level of participation from Council

staff (e.g., the previous Council staff member assigned to the BSAI Plan Team had taken all of the minutes, though in their absence, the responsibility recently shifted to being a shared responsibility similar to how the GOA Plan Team had historically operated).

Following the November meeting, a co-chair of the NPFMC will present the Plan Teams findings to the NPFMC Scientific and Statistical Committee (SSC) for final determination of ABC and OFL levels. A co-chair will also present the Plan Team recommendations to both the Advisory Panel (AP) and the NPFMC.

Assessment tiers and control rules

Per the BSAI and GOA FMPs, the setting of reference points and catch specifications is determined through a well-established control rule (see Appendix D). In general, the harvest control rules become progressively precautionary with increasing tier classification. Tiers are established based on the content and quality of the information available. Harvest rules are adjusted depending on the status of stocks relative to B_{MSY} or the biomass $B_{X\%}$ corresponding to the percentage of the equilibrium spawning biomass that would be obtained in the absence of fishing (Tier 1-2; 3). Reference points and harvest control rules do not vary based on species life history – for example long-lived species like those from the *Sebastes* genus are not managed using a more conservative control rule compared to shorter-lived species like walleye pollock. It should be noted that some AFSC "assessments" are simply roll-overs of previous advice (tier 6) and others are simple smoothed survey trends multiplied by an estimate of M (tier 5). A major role of the SSC is to determine the tier for each stock, taking into account the recommendations of the assessment lead and the Plan Teams.

In all cases, the SAFE reports contain OFL and ABC recommendations for two years, though for stocks assessed annually, the out-year specifications will be supplanted by the following year's assessment. However, the out-year specifications serve as a useful backup in the event updated specifications cannot be passed and approved in advance of the following fishing year (e.g., in the event of a federal government shutdown).

One interesting aspect of the North Pacific catch specification process is the apportionment of total ABC into stock areas. Many of the stocks are assessed as a contingent unit, but managed as discrete areas (e.g., eastern, central and western GOA). The standard approach for apportioning out the total ABC to the sub-areas is through the application of proportion of total survey biomass caught in each area. This is similar to the current approach used for TRAC allocations. Given concerns in the Northeast Region over stock structure and the relatively small spatial scales of northeast stocks relative to those in the Alaska Region, it is possible that simple approaches such as these may be a more appropriate way forward rather than continued debate over conflicting indicators and definitions of the 'fish stock' concept. Smoothing out survey variability is a concern, though this has been partially addressed in the Alaska Region through the use of weighted moving averages, Kalman filters, and random effects models. This approach however, would not address concerns of localized depletion that could occur under a single-stock approach. The healthy status of all NPFMC groundfish stocks also contributes to the consistency of stock proportions over time.

Research recommendations

One of the obligatory sections of the SAFE Report chapters is the listing of stock-specific research priorities. Similar to the Northeast Region, assessment scientists are asked to identify data gaps and research recommendations and these are further added to by both the Plan Teams and SSC. The NPFMC has recently established revised guidance on prioritizing these research recommendations (see Appendix E).

The NPFMC maintains a very nice website tracking all the research priorities currently under consideration (https://research.psmfc.org/). It should be noted that for methods-based priorities, the Plan Team does not recommend that these go to NPFMC priority list, as this is more designed for maintaining a list of priorities

to guide Council and NGO funding of external projects. For simple priorities that can be addressed by the assessment author, the Plan Team recommends that these be listed only in the appropriate SAFE chapters.

Role of the SSC

The SSC meets five times a year in conjunction with the advisory panel (AP) and Council. Groundfish assessments are reviewed during the October and December meetings. These meetings are typically three days and overlap with the AP and Council to allow direct communication among these bodies. The October meeting reviews new stock assessment approaches for the groundfish stocks while the December meeting reviews the updated assessment results for all groundfish stocks and sets OFL and ABC for each. The other SSC meetings during the year address crab, salmon, and scallop OFL and ABC (which operate on different fishing years) as well as other scientific topics such as the Economic SAFE report and scientific issues associated with general topics such as habitat and bycatch. Meetings are scheduled well in advance, for example the 2016 dates and locations are already known, and details for the next two meetings are available in the NPFMC three meeting outlook (http://www.npfmc.org/wp-content/PDFdocuments/meetings/threemeetingoutlook.pdf).

As in New England, the primary role of the SSC is to set OFL and ABC for each stock. However, the NPFMC SSC fills a number of additional roles including providing initial review of EA/RIR/IRFA before they are released for public comment and holding scientific workshops to advance stock assessment methodologies. In order to set OFL and ABC, the SSC first reviews each stock assessment. Typically two or three SSC members are selected as leads for each assessment. These members lead the discussion during the meeting and write up the notes for the stock. The review takes into account the lead scientist's and the Plan Team's recommendations when selecting the model and tier to be used. Any change from these recommendations is detailed in the SSC notes describing why a different model or tier was selected. The SSC can decide to use one tier to classify the assessment but use another tier for determining OFL and ABC due to model uncertainty or diagnostic issues.

Once the model and tier are selected, the OFL and ABC calculations are formulaic. In cases where there are large changes in the ABC from last year (either up or down), a different ABC can be recommended by the SSC to make a smaller change than would otherwise occur (termed 'stairstep'). This creates more stability in the ABC recommendations over time. Additionally, the SSC can recommend ABC less than the formulaic values (denoted maximum permissible), but must provide the scientific reason for why this was done, such as poor diagnostic performance of the model. Based on discussions with a number of SSC members, the ecosystem and economic SAFE reports currently do not influence the OFL and ABC setting for nearly all groundfish stocks, but the goal is for both to eventually do so. It should also be noted that for most stocks the TAC is set below the ABC recommendation, which reduces somewhat the importance of the exact ABC value and provides an additional buffer in the process to prevent overfishing and maintain healthy stock sizes.

The general procedure for each stock during the December SSC meeting is for the Plan Team to present the information, the SSC is given an opportunity to ask questions of the Plan Team chair, public testimony is then welcomed, and finally the stock lead on the SSC provides their summary and initiates deliberation about model and tier for the stock along with any recommendations. This process can be quite quick if there are no major changes to the data or model (and resulting OFL and ABC) or can take a while if large changes have occurred. The large number of groundfish stocks limits the depth of the discussion and requires that the SSC stock leads are well prepared. Since the Plan Team chairs are familiar with the SSC process and information needs, having the Plan Team chairs present the results to the SSC rather than the individual assessment scientists results in a more efficient and consistent process. Additionally, because lead scientists are unavailable to address minor details associated with the assessment, the SSC discussions remain focused on the issues of primary importance with little opportunity for inconsequential details of the assessment to become a distraction. To put this in context, in the Northeast Region, assessment leads often present

assessment results directly to the SSC. While it is helpful to have the subject matter experts available to the SSC, it also presents an opportunity for the SSC to ask very detailed questions related to aspects of the assessment that have little impact on overall stock status or catch advice.

Discussions during the December 2014 SSC meeting were deliberate and congenial. No surprises occurred due to the vetting of new information and models at the October meeting. None of the SSC members attacked the information presented to them or highlighted areas of uncertainty that could be used to advance funding opportunities of self-interest. Instead, the discussions focused on the model results with discussions most often about the tier for a stock assessment. This approach reflected a strong degree of trust in the lead scientists and Plan Team to alert the SSC of any issues. This trust was also exhibited by members of the fishing industry during public testimony. For example, one person noted that they did not understand the models being used but trusted the scientists involved to provide correct information to the managers. The ability to get feedback about management decisions the next year contributes to building this trust with industry. The level of trust provided to the assessment scientists is undoubtedly a function of the healthy status of the Alaskan groundfish stocks. As illustrated by the Pacific cod example (see section: *Alternate models and external participation*). When the stocks have declined, industry trust has also declined, a phenomena common to Northeast groundfish stock assessments. In general, Alaskan industry members have also come to understand that changes in ABC of plus or minus 20% are not unusual or signs that the models are failing, but rather a reflection of the amount of uncertainty inherent in this difficult endeavor. Industry appears to understand that the ABC values are not exact, but that following the scientific advice and process will produce benefits in the long run.

The SAFE reports and any other material needed during the meeting are available on a NPFMC website a couple weeks prior to the meeting. The Council meeting agenda document contains links to each topic with multiple files possible within a topic. This approach allows easy access to the information and also serves as the guide for the SSC discussions. Unlike the Northeast, specific TOR for each SSC meeting are not used in the NPFMC process. Instead, any Council agenda item that will require SSC input is simply addressed during the SSC meeting, requiring close coordination between the Council and SSC chair. The size of the SAFE reports was mentioned as a concern multiple times during the meeting and in private conversations. The reports have become so large that it is extremely difficult for an individual to read them all before the meeting. Thus, SSC members often skim or skip reading those sections they were not specifically assigned, thereby reducing the level of peer review somewhat.

During the December meeting, the SSC needs to produce its report to the Council containing OFL and ABC values for all groundfish stocks within approximately one day of completing its deliberations. This requires the full involvement of all SSC members to contribute written sections and edit other sections. Typically, the two or three leads will work on draft text until they are satisfied, then send it to the chair and vice-chair. Once all sections are complete, the full document will be read by any available SSC members to catch typos or obvious problems. The completed document is typically around 40 pages long. The chair or vice-chair presents the SSC recommendations to the Council. Some SSC members mentioned that they prepare draft text prior to the meeting for stocks they lead so that only modifications made during the meeting are required.

As in the Northeast Region, the NPFMC staff members are highly knowledgeable and contribute to the institutional memory associated with all the stock assessments and management decisions. There appears to be a clear delineation regarding roles and responsibilities of Council staff in the Alaska process and strong working relationships between Council staff, SSC, and Plan Team leads. Timely production of all the documents would not be possible without this strong working relationship.

Role of external peer-review panels

In addition to the normal schedule of stock assessment updates and reviews, the Alaska Region maintains a separate review process involving the Center for Independent Experts (CIE). The purpose of the CIE review is to perform a comprehensive review of the assessment which will lead to improvements in the quality of the assessment. The SSC has developed draft guidelines for the external reviews of groundfish stock assessments (Appendix F), though it is not clear if the NPFMC has adopted a formal policy for the incorporation of external reviews in the assessment review process. As stated in the draft guidelines:

"The basic rule of thumb has been that any assessment with a major change in the model configuration or a major re-examination of input data and model parameters is a benchmark. Typically, a CIE review will result in a benchmark assessment, but benchmark assessments can also arise independently of a CIE review."

Often times the scheduling of CIE reviews is prompted by interest from external partners (e.g., industry). If external partners wish for an assessment to undergo an external peer review the process requires that they notify NMFS and the NPFMC of their intent to conduct an external review prior to the April NPFMC meeting (see Appendix F). While a stated goal of the Alaska Region is to achieve a CIE review of all stock assessments once every 5 years, this does not always appear to be the case. For example, the BSAI and GOA Pacific cod stocks underwent a CIE review in 2001, but did not receive another CIE review until 2011.

External reviews are typically scheduled in late winter/early spring so as to not interfere with the normal schedule of stock assessment updates. Due to the growing interest in external reviews and the substantial time commitments associated with these additional stock assessment reviews, the SSC has recommended that *"they are conducted in a manner that makes efficient use of the Assessment Author's time, provides an open forum for comment, leads to improvements in the quality of the assessment, and does not detract from the stock assessment and review process."*

While CIE reviews are often comprehensive, not all of the comments and recommendations from the CIE Panel will be incorporated into future assessments. Unlike in the Northeast Region, the CIE Panel is not asked to determine the sufficiency of a particular assessment for its use in crafting management advice. Rather the purpose of the CIE review in the Alaska Region is primarily to make recommendations for incremental improvements in the overall assessment approach (see Appendix G for a recent example of CIE TORs). It is the responsibility of the lead assessment author to consider the reviewer comments and determine the appropriateness, and feasibility of individual comments. The assessment author must prepare a response to the CIE reviewer's comments which are in turn provided to the Plan Teams and SSC for their consideration. This can, and has, led to cases where CIE recommendations have not been accepted for use in future assessments.

Alternate models and external participation

Overall, there was strong industry attendance at the November Plan Team and December SSC meetings early in the week during the review of the major stocks (pollock, Pacific cod, sablefish). While the industry did ask some clarifying questions related to the setting of the ABC levels, they were primarily operating as observers and collecting information in advance of the TAC setting process that occurs at the December AP and Council meetings. There were no industry consultants present to provide input on model formulations or reference point determinations.

While direct industry participation in the assessment modelling was not present at the November Plan Team meetings, there is a precedent of this in the Alaska Region. In the late 2000s the assessment biomass of Pacific cod was declining leading to reductions in TAC. Industry expressed concern with the accuracy of the assessment results and hired an industry consultant. In May 2010, a Joint Meeting of the North Pacific Fishery Management Council (NPFMC) Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) Plan Teams was convened to address uncertainty in Pacific cod assessment models. The minutes from this meeting provide an indication of the level of involvement of external consultants and the demands on the

assessment author (Appendix H). These joint meetings continued through 2013, but were replaced in 2014 by a smaller Joint Team Subcommittee on Pacific Cod Models. External participants would recommend model variations for the assessment authors to run at the March meeting and then the subcommittee would then narrow the list to reasonable number which is then forwarded on the SSC for final determination. The authors then conduct these additional model runs over the summer and these are reviewed during the September/November meetings. In all cases the AFSC assessment leads retain primary responsibility of the assessment.

Some Plan Team and SSC members were asked about whether multiple models or references points had been considered. The general response was that it has not been and that the NPFMC was not set up to deal with multiple models and had yet to have discussions on appropriate modelling approaches. While it is not documented anywhere (that could be located) there is a general presumption that the Plan Teams will recommend a single model and set of reference points to the SSC. The current tier system does not appear designed to handle multiple models being brought forward.

System demands and limitations

- List of assessed species continues to grow as species are split off (stock splits) or become increasingly important in a management context. This has been addressed to some extent by the development of a stock structure/spatial management template that can be used to evaluate the need for separating species from species complexes or stocks within species.

- Availability of age and length information. For most stocks survey age data are not available until the following year. Fishery age data are not typically available until the spring of the following year. Fishery length data may be available for the current year, but are often incomplete.

- Lack of quality fisheries-independent information for difficult to survey species (rocky ledge and/or deepwater/shelf slope habitat).

- Funding limitations compromising the integrity of fisheries-independent survey time series (e.g., GOA survey conducted triennially from 1984-1999 and biannually since, eastern Bering Sea shelf slope survey was cut in 2014).

- Model results and subsequent projections are sensitive to survey error (both process and observation), though there did not appear to be much concern that survey error could lead to volatility in the subsequent catch advice. It could be that error/signal ratio in the North Pacific stocks is lower than that of those from the Northeast Region.

- No prescriptive method has been developed for adjusting for retro bias (see Hanselman et al. 2013 http://www.afsc.noaa.gov/REFM/stocks/Plan_Team/2013/Sept/Retrospectives_2013_final3.pdf), but in general it has lead the Plan Teams and SSC to adopt a more precautionary approach to setting ABCs. The magnitude of the retrospective patterns in the Alaska groundfish assessments is typically lower than found in the New England groundfish assessments.

- There is general confusion on how to incorporate economic considerations when establishing catch recommendations. The Plan Team TOR do not currently provide any specific guidance on optimum yield (OY) considerations. There were some discussions on the need to create a separate Plan Team working group to deal with economic considerations when setting OFL/ABC. At least one Plan Team member noted that the decisions made by the Plan Teams should be consistent with that used by SSC which currently only includes biological considerations. Similarly, the ability to incorporate

ecosystem concerns into OFL and ABC setting is currently very limited despite the vast amount of ecosystem information collated.

- Difficulty of dealing with Pacific halibut issues due to their management by the IPHC as well as salmon bycatch in the groundfish fishery.

Strengths

- There is a single review process for all groundfish stocks. This makes it easy to compare and contrast among stock assessment results as well as maintain consistency in approaches.

- The objectivity of Plan Team and SSC membership. All members appeared committed to providing managers with the best available scientific information rather than furthering self-serving agendas.

- Consistency of Plan Team and SSC membership. Unlike the Northeast Region's SARC process, which relies on a CIE review panel, the Alaska Region's process is not susceptible to random reviewer effects. Odd recommendations from CIE reviews in Alaska can be dismissed.

- Allows for a high-frequency of stock assessment results: Assessments for many of the high profile stocks are conducted annually, for some less commercially important stocks, assessments may only be updated bi-annually based on the availability of survey data. Allows recent data to be used almost immediately.

- Limited terms of reference. The terms of reference under which the assessment leads must operate is limited in scope to providing an updated SAFE report. While they must respond to suggestions from external reviews, Plan Team and SSC reviews, it is done in such a way where the assessment lead is largely left to prioritize which aspects are a) most practicable, and b) most likely to produce significant gains in the quality of the stock assessment.

- Ability of lead scientists to explore new models and approaches without the overhead of the Northeast's benchmark process. The feedback cycle allows evolution of the stock assessments over time and provides the freedom to the lead scientist to do their job to the best extent possible while maintaining the goals of transparency, openness, and thoroughness.

- Healthy stocks allow natural fluctuations to be absorbed more easily. The control rules in the NPFMC groundfish FMP reduce the fishing mortality rate used to compute ABC when stock biomass is below B_{MSY}. For healthy stocks, this is an excellent measure to prevent biomass from declining to overfished levels. However, for stocks that are currently highly overfished, such as some New England groundfish, this control rule would eliminate all fishing on a stock, which is not practicable.

Weaknesses

- Resource intensive process requiring significant staff time from September through December.

- Thoroughness of the peer-review. The level of review intensity at any individual Plan Team meeting may be less than assessments are subjected to in the Northeast Region through the Stock Assessment Review Committee (SARC) process. The major strength of the NPFMC Plan Team process is that since many of the assessments are reviewed annually, they have been developed with direct

participation by the Plan Team, as well as the SSC, over long periods of time. Despite this, the NPFMC review process could be improved by applying a more consistent level of review of model diagnostics and performance.

- Potential for "group think" or getting stuck in a rut with a particular stock assessment. Adherence to a regular external review schedule may assist with this concern.

- Lack of consistency in the SAFE report format with respect to tables and figures and model diagnostics. While the organization of the SAFE report is formulaic there are differences in the layout/display of tables and figures and extent of model diagnostics presented that confound the efficient review of SAFE reports.

- The size of the SAFE reports have become so large that it is extremely difficult for an individual Plan Team and SSC members to read them all prior to the meetings. Reviewers often skim or skip reading those sections they were not specifically assigned, thereby reducing the level of peer review somewhat.

Tables

Table 1. Membership of the North Pacific Fishery Management Council Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) Plan Teams. *Acronyms: ADFG – Alaska Department of Fish and Game, AFSC – Alaska Fisheries Science Center, AKRO – Alaska Regional Office, IPHC – International Halibut Commission, NMFS – National Marine Fisheries Service, NPFMC – North Pacific Fishery Management Council, UAF – University of Alaska Fairbanks, USFWS – United States Fish and Wildlife Service.*

BSAI Plan Team	
Member	**Affiliation**
Alan Haynie	NMFS-AFSC (federal)
Bill Clark	IPHC (international) - retired
Brenda Norcross	UAF (academic)
Chris Siddon	ADFG (state)
Dana Hanselman	NMFS-AFSC (federal)
David Barnard	ADFG (state)
Diana Stram	NPFMC (Council)
Elizabeth Chilton	NMFS-AFSC (federal)
Grant Thompson (co-chair)	NMFS-AFSC (federal)
Kerim Aydin	NMFS-AFSC (federal)
Leslie Slater	USFWS (federal)
Lowell Fritz	NMFS-AFSC (federal)
Mary Furuness	NMFS-AKRO (federal)
Mike Sigler (co-chair)	NMFS-AFSC (federal)

GOA Plan Team	
Member	**Affiliation**
Chris Lunsford	NMFS-AFSC (federal)
Craig Faunce	NMFS-AFSC (federal)
Ian Stewart	IPHC (international)
Janet Rumble	ADFG (state)
Jim Ianelli (chair)	NMFS-AFSC (federal)
Jon Heifetz	NMFS-AFSC (federal)
Kristen Green	ADFG (state)
Leslie Slater	USFWS (federal)
March Stichert	ADFG (state)
Michael Dalton	NMFS-AFSC (federal)
Nancy Friday	NMFS-AFSC (federal)
Jim Armstrong	NPFMC (Council)
Obren Davis	NMFS-AKRO (federal)
Paul Spencer	NMFS-AFSC (federal)
Sandra Lowe	NMFS-AFSC (federal)

Table 2. Membership of the North Pacific Fishery Management Council Scientific and Statistical Committee (SSC). *Acronyms: ADFG – Alaska Department of Fish and Game, AFSC – Alaska Fisheries Science Center, APU – Alaska Pacific University, IPHC – International Halibut Commission, ISU – Idaho State University, NMFS – National Marine Fisheries Service, ODFW – Oregon Department of Fish and Wildlife, UAA – University of Alaska Anchorage, UAF – University of Alaska Fairbanks, URI – University of Rhode Island, UW – University of Washington.*

Member	**Affiliation**
Christopher Anderson	UW (academic)
Jennifer Burns	UAA (academic)
Robert Clark (vice-chair)	ADFG (state)
Alison Dauble	ODFW (state)
Sherri Dressel	ADFG (state)
Anne Hollowed	NMFS-AFSC (federal)
George Hunt Jr.	UW (academic)
Gordon Kruse/Milo Adkison	UAF/UAF (academic)
Pat Livingston (chair)	NMFS-AFSC (federal)
Seth Macinko	URI (academic)
Steve Martell	IPHC (international)
Fanz Mueter/Brad Harris	UAF/APU (academic)
Lew Queirolo	NMFS-AFSC (federal)
Terry Quinn	UAF (academic)
Katherin Reedy	ISU (academic)
Farron Wallace	NMFS-AFSC (federal)
Matthew Reimer	UAA (academic)

Figures

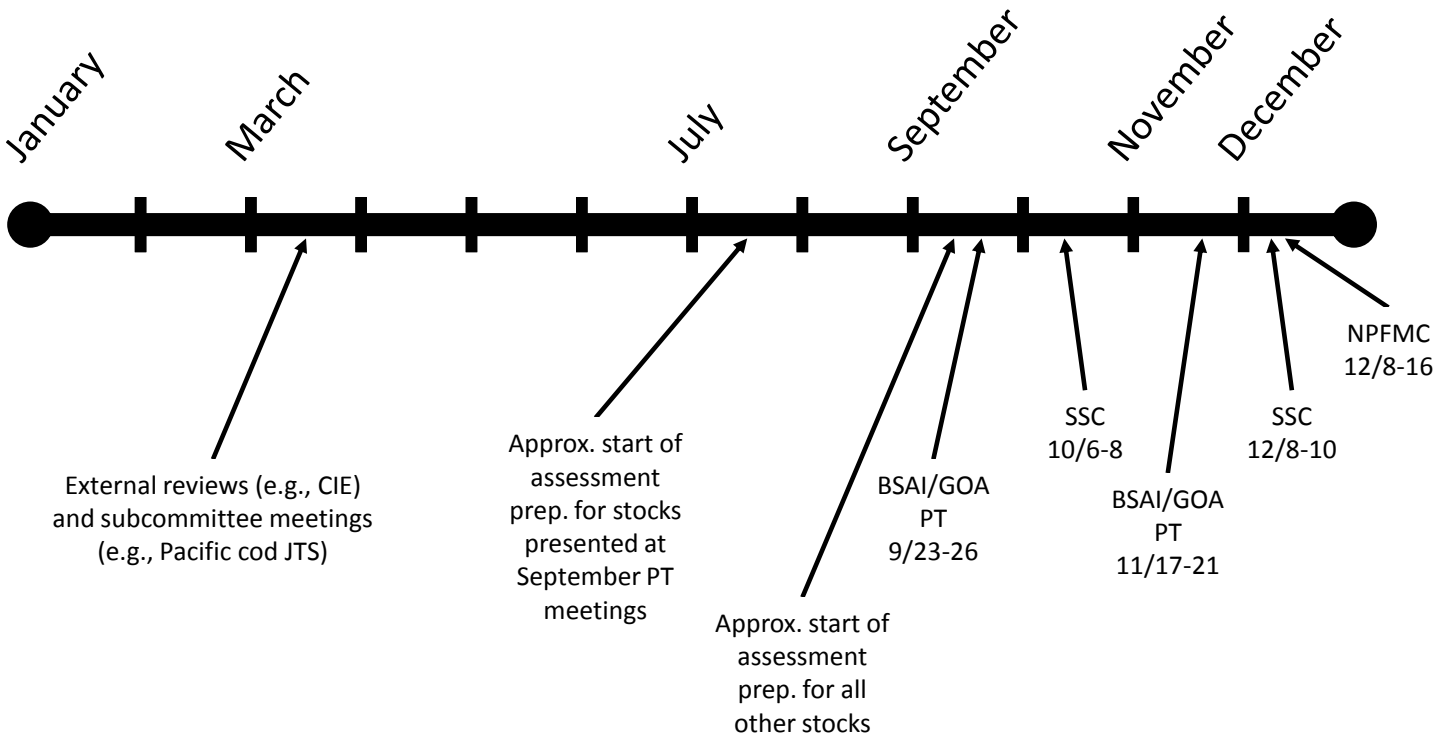


Figure 1. Schematic timeline of the Alaska Region/North Pacific Fishery Management Council groundfish assessment review process.

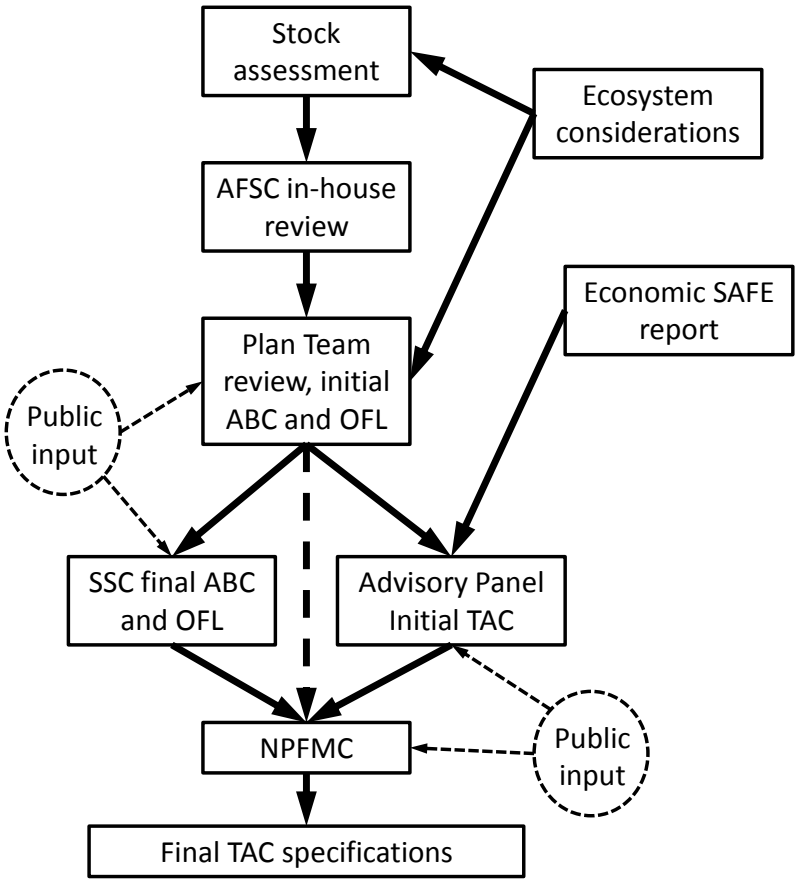


Figure 2. Schematic of the review of annual updates to the the North Pacific groundfish SAFE reports and the NPFMC catch specification setting process (adapted from *'The Alaska Fisheries Science Center-Alaska Department of Fish and Game-North Pacific Fishery Management Council Stock Assesment Review Process'*).

Appendix A. Terms of Reference for the Groundfish Plan Teams for Groundfish Fisheries of the Bering Sea/Aleutian Islands and Gulf of Alaska (updated October 2014).

1. **Establishment**. The North Pacific Fishery Management Council (Council) shall establish Plan Teams for the groundfish fisheries of the Bering Sea/Aleutian Islands (BSAI) and Gulf of Alaska (GOA). The Plan Teams will provide the Council with advice in the areas of regulatory management, natural and social science, mathematics, and statistics as they relate to the groundfish fisheries of the BSAI and GOA.

2. **Membership**. Plan Team members will be appointed from government agencies and academic institutions having expertise relating to the groundfish fisheries of the BSAI and GOA. Normally, each Plan Team will include at least one member from the Council staff, the regional office of the National Marine Fisheries Service (NMFS), NMFS' Alaska Fishery Science Center, the Alaska Department of Fish and Game, the Washington Department of Fisheries, the International Pacific Halibut Commission, the University of Alaska, the University of Washington, and other institutions and universities. With the consent of the sponsoring agency or institution, nominations may be made by the Council, the Scientific and Statistical Committee (SSC), the Advisory Panel (AP), or the Plan Teams themselves. All nominations will be subject to approval by the SSC, with the Council retaining final appointment authority. Appointments should reflect the Plan Teams' responsibility to provide advice in the areas of regulatory management, natural and social science, mathematics, and statistics.

3. **Organization**. Each Plan Team will be directed by a chairperson or co-chairs, and may divide some of its responsibilities among work groups organized according to subject matter. A work group may include members from more than one Plan Team. Each work group will be directed by a work group leader.
   (a) Rules of order. In general, rules of order will be informal. Plan Team decisions will be reached by consensus, whenever possible. If a decision is required and consensus cannot be reached, the opinion of the majority will prevail. In representing either Plan Team publicly, the spokesperson will take care to relate Plan Team opinions accurately, noting points of concern where consensus cannot be reached.
   (b) Meetings. Plan Team meetings will be held prior to Council's September and December meetings. The Plan Team chairpersons may call other meetings as necessary. The two Plan Teams may meet either separately or jointly. A draft agenda will be prepared in advance of each meeting by the Council staff in consultation with the respective chairperson or chairpersons, and may be revised by the Plan Team(s) during the meeting. Each agenda will include an opportunity for comments from the general public. Minutes of each meeting will be prepared by the Council staff, distributed to Plan Team members, and revised as necessary at or before the subsequent Plan Team meeting.
   (c) Selection of officers. Officers (Plan Team chairpersons and work group leaders) will be selected at the meeting preceding the September Council meeting or as vacancies arise. The Plan Team chairpersons will be selected for two-year terms. Work group leaders will be selected for one-year terms. There will be no limit on the number of consecutive terms that officers may serve.

4. **Functions**. The Plan Teams' primary function is to provide the Council with the best available scientific information, including scientifically based recommendations regarding appropriate measures for the conservation and management of the BSAI and GOA groundfish fisheries.

(a) SAFE report. The Plan Teams compile SAFE reports for the BSAI and GOA groundfish fisheries on an annual basis. The SAFE reports provide the Council with a summary of the most recent biological condition of the groundfish stocks and the social and economic condition of the fishing and processing industries. The SAFE reports summarize the best available scientific information concerning the past, present, and possible future condition of the groundfish stocks and fisheries, along with ecosystem considerations/concerns. This includes recommendation of acceptable biological catch and, where appropriate, total allowable catch levels. All recommendations must be designed to prevent overfishing while achieving optimum yield (National Standard 1). All recommendations must also be scientifically based (National Standard 2), drawing upon the Plan Teams' expertise in the areas of regulatory management, natural and social science, mathematics, and statistics. Finally, uncertainty must be taken in account wherever possible (National Standard 6).

(b) Plan amendments. At the direction of the Council, the Plan Teams may also play a role in the development and evaluation of amendments to the BSAI and GOA groundfish fishery management plans.

Appendix B. Outline/contents check of North Pacific groundfish Stock Assessment and Fishery Evaluation (SAFE) reports.

Stock/assemblage:

Outline of SAFE Report Chapters

Executive Summary

Summary of Major Changes

- ❑ Changes (if any) in the input data
- ❑ Changes (if any) in the assessment methodology
- ❑ Changes (if any) in the assessment results, including projected biomass, ABC, and OFL

Responses to SSC Comments

- ❑ Responses to SSC comments specific to this assessment (for each comment that is addressed in the main text, list comment and give name of section where it is discussed; if the SSC did not make any comments specific to this assessment, say so)
- ❑ Responses to SSC comments on assessments in general (for each comment that is addressed in the main text, list comment and give name of section where it is discussed; if the SSC did not make any comments on assessments in general, say so)

Introduction

- ❑ Scientific name(s)
- ❑ Description of general distribution(s)
- ❑ Description of management unit(s) (be sure to include any spatial and/or seasonal management measures).
- ❑ Evidence of stock structure(s), if any
- ❑ Description of life history characteristics relevant to stock assessments (e.g., special features of reproductive biology(ies))

Fishery

- ❑ Description of the directed fishery(ies)
- ❑ Information on bycatch and discards
- ❑ Summary of historical catch distributions
- ❑ Table showing time series of ABC, TAC, and total catch; accompanied by a list of recent relevant management or assessment changes that have influenced choice of ABC; selectivity of commercial fishing gear; or distribution of catch by gear, area, or season (e.g., changes in mesh size, gear allocations, harvest strategy, or modeling approach)

Data (Items in this section should be presented in tabular form.)

Data which should be presented as time series (starting with 1977):

- ❑ Total catch, partitioned by strata used in the assessment model, if any
- ❑ Catch at age or catch at length, as appropriate
- ❑ Survey biomass estimates
- ❑ Survey numbers at age or numbers at length, as appropriate
- ❑ Other time series data (e.g., predator abundance, fishing effort)
- ❑ Sample sizes (e.g., numbers of age or length samples by year, gear, and area)

Data which may be aggregated over time:

- ❑ Length at age
- ❑ Weight at length or weight at age

Analytic Approach

Model Structure

- ❑ Description of overall modeling approach (e.g., age/size structured versus biomass dynamic, maximum likelihood versus Bayesian)
- ❑ Reference for software used (e.g., Synthesis, AD Model Builder)
- ❑ Description of, or reference for, population dynamic representations used in the model (e.g., Baranov catch equation, Brody length-at-age equation)
- ❑ Discussion of changes in any of the above since the previous assessment

Parameters Estimated Independently

- ❑ List of parameters that are estimated independently of others (e.g., the natural mortality rate, parameters governing the maturity schedule)
- ❑ Description of how these parameters are estimated (methods do not necessarily have to be statistical; e.g., M could be estimated by referencing a previously published value)

Parameters Estimated Conditionally

- ❑ List of parameters that are estimated conditionally on those described above (e.g., full-selection fishing mortality rates, parameters governing the selectivity schedule)
- ❑ Description of how these parameters are estimated (e.g., error structures assumed, list of likelihood components)

Model Evaluation

- ❑ Description of alternative models, if any (e.g., alternative M values or likelihood weights)
- ❑ Description of criteria used to evaluate the model or to choose between alternative models, including the role (if any) of uncertainty
- ❑ Evaluation of the model(s) and selection of final model, if more than one model is presented
- ❑ List of final parameter estimates, with confidence intervals or other statistical measures of uncertainty if possible (if the set of parameters includes quantities listed in the "Results" section below, the values of these quantities should be presented in the "Results" section rather than here)
- ❑ Schedules, if any, defined by final parameter estimates

Results

- ❑ Definition of biomass measures used (e.g., biomass at ages 3 and above)
- ❑ Definition of recruitment measures used (e.g., numbers at age 3)
- ❑ Definition of fishing mortality measures used (e.g., full-recruitment F multiplied by average selectivity for ages 3 and above)
- ❑ Table of estimated biomass time series (starting with 1977), including spawning biomass as one measure, with confidence bounds or other statistical measure of uncertainty if possible. Include estimates from previous SAFE for retrospective comparisons
- ❑ Table of estimated recruitment time series (starting with 1977), including average, with confidence bounds or other statistical measure of uncertainty if possible. Include estimates from previous SAFE for retrospective comparisons
- ❑ Table of estimated catch/biomass time series (starting with 1977), with confidence bounds or other statistical measure of uncertainty if possible.
- ❑ Graph of estimated biomass time series, with confidence bounds if possible
- ❑ Graph of the estimated fishing morality versus estimated spawning stock biomass, including applicable *OFL* and maximum F_{ABC} definitions for the stock.

Projections and Harvest Alternatives

- ❑ List of parameter and stock size estimates (or best available proxies thereof) required by limit and target control rules specified in the fishery management plan
- ❑ Specification of F_{OFL} , *OFL*, the upper bound on F_{ABC}, and other applicable measures (if any) relevant to determining whether the stock is overfished
- ❑ List of standard harvest scenarios and description of projection methodology
- ❑ Table of 12-year projected catches corresponding to the alternative harvest scenarios, using stochastic methods if possible (mean values or other statistics may be shown in the case of stochastic recruitment scenarios)
- ❑ Table of 12-year 5-year (or 10-year, if the stock is overfished) projected spawning biomass corresponding to the alternative harvest scenarios, using stochastic methods if possible (mean values or other statistics may be shown in the case of stochastic recruitment scenarios)
- ❑ Table of 12-year projected fishing mortality rates corresponding to the alternative harvest scenarios, using stochastic methods if possible (mean values or other statistics may be shown in the case of stochastic recruitment scenarios)
- ❑ Discussion of information, if any, that might warrant setting ABC below the upper bound
- ❑ Recommendation of F_{ABC} and ABC for coming year.
- ❑ Subsection titled "Area Allocation of Harvests" and provide results and details of any apportionment schemes that are used.

Ecosystem Considerations

- ❑ Discussion of any ecosystem considerations (e.g., relationships with species listed under the ESA, prohibited species concerns, bycatch issues, refuge areas, and gear considerations).

See Guidelines for optional tables summarizing the following subsections:

Ecosystem Effects on Stock

There are several factors that should be considered for each stock in this subsection. These include:

- ❑ Prey availability/abundance trends (historically and in the present and foreseeable future).
- ❑ Predator population trends (historically and in the present and foreseeable future).
- ❑ Changes in habitat quality (historically and in the present and foreseeable future). These would primarily be changes in the physical environment such as temperature, currents, or ice distribution that could affect stock migration and distribution patterns, recruitment success, or direct effects of temperature on growth.

Fishery Effects on the Ecosystem

In this section the following factors should be considered:

- ❑ Fishery-specific contribution to bycatch of prohibited species, forage (including herring and juvenile pollock), HAPC biota (in particular, species common to *YourFishery*), marine mammals and birds, and other sensitive non-target species (including top predators such as sharks, expressed as a percentage of the total bycatch of that category of bycatch.
- ❑ Fishery-specific concentration of target catch in space and time relative to predator needs in space and time (if known) and relative to spawning components.
- ❑ Fishery-specific effects on amount of large size target fish.
- ❑ Fishery-specific contribution to discards and offal production.
- ❑ Fishery-specific effects on age-at-maturity and fecundity of the target species.
- ❑ Fishery-specific effects on EFH non-living substrate (using gear specific fishing effort as a proxy for amount of possible substrate disturbance).
- ❑ *Data gaps and research priorities*

Summary

Table showing:

- ❑ M
- ❑ Tier (previous year or recommended)
- ❑ Projected total biomass (give age range)
- ❑ Female spawning biomass for next year
- ❑ Equilibrium female spawning biomass values for B100%, B40%, B35% and B0 (if available from stock-recruit relationship)
- ❑ F_{OFL}
- ❑ Maximum allowable value for F_{ABC}
- ❑ Recommended value for F_{ABC}
- ❑ OFL
- ❑ Maximum allowable ABC
- ❑ Recommended ABC

❑ Literature Cited

Other comments/notes:

Appendix C. Example of draft agenda from the North Pacific Fishery Management Council Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) November Plan Team meeting.

Oct 14, 2014 version

NPFMC Groundfish Plan Team Meeting
Alaska Fishery Science Center, Building 4
Seattle, Washington

November 17 - 21, 2014
Draft Agenda

	Joint Groundfish Plan Teams Traynor Room 2076	BSAI Groundfish Plan Team Traynor Room 2076	GOA Groundfish Plan Team NMML 2039
Monday **Nov 17th**	9am Introductions, adoption of agenda, assignments, dates for 2015 meetings 915 Suggestions for minutes and SAFE intro summaries 930 PT Terms of Reference 945 Annual observer deployment plan update 10 Research priorities 11 Economic SAFE report (T)		
	1pm Stock structure and spatial management policy 130 Sablefish	3pm Review summary assignments, format, timing 315 Atka mackerel 415 Greenland turbot	3pm Review summary assignments, format,timing 3:15 Ecosystem considerations 3:45 Flathead, Rex, Deepwater
Tuesday **Nov 18th**		9am Ecosystem considerations 930 Pollock: EBS Bogoslof Aleutian Islands	9am Sharks Sculpins Squid Skates Octopus Arrowtooth
		1pm Pacific cod: EBS Aleutian Islands 4pm Flathead sole	1pm Pollock 4pm Forage fish
Wed **Nov 19th**		9am Yellowfin sole Kamchatka flounder Northern rock sole Alaska plaice Other flatfish Arrowtooth flounder	9am Pacific cod 11am Shallow flats and N-S rock sole
		1pm Pacific ocean perch Northern rockfish Blackspotted and Rougheye rockfishes	1pm Northern rockfish Shortraker rockfish Rougheye/BS
Thu **Nov 20th**		9am Shortraker rockfish Other rockfish 10am Skates Sculpins Sharks Squid forage fish	9am Other rockfish (YE Discussion) Demersal shelf rockfish POP Dusky rockfish Thornyhead rockfish Atka mackerel 10am Table preparation, Report writing
		1pm Table preparation, Report writing	1pm Table preparation, Report writing
Fri **Nov 21st**		9:00 Report writing 3pm Adjourn	9am If necessary 12pm Adjourn

NOTE: The above agenda items may not be taken in the order in which they appear and are subject to change as necessary. All meetings are open to the public.

Appendix D. Excerpt from the North Pacific Fishery Management Council (NPFMC) Gulf of Alaska (GOA) Fishery Management Plan (FMP).

Tiers used to determine ABC and OFL for groundfish stocks.

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

1a) *Stock status:* $B/B_{MSY} > 1$
$F_{OFL} = m_A$, the arithmetic mean of the pdf
$F_{ABC} \leq m_H$, the harmonic mean of the pdf

1b) *Stock status:* $a < B/B_{MSY} \leq 1$
$F_{OFL} = m_A \times (B/B_{MSY} - a)/(1 - a)$
$F_{ABC} \leq m_H \times (B/B_{MSY} - a)/(1 - a)$

1c) *Stock status:* $B/B_{MSY} \leq a$
$F_{OFL} = 0$
$F_{ABC} = 0$

(2) *Information available: Reliable point estimates of B,* B_{MSY}, F_{MSY}, $F_{30\%}$, and $F_{40\%}$.

2a) *Stock status:* $B/B_{MSY} > 1$
$F_{OFL} = F_{MSY} \times (F_{30\%}/F_{40\%})$
$F_{ABC} \leq F_{MSY}$

2b) *Stock status:* $a < B/B_{MSY} \leq 1$
$F_{OFL} = F_{MSY} \times (F_{30\%}/F_{40\%}) \times (B/B_{MSY} - a)/(1 - a)$
$F_{ABC} \leq F_{MSY} \times (B/B_{MSY} - a)/(1 - a)$

2c) *Stock status:* $B/B_{MSY} \leq a$
$F_{OFL} = 0$
$F_{ABC} = 0$

(3) *Information available: Reliable point estimates of B,* $B_{40\%}$, $F_{30\%}$, and $F_{40\%}$.

3a) *Stock status:* $B/B_{40\%} > 1$
$F_{OFL} = F_{30\%}$
$F_{ABC} \leq F_{40\%}$

3b) *Stock status:* $a < B/B_{40\%} \leq 1$
$F_{OFL} = F_{30\%} \times (B/B_{40\%} - a)/(1 - a)$
$F_{ABC} \leq F_{40\%} \times (B/B_{40\%} - a)/(1 - a)$

3c) *Stock status:* $B/B_{40\%} \leq a$
$F_{OFL} = 0$
$F_{ABC} = 0$

(4) *Information available: Reliable point estimates of B,* $F_{30\%}$, and $F_{40\%}$.
$F_{OFL} = F_{30\%}$
$F_{ABC} \leq F_{40\%}$

(5) *Information available: Reliable point estimates of B and natural mortality rate M.*
$F_{OFL} = M$
$F_{ABC} \leq 0.75 \times M$

(6) *Information available: Reliable catch history from 1978 through 1995.*
OFL= *the average catch from 1978 through 1995, unless an alternative value is established by the SSC on the basis of the best available scientific information*
$ABC \leq 0.75 \times OFL$

Appendix E. Proposed new categories and definitions for North Pacific Fishery Management Council (NPFMC) research priorities.

Based on the recommendations of the NPFMC SSC at the June 2014 meeting in Nome, a subgroup of SSC/Council members was formed to discuss and refine the categories and definitions used for the NPFMC research priorities. The SSC/Council subgroup consisted of Pat Livingston, George Hunt, Bill Tweit, and Glenn Merrill. The group corresponded via email and by teleconference over the summer and arrived at the following draft research priorities definitions.

Background and History

In June 2012, SSC recommended that the research priorities process be revamped. At that time research priorities were separated into two categories:

1. Immediate concerns: Research activities that must be addressed to satisfy federal requirements and to address pressing fishery management and ecosystem issues related to fishery management
2. Ongoing needs: Research to advance the Council's fisheries management goals as defined in the Groundfish PSEIS, other strategic documents of the Council (i.e., FMPs, AI FEP, and EFH, crab, salmon PSC, and other EISs) and NMFS). It also includes efforts on which assessment models depend for annual updates (e.g., survey information) for setting OFLs and ABCs.

Based on the June 2012 SSC recommendation, a summary of the proposed revamp still included the idea of maintaining the above two categories but also to include a relative rank (high, medium, low) among all the priorities submitted by a Plan Team. A workgroup met in August 2012 to go over the proposed fields and there appeared to be duplication between items that were both immediate concerns and ongoing needs. When the SSC revamped the list in April 2013, those two categories were removed.

In June 2014, the SSC went through the scallop Plan Team and crab Plan Team research priorities and attempted to provide more delineation between high, medium, and low priorities so that all priorities were not in the high priority category. However, this differentiation was difficult without a definition of those categories and the Council asked for an explanation of how the SSC made the differentiation. The SSC recommended in June 2014 that a subgroup be formed to look at the research priority categories and derive definitions. In discussion, some members wondered whether a return to the use of the "immediate concerns" and "ongoing needs" categories would be useful. The discussion also noted that the list of research priorities would generally tend towards including mainly the highest priority research items anyway and that differentiation between high, medium, and low might not be so critical.

Research Priorities Subgroup Discussions about Options

Possible options initially considered by the subgroup:

1. Bring back immediate concerns and ongoing needs categories and remove hi, med, low
2. Retain high, medium, low categories and derive definitions for those
3. Bring back immediate concerns and ongoing needs and retain high, med, low categories after deriving definitions for those

After several rounds of discussion the first option was refined to arrive at a 4 category prioritization system that consists of: **urgent/important/useful and critical ongoing monitoring**. Wording from the IPHC research categorization scheme was considered and partly incorporated into the proposed scheme.

DEFINITIONS:

CRITICAL ONGOING MONITORING: Monitoring activities placed in this category consist of those that: (1) provide an essential management function; and (2) cannot be achieved through other means. This is monitoring essential to maintain our compliance with federal requirements, National Standards, or is necessary for the ongoing management of the fishery. Postponement would have a significant and immediate impact on management.

Examples include monitoring that has a direct bearing on the assessment or its inputs, harvest policy, or current management structure such as: agency fish surveys that are the inputs for fish stock assessment, marine mammal surveys needed for tracking Biological Opinion requirements, or socioeconomic data collections needed to evaluate impacts of management decisions and track performance of programs.

URGENT: Research that is essential for compliance with federal requirements, National Standards, or identified by management as important to aid decision-making. It is expected that a one or two year project would meet the information need. Postponement would have a significant impact on management.

Examples include genetics analyses to resolve stock delineation questions for harvest specifications, social science surveys to inform the design of new rationalization programs, deep-sea coral habitat mapping, or marine mammal ecology or fishery interaction studies that would provide important input into Biological Opinions or NEPA analyses.

IMPORTANT: Obtaining a new set of data or research result that is likely to aid in the evaluation of a management goal or advancement of information for EBM The research might be a several year program. Postponement will not have an immediate significant impact on fishery management but will likely impact future analyses.

Examples include studies to improve parameters for stock assessment, gear research to reduce bycatch, management strategy evaluations to examine robustness of harvest policies to climate change, incorporation of uncertainty into harvest-setting, examination of ecosystem thresholds for management, particularly if these have been identified as items to implement expressed goals of the NPFMC through the groundfish PSEIS workplan or FEP.

USEFUL: Research which addresses current issues of any subject but is not considered having a timely need or being crucial to current management or operation.

Examples include ichthyoplankton surveys or analyses that have not yet been linked to a stock assessment or fishery management, new methods to monitor disease, or monitoring of contaminant levels in living marine resources.

Appendix F. North Pacific Fishery Management Council and Alaska Fisheries Science Center guidelines for external reviews of groundfish stock assessments.

A Guide to External Reviews of Alaska Groundfish Assessments

Background

The Alaska Fisheries Science Center is the primary institution responsible for groundfish stock assessments. Assessment Authors prepare assessments for groundfish stocks and stock complexes managed under the Fishery Management Plan (FMP) for the groundfish fisheries of the Bering Sea and Aleutian Islands Region and the FMP for the groundfish fisheries of the Gulf of Alaska. These assessments are subject to in-house review before dissemination to the Plan Teams, Scientific and Statistical Committee (SSC), and Council as part of the respective Stock Assessment Fishery Evaluation (SAFE) report process.

The Center regularly requests independent external reviews of a sub-set of assessments. External reviews are typically conducted through the Center of Independent Experts (CIE). The CIE provides qualified external reviewers who perform a comprehensive review of the assessment. The Assessment Author considers the comments of the reviewer and seeks to address issues or concerns raised during the process. The reviewer's comments and the Assessment Author's responses (if any) are provided to the Plan Teams and SSC for their information and consideration.

The AFSC prepared guidelines for preparation of the stock assessments which were approved by the Plan Teams and SSC (Attachment 1). The Bering Sea Aleutian Islands and Gulf of Alaska Groundfish FMPs require that draft SAFE reports be produced each year in time for the October and December meeting of the North Pacific Fishery Management Council (NPFMC). These drafts are assembled and reviewed at meetings of the Groundfish Plan Teams held in September and November. The draft reports prepared for the October meeting of the NPFMC are limited to assessments where substantial changes to the information used in the assessment or the model structure are proposed. To ensure adequate time for internal review of stock assessments, a pair of due dates will be established annually. These due dates typically will precede the respective Plan Team meetings by three to four weeks to allow time for internal review, reproduction and distribution of the report, and review by members of the Plan Team.

The current guidelines for submission of SAFE chapters from Assessment Authors do not address procedures for external reviews of assessments. While Assessment Authors welcome expert advice on their assessments, there are substantial time commitments associated with these additional stock assessment reviews. Given the growing interest in external reviews, the SSC recommends that the Council adopt guidelines for reviews to ensure that they are conducted in a manner that makes efficient use of the Assessment Author's time, provides an open forum for comment, leads to improvements in the quality of the assessment, and does not detract from the stock assessment and review process. A draft guideline follows.

Notification

If members of the public wish for comments of an external reviewer to be considered in the upcoming assessment cycle, they should notify NMFS and the NPFMC of their intent to formally review an assessment no later than the April NPFMC meeting. If multiple groups plan to assess the same assessment, the AFSC and the NPFMC should work with the groups to coordinate meetings and requests for materials to ensure the most efficient use of the Assessment Author's time.

Timing

External reviews of groundfish assessments should occur prior to the peak AFSC Staff assessment period July – December. Ideally, the reviewer will work with Assessment Authors in a collegial setting where reviewers would make suggestions to the framework or information used in the assessment. If this procedure is adopted, the Assessment Author would work with the reviewer(s) to find a mutually acceptable time for a pre-assessment workshop.

Responsibilities of External Reviewers and Assessment Authors

The pre-assessment workshop (this implies a formal meeting – is this the intention?) will allow the reviewer to discuss the stock assessment with the Assessment Author and make requests for model modifications or alternative use of information in the assessment. The External Reviewer should produce a written report of their recommendations. To the extent practicable, the Assessment Author will address the comments and suggestions documented in the External Reviewer's report in their SAFE document. In general it is assumed that the Assessment Author will be able to determine whether any changes in the stock assessment recommended by the External Reviewer are substantial enough to require review by the Plan Teams and SSC. Assessment Authors will have the professional discretion to decide when the External Reviewer's recommendations will be incorporated into the SAFE document. When the External Reviewer's recommendation involves a matter of professional discretion, such as the choice of statistical or computational methods, Assessment Authors will have the ability to decline to implement the recommendation. In addition, Assessment Authors may defer action on an External Reviewer's recommendation when complying with the recommendation would compromise the SAFE schedule. For example, if an External Reviewer made a request that would require extensive re-analysis of existing data that could not be accomplished prior to the September Plan Team meeting, that request could be deferred to a subsequent year.

In cases where a recommendation is not brought forward in the assessment, Assessment Authors will inform the reviewer of his or her rationale for not acting on the recommendation three weeks prior to the September Plan Team meeting. The External Reviewer can inform the Plan Team and the SSC of the rationale for their recommendation by submitting a report in September. The report should contain sufficient information to allow the Plan Team and SSC to fully review the recommendation. The SSC will determine whether the recommendation should be advanced for consideration.

Appendix G. Example of Terms of Reference from the 2011 external Center for Independent Experts (CIE) peer review of the Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) Pacific cod assessments.

Annex 2: Tentative Terms of Reference for the Peer Review BSAI and GOA Pacific Cod Stock Assessment Review
Annex 2: Terms of Reference

For both the EBS and GOA Pacific cod assessments, CIE reviewers shall evaluate current model assumptions and make recommendations for improvements thereof, including:

1. Use of age data, including:
    a. Use of age composition data
    b. Use of mean-size-at-age data
    c. Use of ageing bias as an estimated parameter
    d. External estimation of between-individual variability in size at age
2. Data partitioning/binning, including:
    a. Catch data partitioned by year, season, and gear
    b. Size composition data partitioned by year, season, gear, and 1-cm size intervals
    c. Age composition data partitioned by year, season, and gear
3. Functional form of the length-at-age relationship and estimating the parameters thereof
4. Number and functional form of selectivity curves estimated, including assumptions regarding which selectivity curves should be forced to exhibit asymptotic behavior
5. Fixing the trawl survey catchability coefficient for the recent portion of the time series such that the average product of catchability and selectivity across the 60-81 cm size range equals the point estimate obtained by Nichol et al. (2007)
6. Fixing the natural mortality rate at the value corresponding to Jensen's (1996) Equation 7
7. Input sample sizes for size composition and age composition data, and input log-scale standard deviations for survey abundance data
8. Allowing for annual variability in trawl survey selectivity
9. Setting the input standard deviation of log-scale recruitment (σ_R) equal to the standard deviation of the estimated log-scale recruitment deviations
10. Use of survey data and non-use of fishery CPUE data in model fitting

References:

Jensen, A. L. 1996. Beverton and Holt life history invariants result from optimal trade-off of reproduction and survival. *Can. J. Fish. Aquat. Sci.* 53:820-822.

Nichol, D. G., T. Honkalehto, and G. G. Thompson. 2007. Proximity of Pacific cod to the sea floor: Using archival tags to estimate fish availability to research bottom trawls. *Fisheries Research* 86:129-135.

Appendix H. Meeting minutes from the May 2010 Joint Meeting of the North Pacific Fishery Management Council (NPFMC) Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) Plan Teams. The 2010 joint meeting was the first special meeting convened to address uncertainty in Pacific cod assessment models. These joint meetings continued through 2013, but were replaced in 2014 by a smaller Joint Team Subcommittee on Pacific Cod Models.

JOINT MEETING OF THE BSAI AND GOA GROUNDFISH PLAN TEAMS
May 6, 2010

Members of the Plan Teams present for the meeting included those shown in bold below.

Loh-Lee Low	AFSC REFM (BSAI chair)	**Jim Ianelli**	**AFSC REFM (GOA co-chair)**
Mike Sigler	**AFSC (BSAI Vice chair)**	**Diana Stram**	**NPFMC (GOA co-chair)**
Kerim Aydin	**AFSC REFM**	**Sandra Lowe**	**AFSC REFM**
Lowell Fritz	AFSC NMML	**Jeff Fujioka**	**AFSC ABL**
David Carlile	**ADF&G**	**Jon Heifetz**	**AFSC ABL**
Alan Haynie	**AFSC REFM**	**Mike Dalton**	**AFSC REFM**
Jane DiCosimo	**NPFMC (Coordinator)**	Cleo Brylinsky	ADF&G
Henry Cheng	**WDFW**	Tom Pearson	NMFS AKRO Kodiak
Brenda Norcross	UAF	**Nick Sagalkin**	**ADF&G**
Mary Furuness	NMFS AKRO Juneau	**Paul Spencer**	**AFSC**
Grant Thompson	**AFSC REFM**	Leslie Slater	USFWS
Dave Barnard	ADF&G	**Nancy Friday**	**AFSC NMML**
Leslie Slater	USFWS	**Henry Cheng**	**WDFW**
Dana Hanselman	**AFSC ABL**	Ken Goldman	ADF&G
Bill Clark	**IPHC**	Bob Foy	AFSC Kodiak
		Sarah Gaichas	**AFSC REFM**
		Steven Hare	**IPHC**

Others in attendance: Pat Livingston, Anne Hollowed, Farron Wallace, Martin Dorn, Tom Helser, Chris Lunsford, Teresa A'Mar, Delta Anderl, Kenny Down, Mark Maunder, Julie Bonney.

Mike Sigler chaired the joint meeting of the groundfish Plan Teams. The objective of the meeting was to review proposals for GOA and BSAI Pacific cod stock assessment models. The goal was to recommend no more than six models for each area assessment for Fall 2010. The proposers deferred to Grant Thompson and the Teams for the review of their proposals, but were invited to participate in the discussion of their proposal.

Twenty one proposals were received from the GOA Groundfish Plan Team, Teresa A'mar, Mark Maunder, the Freezer Longline Coalition, the BSAI Groundfish Plan Team, and the Scientific and Statistical Committee (SSC). Grant Thompson reviewed new model proposals collectively for the GOA, the BSAI, and for both areas, as well as his own suggestions for model changes.

The Teams reviewed a draft spreadsheet that was prepared by Mike Sigler, which grouped the proposals by nineteen categories (types of recommended model changes), including the current model (Model 1) for each area assessment. Dave Carlile suggested that the teams consider combining model proposals for each category listed in the table. Jim Ianelli suggested that this could be achieved by adding columns to the draft spreadsheet. Grant Thompson revised the table as the teams reached consensus.

Exclude mean length-at-age data and exclude age composition data

Bill Clark noted that all models that would exclude length-at-age data also would exclude age composition data,

so these proposals were reviewed together. Jim Ianelli endorsed the suggestion to put all the age related ideas into a single model. Grant Thompson agreed with Bill, noting that current practice is to omit survey length composition data in years for which survey age composition data are used, which implies that inclusion of length-at-age data is essential for meaningful estimation of cohort-specific growth parameters when age composition data are used (otherwise, the only data available for estimation of cohort-specific growth parameters would be the length composition data from the fisheries, which generally do not include the young ages at which cohort-specific growth is easiest to detect). The teams agreed to recommend that one model exclude both age composition data and length-at-age data for both assessment areas.

Jon Heifetz questioned whether these assumptions lead to a realistic model, or whether the teams were simply exploring sensitivities to baseline assumptions. Jim Ianelli clarified that Model 1 would form the baseline against which other models would be compared. Dana Hanselman responded that the teams would be recommending at most five alternate model configurations to the baseline model.

Recommendation: The teams recommended adding this component to models 4, 5, and 6.

Estimate the two parameters describing variation in length-at-age
Bill Clark asked why this model configuration was proposed. Mark Maunder responded that including these parameters improves the fits to the data. He noted that the variability in length at age of year l fish is at age is fairly well determined, but is less well determined for older fish. Bill suggested that length-at-age data might be adequate for external estimation of these parameters, even if the data are biased.

Grant Thompson referred to slide 13 of his Powerpoint presentation, which depicted a good fit between standard deviation of length at age and mean length at age. Mark Maunder voiced concern about using length-at-age data if bias is showing up in only the older fish, resulting in more variability than expected; therefore he prefers to exclude the length-at-age data in one model run. He was particularly concerned if the model creates this bias inside the model. Grant agreed that using length-at-age data to estimate variability in length at age would not result in a model that is completely independent of all data relating to age; however, if the Teams wanted to include a model that was "almost" completely independent of age data, this would probably be the first compromise they would want to make. Mark continued that if you are going to exclude all age-related data, then you need to estimate the variance of age data in the model itself. Jim Ianelli replied that this assumption seems reasonable, but was concerned about estimating variability in length at age within the model when the length-at-age data themselves have been excluded. He shared Grant's concern that any improvement in the model's fit could result from misspecification(s) elsewhere in the model. Kenny Down noted that internal estimation of variability in length at age, without using length-at-age data, would be a logical extension of the Freezer Longline Coalition's previous requests to eliminate age composition data from the model. Mike Sigler noted that the proposal was worth recommending for technical reasons.
Grant responded that the Teams could approve one model that estimates variability in length at age internally, and another that does so externally.

Recommendation: The Teams recommended adding this component to models 5 and 6.

Eliminate cohort-specific growth & add time-varying growth
Grant Thompson noted that use of cohort-specific growth was a new feature in the BSAI model last year; and it became the preferred model. Bill Clark said he was hesitant to accept the proposed model change unless it fits the data better. He preferred a model that has constant growth unless there is clear evidence for a cohort-specific effect. Mark Maunder recommended treating time-varying growth like a random effect. Grant offered that Rick Methot has suggested

interpreting cohort-specific growth as being roughly equivalent to cohort-specific K. Thus, cohort-specific growth adds one parameter to be estimated for each cohort, whereas time-varying growth (as implemented by Mark) adds three parameters to be estimated for each year.

Mike Sigler said that Model 6 is the same as Model 5 with cohort specific growth replaced by time-varying growth. As a new alternative, he proposed that the teams add a model with constant growth. Mark Maunder asked if the teams felt there was evidence of time varying growth, and suggested Pacific cod growth does not have a consistent trend like Pacific halibut. The trend for cod varies greatly; he referred to page 5 of his proposal for more discussion on this issue.

Dana Hanselman clarified that since the current model already uses cohort-specific growth, going to more parameters might be too much. He suggested that the proposals are general and the plan teams can modify them (e.g., vary only K, and not L1 and L2). He recommended maintaining cohort-specific growth assumptions in the model; he was concerned about making the model more complex by varying growth while there may be other model misspecifications.

The Teams deleted Mike Sigler's suggestion related to cohort growth, to not allow a growth matrix that is constant in time. The base model has cohort-specific growth. Time-varying growth will only be implemented in BSAI (Model 6) due to the quantity of age data in the GOA. Bill Clark asked why go to annual deviations of growth (or age?) data. Mark Maunder responded that cohort specific growth did not explain everything he wanted it to; incorporating time-varying growth substantially improved the likelihood. Model 6 is based on models that do not include mean length at age data. While the teams are trying to limit the number of models requested from the author this fall, the teams discussed the need for requesting this model relative to other priorities. The team ultimately agreed to request this model as it was the only request by industry different from other team or SSC requests (i.e., adds only one model beyond the models requested by the SSC or teams).

Recommendation: The teams recommended adding this component to Model 6 (BSAI only).

Age conditioned on length

Farron Wallace said that the SSC thought that this proposal might resolve the issue where mean size at age does not match the size modes in the BTS. Jim Ianelli responded that this approach is not used in any other AFSC assessment and that residuals should be carefully examined. Farron agreed and recommended that the author take another look at this approach in future assessments to see if it improves model fits. Jim concurred.

Recommendation: The Teams did not recommend adding this component to any of the models until age determination issues are resolved.

Finer length bins

After some discussion the teams felt this was a routine housekeeping change to the model. Grant Thompson noted that this might result in the loss of the pre-1982 portion of the EBS bottom trawl survey time series, because the original size composition files for those years appear to have been lost. Mark Maunder noted that Stock Synthesis allows the user to specify different bin structures for different data sets (including different years), so continued use of the pre-1982 survey time series should not be a problem after all.

Recommendation: The teams agreed that the author was free to test and implement minor changes to the model as he felt appropriate. The Teams recorded this as a change to models 2 through 6.

Maturity as a function of length rather than age and ageing bias from radiocarbon study
The Teams discussed these two proposed model changes. It was noted that basing maturity on length rather than age would be more consistent for those models that did not use age data. It was also noted that the sample size (10) used in the radiocarbon study would not be sufficient to construct an ageing bias matrix. Recommendation: The Teams recommended adding maturity as a function of length rather than age to models 4, 5, and 6. The teams recommended no change related to the radiocarbon study.

Priors on selectivity, estimate catchability
Dana Hanselman asked about the history of estimating selectivity; e.g., had Grant "tried everything" and the priors were fixed now? Grant responded that the current models use uniform priors only, but he prefers using informative priors on any parameters where some prior information is available. Mark Maunder was concerned that, in December, the SSC could reject an entire model because of its use of informative priors, even if the other features of the model constitute significant improvements. Grant and Mike Sigler suggested that Team and SSC review of any proposed priors in September/October should minimize this possibility (i.e., priors that the Teams/SSC accept in September/October would likely be accepted in November/December).

Grant reported that while, it is difficult to estimate catchability inside the model, he is concerned that the point estimate of catchability from the 11 cod tagged by Dan Nichol might not be correct. He would like to continue his modeling attempts in this area. Dana Hanselman suggested that tightening up priors on selectivity should help with improving catchability estimates. A separate model using these components was suggested.

Recommendation: The Teams recommended adding these components as the main new features of Model 3.

Exclude IPHC data
Cod data from the IPHC halibut survey have been used in the BSAI model, but not in the GOA model. The SSC has recommended that the data no longer be used in BSAI (the BSAI Plan Team made no recommendation on its use last year), because the relative abundance data from the IPHC survey turned out to be inversely correlated with the abundance estimates from all 14 models in last year's assessment. Bill Clark noted that the survey coverage was much greater in the GOA than in the BSAI and so the GOA data could be more useful due to overlapping halibut and cod habitat there. Steven Hare noted that, except for Area 3B, there is good survey coverage in both areas. The request for length composition data from this year's IPHC survey has already been withdrawn, and it is too late to change the IPHC survey methods this year. Kenny Down recommended that cod length data collection in the IPHC halibut survey be reinitiated in 2011.
The Teams recommended leaving the IPHC data in the BSAI assessment and asked Grant to determine whether inclusion of IPHC data would be a useful addition to the GOA model.

Bill Clark asked Grant whether it would be appropriate to leave the IPHC size composition data out of the model. Sandra Lowe recommended that the GOA Groundfish Plan Team should request IPHC data for the GOA assessment. The summary table will reflect the teams' recommendation to incorporate IPHC data for the GOA.

Recommendation: The Teams rejected the proposal and recommended that the IPHC data be considered for use in both the BSAI and GOA model as well.

Evaluate spatial-temporal variation in fishery CPUE
Sandra Lowe noted that the analysis for evaluating the catch data is more complex than can be completed in 2010, given the new modeling requests. This requested evaluation could be planned for Sept 2011. In response to Bill Clark's question of why analysis of fishery CPUE is being requested, Farron Wallace said that the SSC was interested in spatial variation of fishery catches and recommended leaving it on the list as a research item.

Recommendation: The Teams recommended that the SSC proposal to evaluate spatial-temporal variation in fishery CPUE be included in the next set of research priorities.

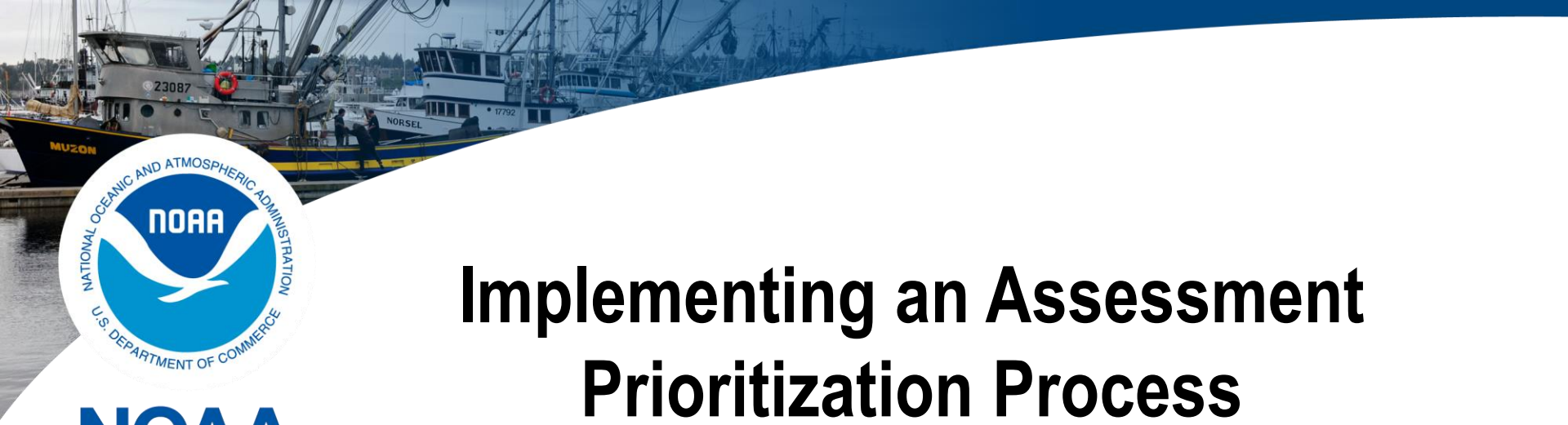
Advance model one year, compare with projections
No action was taken.

Other GOA proposals
Mike Sigler suggested that Teresa A'Mar test her proposed changes to the GOA base model as an appendix. Several of them are addressed by other proposals. Ms Lowe pointed out that Teresa's assignments did not include further development of the GOA cod model. Clark and Ianelli thought many of the proposals had merit. Teresa conceded that if the assessments will already address them, then there was no need to proceed with separate examinations. Grant suggested they should be examined in both areas if they were to be addressed. The Team recommended to treat the seasonal proposal under models 2 through 6, but not to address the plus group proposal. The catchability and selectivity-at-age proposals are treated under Model 3 (see "prior" proposals). No recommendations were made on the remaining two proposals (weight, lower bound).

Other issues
Anne Hollowed and Henry Cheng asked whether the Teams intend that Grant prepare *a factorial design is required to compare model alternatives.* The Teams responded that a factorial design would not be requested. Given that 10 new alternatives are being proposed for consideration in the GOA and 11 in the BSAI, a full factorial design would require consideration of 1,024 models in the GOA and 2,048 models in the BSAI.

Jim Ianelli noted that Grant still has discretion to add or delete aspects of the model if he discovers a productive line of modeling.

Group	Feature(s)	Proposal(s)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Current models	Keep all features of current models	CM1, CM2, BPT1	x					
Age and length	Exclude mean length-at-age data	GPT1, MM1, BPT3, FLC1				x	x	x
	Exclude all age composition data	GPT1, MM1, BPT3, FLC1				x	x	x
	Estimate variation in length-at-age internally	GPT1(?), MM2, FLC2					x	x
	Omit cohort-specific growth, add time-varying growth	FLC3						x (BSAI
	Use age conditioned on length	SSC1						
	Use finer length bin structure	GT1		x	x	x	x	x
	Describe maturity as a function of length, not age	BPT3				x	x	x
	Estimate ageing bias from radiocarbon study	BPT2						
	Decrease emphasis on season 1 fishery sizecomps	TA5						
	Reduce "plus" age from 20 to 15	TA1						
	Exclude fishery (but not survey) age composition data	SSC3	(SSC3 was inadvertently omitted from Team discussions.)					
Selectivity and Q	Use informative priors or other constraints on selectivity	SSC2, TA3			x			
	Estimate catchability internally	GT3			x			
	Put a cap on catchability for sub-27 survey in the GOA	TA4						
	Decrease lower bound for selectivity parameters	TA6						
Other	Exclude IPHC data	SSC4						
	Examine spatial-temporal variation in fishery CPUE	SSC5						
	Advance model one year, compare with projections	GPT2						
	Re-evaluate seasonal structure	TA2, GT2		x	x	x	x	x



Implementing an Assessment Prioritization Process

Briefing for
Northeast Regional Coordinating Committee
Washington, DC
May 27, 2015

Overview

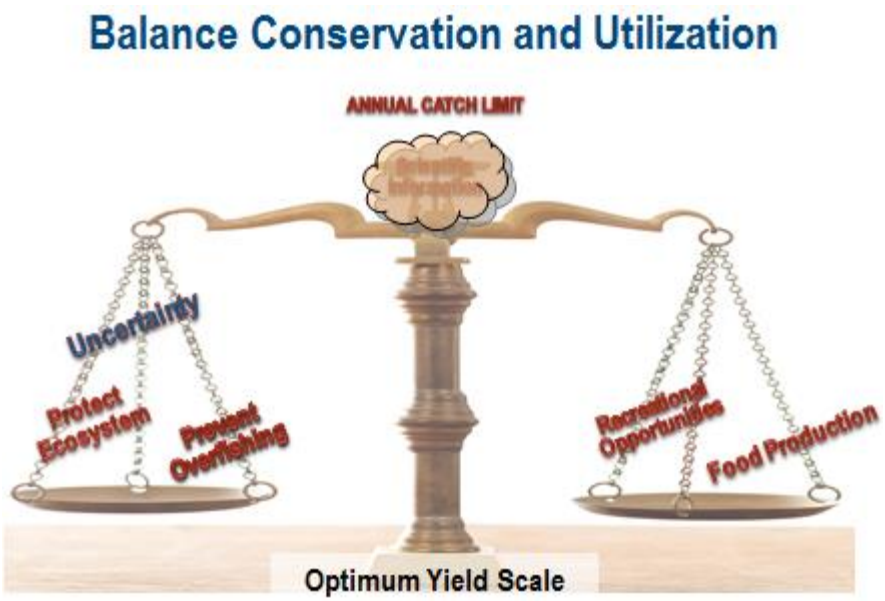
- Recap History
- Goal for Prioritization
- Changes from 2014 version
- Prioritization Process
- Role for Regional Partners

Recent History and Plans

- Spring 2014 – public comment
- Fall 2014 and Spring 2015 – test scoring by NWFSC and NEFSC scientists
- April 2015 – Develop revised approach
- May-June 2015 – Present to NRCC, CCC
- Summer 2015 – Release of document
- Late Summer 2015 – Hold first regional workshops

Assessments Support Management

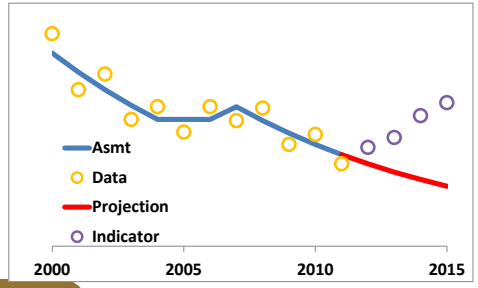
- How good (complete, data-rich) does a stock's assessment need to be to provide good enough management advice?
- How frequently should it be updated?

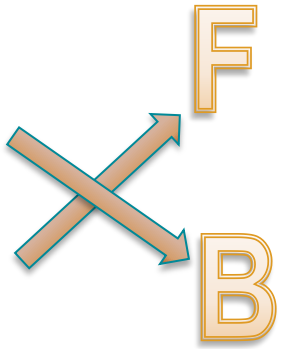


Which Stocks Need Assessments?

Important

Assess It!

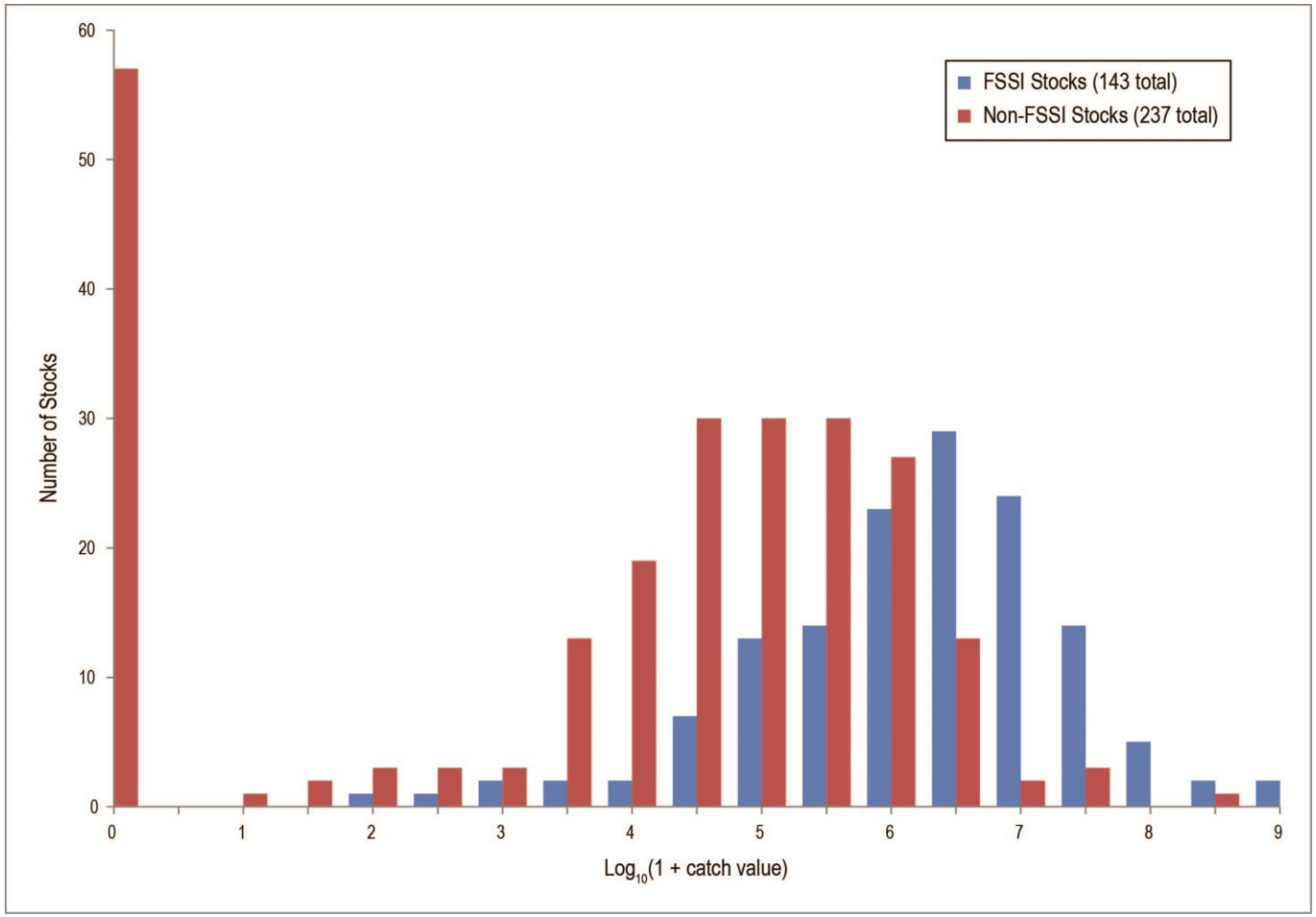




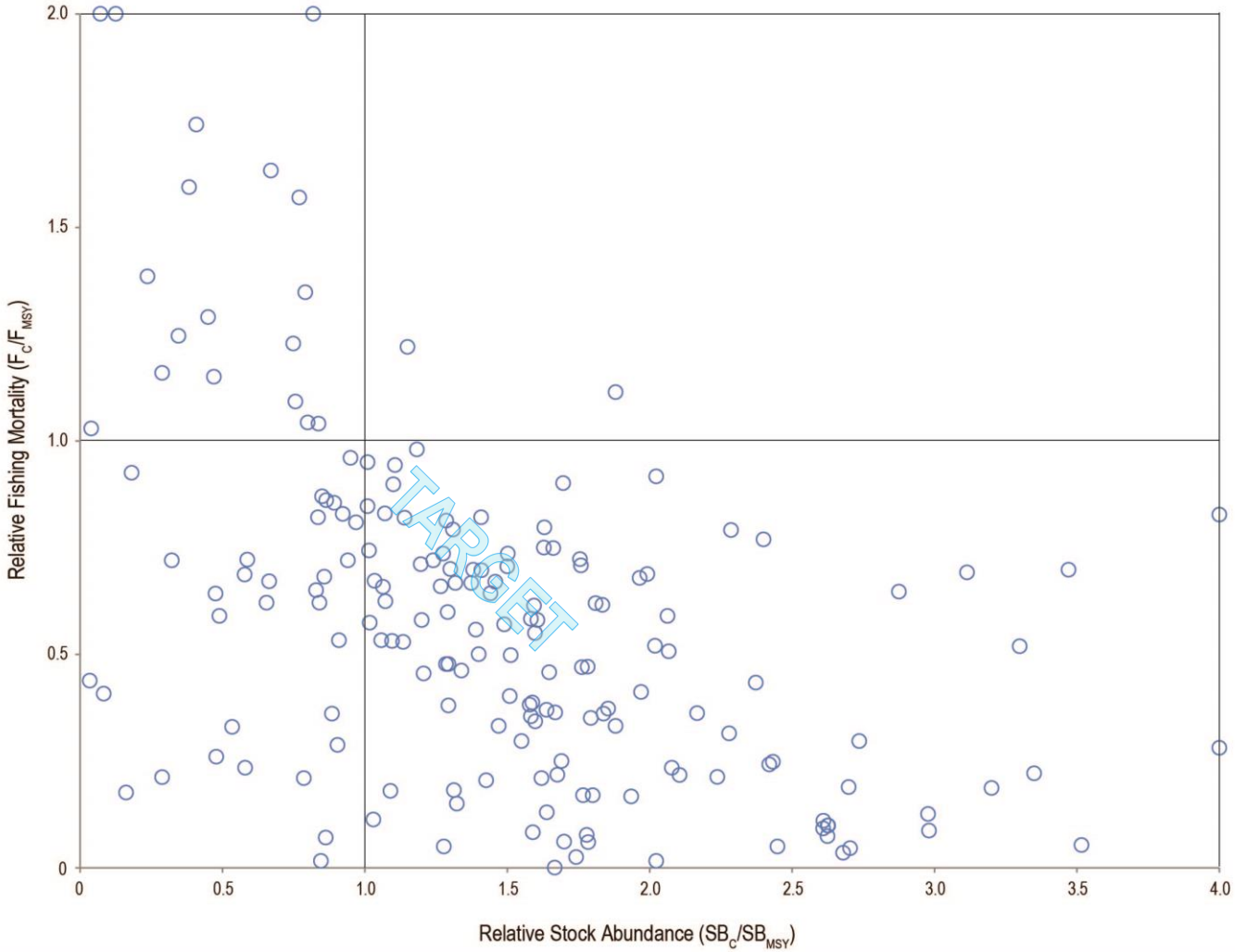
At-Risk

Changed

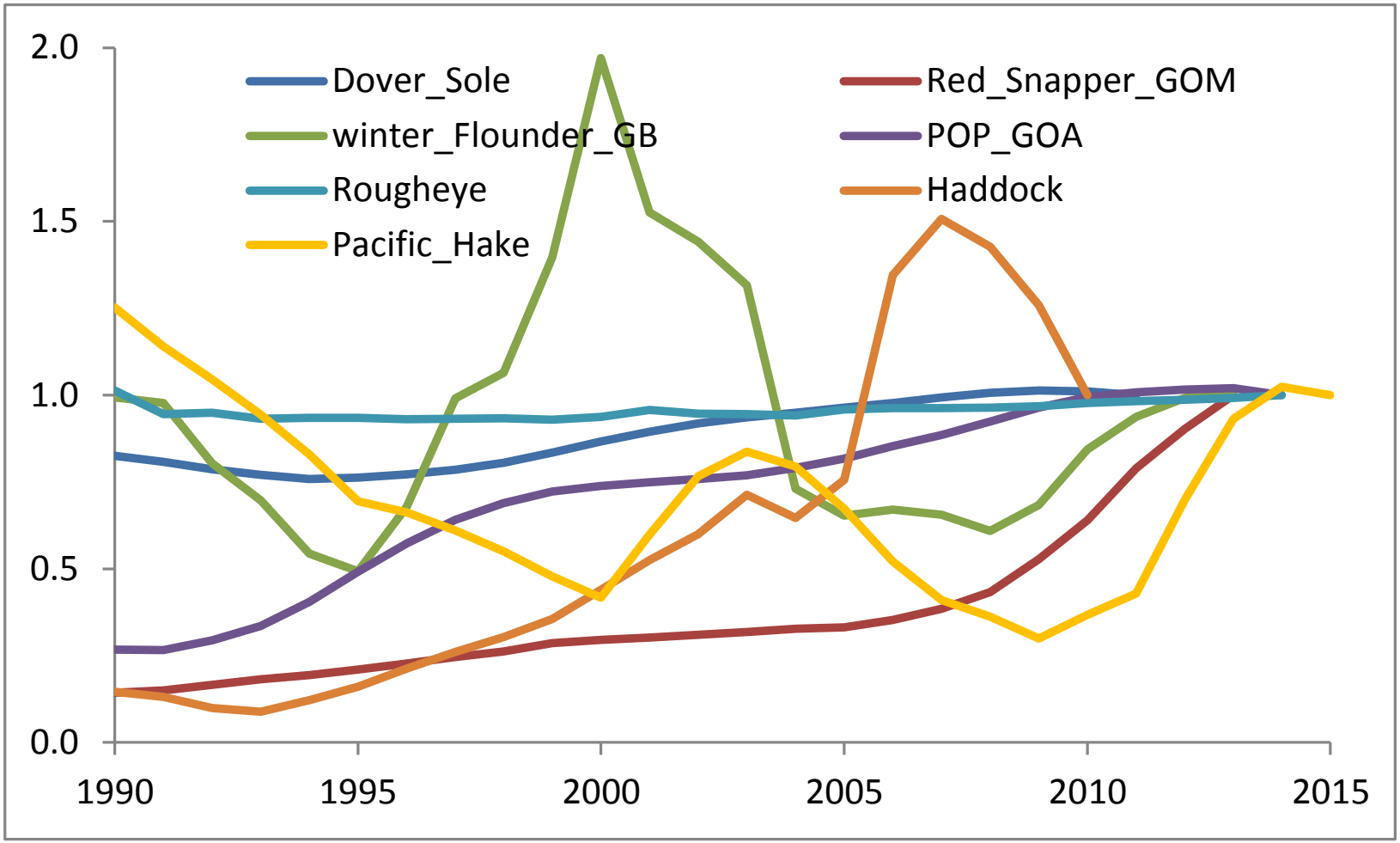
How Many Important Stocks Are There?



How Many Stocks are At-Risk?



How Fast do Stocks Change?



Why Prioritize?

- Some stocks need very good and timely assessments, but no assessment will ever provide perfect information, real-time
- All managed stocks need some level of assessment, but costs could exceed benefits for some low-valued stocks
- The goal is a prioritized portfolio of right-sized assessments for each stock
- Achieved through facilitation and standardization of each regional prioritization process
- Nationally, gaps in capability will be more apparent and can be considered for future investments

Tradeoffs in Prioritizing Assessments

Annual, High Quality Assessment for Key Stocks — Baseline for All Stocks	Rapid Annual Updating — Thorough, Holistic Investigation	Frequent Enough to Track Signal — Infrequent Enough to Smooth Noise
Data-Rich — Data-Limited	Standardized, Operational Methods — Tailored Investigations	Investigate New, Resolvable Issues — Don't Re-examine Every Aspect, Every Time

Major Changes since 2014

- Stocks to be included
  - Be inclusive and make the list as the first regional step
- Approach to factor weighting
  - Allow for regionally determined weights;
  - Now closer to a formal Multi-Criteria Decision Analysis
- Recreational fishery valuation
  - Obtain relative value through regional expert workshops
- Data-limited
  - No separate track for first time assessments

Assessment Prioritization Process

Based on data from available databases or regional expert opinion in 5 categories:

- Fishery Importance (6 sub-cat.)
- Stock Status (2)
- Ecosystem Importance (1)
- Stock Biology (2)
- Assessment History (3)

Activities Completed at Regional Level

Target Assessment Level	Target Assessment Frequency	Determine Annual Priorities
What is the right level of data inputs and complexity for a stock's assessment?	What is the ideal interval between updates for a stock's assessment to meet management needs?	How can we best meet established targets, given available resources?
Concept will be fully developed and implemented with updated SAIP	Developed through initial regional expert workshops, then reviewed and revised as necessary	Annual workshop to update data, review scoring weights, develop priorities for coming years

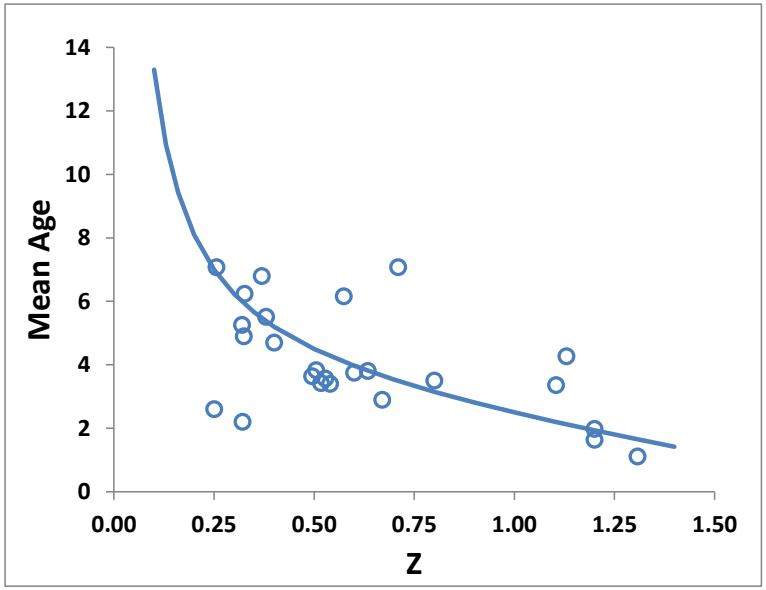
12 Factors In Prioritization

	FACTOR	Source	Raw Scores	Proposed Weight Range
FISHERY	Commercial Fishery Importance from landed value	SIS_ACL	log10(comm_value)	10 - 25
	Recreational Fishery Importance from regional input	experts	0 - 5	0 - 25
	On rebuilding plan	SIS	0 - 1	0 - 10
	Importance to Subsistence	experts	0 - 2	0 - 10
	Constituent Demand/choke stock	experts	0 - 5	0 - 25
	Non-Catch Value	experts	0 - 2	0 - 10
STOCK	Relative Stock Abundance	SIS	1 - 4	5 - 25
	Relative Fishing Mortality	SIS	1 - 4	5 - 25
ECO	Key role in food web	experts	1 - 3	0 - 10
ASMT	Unexpected Changes in Stock Indicators	experts	0 - 5	5 - 20
	Relevant New Data Type or Other Information Becomes Available	experts	0 - 5	5 - 20
	Assessment Years Overdue Relative to Target Frequency	SIS	0, 1 - 10	10 - 30

Total = 100

- For each stock, scores for each factor are extracted from databases and/or set by regional expert groups
- For each factor, regional managers set weights for each factor
- Each stock's priority = sum of its factor scores x overall factor weights
- List of stock priorities becomes starting assessment plan pending adjustments made by regional managers; subject to assessment capacity

Target Assessment Frequency



Calculating Target Assessment Frequency

1. Mean Age in Catch * Scaling Factor (example: 0.5)
2. Adjust for Expected Variability:
   – 1 year (i.e. more frequent) for stocks with high variability
   + 1 year (i.e. less frequent) for stocks with low variability
1. Adjust for Fishery Value:
   – 1 year for stocks in the top third of the regional Fishery Importance
   + 1 year for stocks in the bottom third of the regional Fishery Importance
1. Adjust for Ecosystem Importance:
   – 1 year for stocks with top 1/3 scores
   + 1 year for stocks with lower 1/3 scores

MIN & MAX Frequency: 1 year to 10 years

Needed Steps in Each Region

- Envisioned as needing several workshops, at least dialogues, with Center and other regional scientists, potentially the Plan Teams
- Bigger effort in first year; lesser annual maintenance

1. Define stock list for each prioritization group (i.e. FMP with qualifiers)
2. Assign ecosystem importance stocks; piggyback on climate vulnerability?
3. Assign recreational importance scores
4. Assign scores for the additional fishery factors
5. Develop process to access stock indicator data
6. Lead regional managers through assignment of weights

Future Directions

- Management Strategy Evaluations for a few example stocks can better inform setting of target assessment level and frequency;
- Gaps between current and target assessment levels, and the number of overdue assessments informs future investments in capacity;
- The simple “factor score x weight” approach evolves to calculate a portfolio of assessments that achieve the greatest benefits

BACK-UP SLIDES

Step 1 - Scoring

FACTOR	Hypothetical Raw Scores for 5 Fictitious Stocks					Sum Across Stocks
	Stock 1	Stock 2	Stock 3	Stock 4	Stock 5	
Commercial Fishery Importance from landed value	4	0.1	0.1	3	1	8.2
Recreational Fishery Importance from regional input	0	4	0.1	3	1	8.1
On rebuilding plan	0	0	0	1	0	1
Importance to Subsistence	0	0	1	0	0	1
Constituent Demand/choke stock	2	2	0	2	2	8
Non-Catch Value	0	0	1	0	0	1
Relative Stock Abundance	2	2	3	4	4	15
Relative Fishing Mortality	2	2	3	4	4	15
Key role in food web	2	2	1	2	2	9
Unexpected Changes in Stock Indicators	2	1	0	0	1	4
Relevant New Data Type or Other Information Becomes Available	0	0	1	2	1	4
Assessment Years Overdue Relative to Target Frequency	0	4	10	0	0	14
	comm imp	recr imp	newbie	imp and status	mod and status	

Step 1a – Scaling the Scores

FACTOR	Convert to Relative Scores				
	Stock 1	Stock 2	Stock 3	Stock 4	Stock 5
Commercial Fishery Importance from landed value	0.49	0.01	0.01	0.37	0.12
Recreational Fishery Importance from regional input	0.00	0.49	0.01	0.37	0.12
On rebuilding plan	0.00	0.00	0.00	1.00	0.00
Importance to Subsistence	0.00	0.00	1.00	0.00	0.00
Constituent Demand/choke stock	0.25	0.25	0.00	0.25	0.25
Non-Catch Value	0.00	0.00	1.00	0.00	0.00
Relative Stock Abundance	0.13	0.13	0.20	0.27	0.27
Relative Fishing Mortality	0.13	0.13	0.20	0.27	0.27
Key role in food web	0.22	0.22	0.11	0.22	0.22
Unexpected Changes in Stock Indicators	0.50	0.25	0.00	0.00	0.25
Relevant New Data Type or Other Information Becomes Available	0.00	0.00	0.25	0.50	0.25
Assessment Years Overdue Relative to Target Frequency	0.00	0.29	0.71	0.00	0.00

Step 2 – Manager Importance Weights

FACTOR	Raw Factor Importance (Weight) (assign 100 pts)					Steering Committee Average
	Member 1	Member 2	Member 3	Member 4	Member 5	
Commercial Fishery Importance from landed value	20	10	18	10	10	13.6
Recreational Fishery Importance from regional input	20	2	15	9	10	11.2
On rebuilding plan	1	1	3	1	1	1.4
Importance to Subsistence	1	0	5	8	2	3.2
Constituent Demand/choke stock	10	5	15	8	10	9.6
Non-Catch Value	1	5	2	9	5	4.4
Relative Stock Abundance	12	20	10	9	7	11.6
Relative Fishing Mortality	12	20	10	9	7	11.6
Key role in food web	3	10	2	9	1	5.0
Unexpected Changes in Stock Indicators	5	5	5	9	19	8.6
Relevant New Data Type or Other Information Becomes Available	5	5	5	9	18	8.4
Assessment Years Overdue Relative to Target Frequency	10	17	10	10	10	11.4
	100	100	100	100	100	

Step 3 – Priority = Scores x Weights

FACTOR	Weighted Scores				
	Stock 1	Stock 2	Stock 3	Stock 4	Stock 5
Commercial Fishery Importance from landed value	6.6	0.2	0.2	5.0	1.7
Recreational Fishery Importance from regional input	0.0	5.5	0.1	4.1	1.4
On rebuilding plan	0.0	0.0	0.0	1.4	0.0
Importance to Subsistence	0.0	0.0	3.2	0.0	0.0
Constituent Demand/choke stock	2.4	2.4	0.0	2.4	2.4
Non-Catch Value	0.0	0.0	4.4	0.0	0.0
Relative Stock Abundance	1.5	1.5	2.3	3.1	3.1
Relative Fishing Mortality	1.5	1.5	2.3	3.1	3.1
Key role in food web	1.1	1.1	0.6	1.1	1.1
Unexpected Changes in Stock Indicators	4.3	2.2	0.0	0.0	2.2
Relevant New Data Type or Other Information Becomes Available	0.0	0.0	2.1	4.2	2.1
Assessment Years Overdue Relative to Target Frequency	0.0	3.3	8.1	0.0	0.0
	18	18	23	24	17

Scheduling Worksheet for Stock Assessments. **date: Oct. 31, 2014**

Basis for entries in Table: Oct. 2014 NRCC meeting

	2014: 1st half	2014: 2nd half
1	N. shrimp - SARC 58, Jan. 27-31	GOM haddock - SARC 59, July 15-18
2	Tilefish - SARC 58	Scallops - SARC 59
3	Butterfish - SARC 58	
4		
5	(GB YT Alternative - April 14-19, WH)	(Pollock, GOM winter fl, GB winter fl, Aug 11-13, Oper. Assessment Process)
6	(Model Review - May 19-23)	
7	(TRAC - EGB cod, EGB haddock, GB YT) June 23 -27, WH	(GOM cod, Aug. 28-29, Oper. Assessment)
8		
9	(Updates: Bluefish, BlkSeaBass [data update; research report], Scup [data update], Fluke [data update], Mackerel [data update, research plan]), squids [data update])	(Updates: Dog [data update], skates, hakes [silver, red, offshore])

	2015: 1st half	2015: 2nd half
1	Scup - SARC 60, June 2-5 , might be done with incomplete 2014 data	
2	Bluefish - SARC 60 June 2-5 , might be done with incomplete 2014 data	
3		
4		(20 Groundfish Stocks, Operational Assessment, Sept.14-18; AOP: *tentative date July*)
5	(ASMFC - Lobster peer review -Spring 2015)	
6	(Scallop Survey Methods- March 17-19, near New Bedford)	
7	(Herring, Operational Assessment, May; AOP: *tentative date early Dec.2014*)	
8	(TRAC - EGB cod, EGB haddock, GB YT - June 22-26, St. Andrews, Canada)	
9	(Protected species: Program Review - *Date in 2015 TBD*)	
10	(Updates: BlkSeaBass [data update],Fluke, surfclam [data update], Dog, skates, Mackerel [data update], butterfish [data update], tilefish [data update], squids [data update], OQ [data update]	

	2016: 1st half	2016: 2nd half
1	*Skates, red hake or monkfish - (choose 1 or 2 of these) SARC 61, Month TBD*	*Mackerel, Black sea bass, or monkfish -- SARC 62, Nov./Dec.; choice depends on research progress; pick 2; or possibly schedule NE Groundfish benchmarks.*
2	*Ocean quahog (with limited TORs; possibly review in a non-SARC process) SARC 61*	
3	*BlkSeaBass: ASMFC wants this reviewed in June by ASMFC process. MAFMC wants this reviewed in the SARC. Final timing and process decisions have not been made. And see next column.*	
4	*(TRAC - EGB cod, EGB haddock, GB YT - Date TBD)*	
5		*(cod stock structure)*
6	*(Cumul. Discard Methodology - January/February)*	
7	*(Ecosystem Applications, Management, Habitat : Program Review - DATE TBD)*	
8	*(Updates: Fluke (data update), surfclam [data update], Dog, skates, butterfish (data update), tilefish [data update] ,squids (data update)*	

	2017: 1st half	2017: 2nd half
1	*surfclam*	
2		
3		
4		
5	*(ASMFC - Sturgeon)*	

Key:

Italics = Under consideration, but not officially scheduled.

"( )" = not in the SARC process.

Cells filled with gray = work completed.

For NRCC Discussion: Scheduling Worksheet for Stock Assessments. **date: May 21, 2015**

Basis for entries in Table: Oct. 2014 NRCC meeting and Prep for Spring 2015 NRCC meeting

	2014: 1st half	2014: 2nd half
1	N. shrimp - SARC 58, Jan. 27-31	GOM haddock - SARC 59, July 15-18
2	Tilefish - SARC 58	Scallops - SARC 59
3	Butterfish - SARC 58	
4		
5	(GB YT Alternative - April 14-19, WH)	(Pollock, GOM winter fl, GB winter fl, Aug 11-13, Oper. Assessment Process)
6	(Model Review - May 19-23)	
7	(TRAC - EGB cod, EGB haddock, GB YT) June 23 -27, WH	(GOM cod, Aug. 28-29, Oper. Assessment)
8		
9	(Updates: Bluefish, BlkSeaBass [data update; research report], Scup [data update], Fluke [data update], Mackerel [data update, research plan]), squids [data update])	(Updates: Dog [data update], skates, hakes [silver, red, offshore])

	2015: 1st half	2015: 2nd half
1	Scup - SARC 60, June 2-5 , might be done with incomplete 2014 data	
2	Bluefish - SARC 60 June 2-5 , might be done with incomplete 2014 data	
3		
4		(20 Groundfish Stocks, Operational Assessment, Sept.14-18; AOP:- July 22)
5	(ASMFC - Lobster peer review - June 2015)	
6	(Scallop Survey Methods- March 17-19, New Bedford)	(ASMFC - Weakfish)
7	(Herring, Operational Assessment, April; AOP: Dec.2014)	
8	(TRAC - EGB cod, EGB haddock, GB YT - July 7-9, St. Andrews, Canada)	
9	(Protected species: Program Review - April 13- ,2015)	
10	(Updates: BlkSeaBass [data update],Fluke, surfclam [data update], Dog, skates, OQ [data update])	
	(Mackerel [data update], butterfish [data update], tilefish [data update], squids [data update])	

	2016: 1st half	2016: 2nd half
1	*BlkSeaBass - SARC 61, mid-July*	*Mackerel - SARC 62, Nov./Dec*
2	*Ocean quahog - (with limited TORs - SARC 61*	*Monkfish - SARC 62, Nov./Dec*
3	*Red hake - (with limited TORs - SARC 61*	
4		
5	*(TRAC - EGB cod, EGB haddock, GB YT - Date TBD)*	
6		*(cod stock structure ??)*
7	*(Cumul. Discard Methodology - March)*	
8	*(Ecosystem Applications, Management, Habitat : Program Review - DATE TBD)*	
9	*(Updates: Fluke [data update], surfclam [data update], Dog, skates, butterfish [data update], tilefish [data update] ,squids [data update], scup [data update])*	

	2017: 1st half	2017: 2nd half
1	*surfclam - SARC 63*	
2	*Multispecies Groundfish Model - SARC63*	*(20 Groundfish Stocks, Operational Assessment, Date: TBD)*
3		*(MRIP transition)*
4		
5	*(TRAC - EGB cod, EGB haddock, GB YT - Date TBD)*	
6	*(ASMFC - Sturgeon)*	
7	*(Updates: BSB [data update] , Fluke [data update], ocean quahog [data update] , Dog, skates, butterfish [data update], tilefish [data update] ,squids [data update], scup [data update],)*	

Key:

Italics = Under consideration, but not officially scheduled.

"( )" = not in the SARC process.

Cells filled with gray = work completed.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northeast Fisheries Science Center
166 Water Street
Woods Hole, MA 02543-1026

April 24, 2015

Mr. Richard B. Robins, Jr.
Chairman
Mid-Atlantic Fishery Management Council
5103 Mariners Cove
Suffolk, VA 23435

Mr. E. F. Stockwell, III
Chairman
New England Fishery Management Council
50 Water Street; Mill 2
Newburyport, MA 01950

Mr. Robert E. Beal
Executive Director
Atlantic States Marine Fisheries Commission
1050 N. Highland St., Suite 200 A-N
Arlington, VA 22201

Mr. John K. Bullard
Regional Administrator
Greater Atlantic Region
55 Great Republic Drive
Gloucester, MA 01930

Dear Rick, Terry, Bob, and John:

As you know, the Center agreed to conduct benchmark assessments of bluefish and scup in early June of 2015 in response to the Council's need for timely information. During the NRCC meeting in May 2014 and a subsequent meeting in Woods Hole on June 24, 2014, we emphasized the need for an accelerated schedule for delivery of 2014 commercial landings data, including the state data processed by ACCSP. The purpose of this letter is to inform you that the landings data were not received by April 1, 2015. The delay in the data will require analysts to use less reliable methods to estimate discards and result in greater uncertainty in the landings and discard estimates for the terminal year of the assessment. In turn, this may lead to greater uncertainty in the estimates of Overfishing Levels (OFL). Late delivery of this data also places a considerable additional burden on staff who are already fully committed to preparing for these assessments.

We appreciate your efforts to accelerate the delivery of catch data for these assessments. However, unless additional steps are taken to ensure timely delivery of data, we will only be able

to conduct future benchmark assessments later in the year, at a time when we can be confident that the data will be readily available.

I would like to consider this issue further at the upcoming NRCC meeting, and establish clear deadlines and responsibilities relative to delivery of landings data in support of stock assessments.

Sincerely,

Russell W. Brown
for

William A. Karp, Ph.D.
Science and Research Director

cc: C. Moore
T. Nies

vers. May 7, 2015

Guidelines on Formation, Participation, and Function of Stock Assessment Workshop Working Groups

A Report prepared for and reviewed by the Northeast Region Coordinating Council (NRCC)

NRCC reviewed early drafts in 2009, 2013 and 2014. Report prepared by staff members of the NEFMC, MAFMC, ASMFC, and NEFSC.

Table of Contents

1. Background/Rationale

Stock Assessment Workshop (SAW) Working Groups (WGs) prepare benchmark stock assessments which are peer reviewed by the Stock Assessment Review Committee (SARC) and are then published. In the future SAW WGs may also take part in developing new assessments and methods as part of the planned "Research Track". These stock assessments form the scientific basis for managing fish and invertebrate marine resources in the northeastern and Mid-Atlantic regions of the U.S. WGs play a key role in the stock assessment process, but to date there are few written guidelines which describe how WGs are formed, their composition, and how they function. This report was developed by the NRCC to provide guidelines on SAW WG formation, participation, and function.

2. Guidance about SAW Working Groups (WG)

2.1. SAW Working Group (WG) eligibility and WG formation

The SAW WG is responsible for carrying out and making decisions about stock assessment and addressing the assessment terms of reference (TORs). Development of stock assessments by the SAW WG requires a high level of expertise and commitment. Effective assessment workgroups should be composed of individuals from several disciplines, and have a broad range of skills and expertise. SAW WG members must be objective, constructive, efficient, and productive. SAW WGs are not intended, or required, to include every expert or researcher involved in every assessment issue. A certain amount of debate and disagreement is normal among members of a SAW WG, but the group must decide, generally by consensus, how to move forward with assessment development using the best available science.

2.1.1. Eligibility

- SAW WG members should not actively participate on another committee or panel whose purpose is to peer review the assessment products from the same SAW WG. This will maintain **independence** between those who produce the stock assessment and the subsequent peer review.
- SAW WG members must have **expertise** and **education** directly aligned with the expertise needed to address the specific assessment TORs for the stock assessment. Generally this includes experts in the following core assessment areas: Biology, Ecology/Ecosystem Science, Data and Survey Design (Fishery-Independent, Fishery-Dependent Data), Mathematics/Statistics and Modeling Methods, and Fishery Management. This includes experts involved with state, federal, or international fisheries, academics, or fisheries management entities. Persons familiar with the fishery may also have the necessary expertise.
- As part of the selection process, all candidates for SAW WGs, other than the SAW WG chair and lead stock assessment scientist, will be required to fill out a questionnaire which will be reviewed by the SAW WG chair and a higher level selection committee (described in section 2.1.2). Criteria that will be considered by the selection committee will include independence, expertise, and education of candidates, as well as SAW WG size, composition, and balance. The SAW WG chair and lead stock assessment scientist are automatic members of the SAW WG and are not required to go through the selection process.

2.1.2. Working Group Selection and Approval by Selection Committee

When a stock is scheduled for an upcoming SARC peer review, the SAW WG Chair, with assistance from the lead assessment scientist, should make a general public announcement that the SAW WG is seeking candidates for membership. The SAW WG Chair will then identify the initial workgroup membership list, after having ensured that each member on the list is willing to participate. Each candidate wanting to serve on a SAW WG will be required to fill out a questionnaire that will be used to determine whether the candidate satisfies the qualification criteria for independence, expertise and education. The information submitted on questionnaires

is public and part of the administrative record. Other criteria that may be considered in establishing the SAW WG include WG size, composition, and balance.

The list of candidates along with their questionnaires will be provided to the selection committee comprised of Deputies from each of the NRCC organizations (NMFS-NEFSC, NMFS-GARFO, MAFMC, NEFMC, ASMFC) for review. This selection committee will make a decision regarding approval of each candidate. Approval would not require an in-person meeting, and approval could be obtained via email or conference call. The NRCC Deputies selection committee will notify the Chair of the NEFSC SAW process and the SAW WG Chair of the committee's WG membership decisions in a timely manner, with the time schedule based on a recommendation from the NEFSC SAW Chair and the SAW WG Chair. To fill any vacancies, the SAW WG Chair could make an alternative member recommendation (based on input from the NRCC approval body) to be considered for approval. The SAW WG Chair has the option to proceed without finding a replacement for a disapproved member.

2.1.3. Notification of Workgroup and Meeting Participants

Identification of the approved SAW WG should be completed soon after the assessment TORs have been developed and set. SAW WG membership should be established well in advance of the first WG meeting (e.g., generally 3-8 months on advance), and the SAW WG Chair or SAW Chair should notify all interested parties by posting the names of the SAW WG members on the SAW website or on a share drive set up for the WG, along with any meeting agendas and materials. Candidates who have or have not been approved by the approval body will be notified by the SAW WG Chair or NEFSC SAW Chair. The notification should point out that the final decision regarding membership was made by the official NRCC approval body in consultation with the SAW WG Chair and SAW Chair. If a candidate has not been selected by the NRCC approval body, there is no process for reconsideration. However, candidates may apply to be on other SAW WGs, even after not being selected for membership on a particular SAW WG. SAW WG candidates who are not selected may still attend SAW WG meetings and the SARC peer review, and may contribute their views during public comment sessions or as decided by the SAW WG chair and SARC chair during assessment development and peer review, respectively.

2.1.4. Working Group Meeting Participants List

A more enhanced section on the SAW webpage will be developed, which not only lists the schedule for data and modeling meetings (as is done presently), but details who is the SAW WG Chair, how to be added to a email list for the workgroup (who to contact), and SAW WG membership.

2.2 . Size of a SAW WG and selection of the WG chair

Background / Rationale
WG size will vary by stock assessment, and is dependent on the specific expertise needed to inform and develop analyses/models to complete the assessment. Typically, the following types of information and their analytical components are combined to build an assessment product: Biology, Ecology/Ecosystem Science, Data and Survey Design (Fishery-Independent, Fishery-Dependent Data), Mathematics/Statistics and Modeling Methods, and understanding of the fishery and its management. It is advantageous to keep WGs reasonably small to allow for consensus building and efficient development of stock assessments. The chair facilitates and guides assessment development discussions and strives for consensus decisions. When consensus cannot be reached, the SAW WG chair is responsible for deciding whether one or multiple primary surveys, models, etc. are brought forward for review and who will present the assessment information to the SARC (see Sections 2.2.2 and 3.4).

2.2.1. Working Group Size

SAW WGs may consist of 4-8 members, comprised of the WG chair and individuals with expertise and balanced representation in the core assessment areas required to address the assessment terms of reference. The specific number of members within this range depends on the overall workload of the assessment and range of expertise required to complete the assessment. It is the responsibility of the SAW WG chair, in consultation with the SAW Chair and SAW WG selection committee, to determine how many members are needed to complete the work, while also taking into account WG expertise and balance of opinions.

2.2.2. Working Group Chair Selection

In most cases, NEFSC Population Dynamics Branch Task Leaders (e.g., Southern demersal) and assessment scientists chair SAW WGs. For contentious stocks, the Center may recommend appointing an external chair from Council staff, academia, or other appropriate external institutions, and the NRCC selection committee may be consulted on the selection decision.

3. Guidance on how SAW WGs function

3.1. WG formation, composition, and participation

When a stock assessment is scheduled by the NRCC, the SAW WG chair, in consultation with the lead assessment scientist, should make a general announcement that the SAW WG is seeking candidates for membership. The SAW WG Chair will then identify a list of WG members which will be checked by the selection committee for approval based on independence, expertise, and education. Size of the WG, and balance and diversity of WG composition may also be considered in establishing the WG (see Sections 2.1.1, 2.1.2, and 2.2.1). WG membership requires a high level of commitment. WG's should achieve a balance of opinions and expertise in the main areas relevant to the stock being assessed. An imbalance of membership may lead to over-emphasis on one area of the assessment or excessive advocacy for a certain position. Members are strongly encouraged to participate in all of the SAW WG meetings used to develop the assessment. To ensure efficient progress and timely delivery of the assessment, in general WGs should not revisit decisions that they made at an earlier WG meeting. Likewise, unless an error needs to be corrected, a subset of WG members should not engage after a WG meeting to overturn decisions made earlier by the full WG (e.g., about data set inclusion/exclusion, or model specification and selection decisions).

3.2. Invited collaborators

As noted earlier (Section 2.1) the SAW WG is not intended to include every expert or researcher involved in every assessment issue. However, the WG process may benefit from including some invited collaborators who can contribute particular information. The WG Chair may invite individuals to attend all or part of WG meetings to contribute research papers, or who have particular expertise and present information to the WG as appropriate. These invited collaborators are not WG members, and while they may engage in a full discussion with the WG at appropriate times during WG meetings, they may not participate in WG consensus decisions. It is the responsibility of the SAW WG chair to run the meeting in this manner. All WG meetings are to be public, and the SAW WG may take comments from the public. Like members of the public, invited collaborators may participate during public comment or when addressed by the SAW WG, but they are not directly involved with the WG when the WG makes its decisions.

3.3. Wide net for sources of data

When a SAW WG is formed, the lead assessment scientist, with support from the WG chair, should seek to acquire all data relevant to the TORs for that stock assessment. This may include new sources of information, as well as data not collected by the NEFSC. Acquiring such data sets can be done in various ways (e.g., sending email requests, phone calls, or holding a public meeting with industry/academia to discuss the strategy for conducting the stock assessment, and any major issues related to the assessment). If relevant peer-reviewed publications exist, the WG chair and lead scientist may want to contact the author(s) to indicate that this published information is being considered for use in the assessment.

When new data sets are obtained, the WG should review the quality of those data and determine whether the data meet scientific standards for inclusion in the assessment. If the data do not

meet these standards, the WG should not include the data in the assessment, but should document that the data were considered and explain why the data were not included.

Ideally, research to support a stock assessment should begin after the previous benchmark assessment is completed, based on the research recommendations.

3.4. How the WG makes decisions

-- "Consensus decision-making" defined: "Consensus decision-making" is a group decision-making process that seeks the consent of all participants. Consensus may be defined professionally as an acceptable resolution, one that can be supported by the WG members, even if not the "favorite" of each individual.

--On Consensus: SAW WGs should strive to achieve consensus. This is because SARC reviewers are generally very adept at evaluating whether an analysis presented to them is technically appropriate, but they struggle with resolving complex issues that a SAW WG was unable to resolve. The SARC generally respects the expertise and time devoted to these issues by the SAW WG, but the SARC has limited time to resolve or delve deeply into contentious issues that may have caused dissension within a WG.

--On Minority opinions: During SAW WG meetings the WG chair should seek out, but not force, a consensus of the WG on major assessment issues. If a SAW WG is unable to reach consensus on an assessment topic, a minority opinion can go forward to the SARC only if more than one WG member has the minority opinion. During the SARC peer review the SAW WG Chair, rather than a WG member, will be responsible for explaining the minority opinion and describing how it differs from the majority report.

--On Documentation of WG decisions: The WG chair should keep a log of the decisions made during each day of a WG meeting. The WG Chair's daily log should describe the decision, the logic and reasons behind the decision, the number of WG members who supported the decision, and the names and number of WG members in attendance at each meeting.

3.5. Dealing with single best model or with multiple models

For any TOR in which one or more models are explored by the WG, the WG report should provide a detailed account of the "best" model, including inputs, outputs, diagnostics of model adequacy, and sensitivity analyses that evaluate the robustness of model results to assumptions. In less detail, all other models and sensitivity analyses evaluated by the WG should be described and the strengths, weaknesses and results of the other models and analyses explained in relation to the "best" model.

Ideally the WG will be able to decide on and select a "best" model. However, when this is not possible, the alternative model(s) should also be described in detail, and the relative utility of each model summarized, including a comparison of results. It should be highlighted whether any of the models represents a "minority" opinion (see Section 3.4) of the SAW WG.

For the "best model", include one or more tables that describe the model structure (for example: model type or name (including version and date of compilation), age- or length-based, sex-based,

types of landings and discard data, length-weight parameters, maturity parameters, size bins, time bins, M assumptions, surveys used, model years for surveys and catch, etc.).

3.6. Number of WG meetings to have before the SARC Review

There is flexibility in the number of SAW WG meetings to hold. It depends on the complexity and importance of the benchmark stock assessment. Most SAW WGs schedule 1-3 WG meetings to evaluate data, models, BRPs, stock status, and projections. Earlier meetings tend to focus on data and recent research, while later meetings focus on model selection, etc. Having a special meeting with the public, early in the process, to discuss major issues involved with the benchmark assessment is also encouraged, if adequate time and resources are available. Public comment can also be taken during the normal 1-3 WG meetings.

3.7. SAW WG Chair's Responsibilities

The WG Chair is responsible for working with the selection committee to form the SAW WG, chairing SAW WG Meetings, assuring that assessment reports are prepared on time, and attending the SAW/SARC review as a WG representative along with the lead assessment scientist. The WG Chair is responsible for determining who makes presentations to the SARC, although such presentations are normally made by the lead assessment scientist. The WG Chair is responsible for ensuring a constructive WG meeting environment for all participants and seeing that notes or suitable records of decisions are kept. The WG Chair facilitates consensus building and is responsible for ensuring consensus decisions are made regarding assessment inputs, model selection, and final workgroup products/SARC presentations. The chair does not make decisions unilaterally with regard to assessment products, but guides decisions made by the full WG. In cases where consensus cannot be reached, the WG Chair makes final determinations on WG products to be presented to the SARC. For instances where a minority opinion or multiple 'best models' (See Section 3.5) are brought to the SARC, the SAW WG chair will present the minority opinion and alternative models associated with it and describe how this differs from the majority opinion. (Additional responsibilities are described in sections 2.2.2 and other parts of Section 3.).

3.8. Conduct during SAW WG Meetings

Anyone participating in SAW assessment working group meetings who will be running or presenting results from an assessment model is expected to supply the source code, a compiled executable, an input file with the proposed configuration, and a detailed model description in advance of the model meeting. Source code for NOAA Toolbox programs is available on request. These measures allow transparency and a fair evaluation of differences that emerge between models. In general, all of these materials will be placed on a SAW website and remain freely available to interested parties.

Proposed Charter for Northeast U.S. Trawl Advisory Panel (NEFSC May 7, 2015)

Section 1: Panel Purpose

The Northeast Trawl Advisory Panel (NTAP) is established to bring commercial fishing, fisheries science, and fishery management professionals together to identify concerns about regional research survey performance and data, to study those concerns and ways to address or mitigate them, and to promote mutual understanding and acceptance of the results of this work among their peers and in the broader community.

Section 2: Objectives

We propose three focus areas for the panel: understanding the existing NOAA/NEFSC trawl survey methodology and gear performance, developing new work to complement or supplement this and other regional research surveys, and improving understanding and acceptance of NOAA/NEFSC survey and data quality.

Understanding the trawl survey methodology and the efficiency and selectivity of the NEFSC standardized bottom trawl

Suggested topics

- Survey design (station selection, temporal and spatial considerations)
- Survey operations
- Sweep efficiency/selectivity
- Fish behavior (*e.g*. herding/avoidance) effects on trawl performance
- Vertical distribution effects on trawl performance
- Day/night differences in trawl performance
- Current effects on trawl performance

Development of potential projects intended to supplement the existing NEFSC standardized bottom trawl survey:

Suggested topics

- Inter-calibrations between industry vessels and NOAA FS/V *Henry B. Bigelow*. This would allow industry partners to supplement survey activity and be better positioned to perform the survey in the event that the *Bigelow* is not available.
- Increased trawl survey station density using industry vessels. This effort may improve precision of indices for species that are presently at low abundance.
- New industry-based surveys to supplement/complement existing research trawl surveys. This might include fixed-gear surveys in untrawlable habitat or a dedicated trawl survey for bottom-tending species
- Inter-calibration among the established regional research surveys: NEFSC Ecosystem Survey, Northeast Monitoring and Assessment Program (NEAMAP) and the Massachusetts and Maine-New Hampshire state research surveys

Improving understanding and acceptance of survey and data quality
Suggested topics

- Developing routine reporting products and distribution
- Explaining similarities and differences between research survey and commercial trawl operations
- Identifying preferred routine, near real-time research survey data types and format
- How to reconcile perceptions derived from survey data trends and commercial catch per unit of effort
- Best practices for keeping peers informed about the panel's work and results

Section 3: Proposed Organizational Structure
The NTAP is a joint advisory panel of the Mid-Atlantic and New England Fishery Management Councils. It is composed of council members, and fishing industry, academic and non-governmental organization experts who shall provide advice and direction on the conduct of trawl research. The Mid-Atlantic Fishery Management Council is designated as the lead organization for administering the panel.

Section 4: Proposed Membership
The NTAP will consist of 16 members drawn from the New England and Mid-Atlantic Fishery Management Councils, industry experts, non-federal government scientists and Northeast Fisheries Science Center scientists:

- two fishery management council members from each council (n=4)
- up to three fishery stakeholder representatives appointed by each council (n=6)
- 2 academic and non-academic scientists appointed by each council (n=4)
- 2 staff members of the Northeast Fisheries Science Center (n=2)

Minor deviations for this composition plan may be permitted if both Council Chairs approve. Each fishery management council shall be responsible for making council, fishery stakeholder and scientific nominations. The Science and Research Director of the Northeast Fisheries Science Center shall recommend two NEFSC staff members for Panel membership.

Key areas of expertise that will be important in success of the panel include:

- Gear design and construction
- Trawl gear efficiency
- Trawl mensuration
- Fish behavior
- Fishery acoustics
- Survey statistics and stock assessment

Commercial industry members active in the fishery will be permitted to designate an alternate member to participate when necessary. Alternates must be designated in advance and are subject to the same approvals as panel members.

Panel members shall strive to participate in meetings, independent projects and other efforts of the panel. The panel chair shall contact members to determine their interest in continuing as a panel member following: two consecutive absences from panel meetings, or failure to substantially participate in panel activities and efforts. Panel members who are unable or unwilling to complete designated terms on the Panel shall resign in writing to the chair of the NTAP.

Section 5: Panel Leadership

Leadership of the panel shall consist of a Chair and Vice Chair, who will be jointly responsible for establishing meeting agendas, conducting meetings, and ensuring that summaries and other products from meetings are produced and distributed. The Mid-Atlantic Council will appoint the Chair and the New England Council will appoint the Vice Chair. The Chair and Vice-Chair positions may be occupied by fishery management council, fishery stakeholder, or non-governmental scientific members, but shall not be occupied by Council staff or Northeast Fisheries Science Center scientists.

Section 6: Panel/Membership Longevity

The NTAP shall have no defined termination date. However, after 3 years the Councils will evaluate if the need for the Panel continues. If the NTAP does continue to operate, new membership will be considered at that time along with new recommended focus areas.

Section 7: Meetings

During the first three months of panel activity, two meetings should occur during which summary information of relevant research and activities to date will be provided and discussed. Thereafter, the NTAP shall hold in-person meetings two to three times annually. If the NTAP determines that more frequent meetings are warranted, scheduling of additional meetings is subject to budget availability. Additional panel business may be conducted through teleconferences or electronic communications. All in-person meetings shall be announced through established fishery management council processes.

Section 8: Panel Organizational Support

Travel costs, staff support and administrative costs associated with panel operations shall be financially supported funds made available to the Mid Atlantic Fishery Management Council by NOAA. Panel activities including communications, meeting and venue scheduling, meeting equipment support, and meeting taping and notes shall be supported by staff of the Mid-Atlantic Fishery Management Council. Travel cost reimbursement for non-federal government members of the NTAP shall be coordinated through the Mid Atlantic Fishery Management Council.

#8c

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
C. M. "Rip" Cunningham, Jr., *Chairman* | Paul J. Howard, *Executive Director*

To: Paul J. Howard, Executive Director
From: Scientific and Statistical Committee
Date: 27 February 2012

Subject: **Gulf of Maine cod work plans**

The Scientific and Statistical Committee (SSC) was asked to develop work plans for addressing all four items listed as warranting further investigation in the SSC 30 January 2012 report to the Council and to submit those work plans as quickly as possible to the NEFSC by a Council motion passed February 1, 2012. Per later instructions provided by a memorandum from Paul Howard, these work plans are being provided to the Council for direct transmission to the NEFSC.

There are two work plans attached. The first document describes the plan for addressing the stock structure issue for cod in this area. The second document describes the plan for addressing the discard mortality rate, transition from estimation of recreational catch by MRFSS to MRIP, and the use of landings per unit effort in the stock assessment model.

Re-evaluating the spatial basis for management of Atlantic cod

Proposed work plan

NEFMC Scientific and Statistical Committee

February 27, 2012

Overview

We propose a three-phase process for re-evaluating, and possibly revising, the spatial basis for assessment and management of Atlantic cod, including the following objectives at each step:

Phase I

- Summarize the potential implications of defining inappropriate stock boundaries and ignoring sub-stock structure within stock units, as well as the potential advantages and disadvantages for both science and management of revising the status quo units, in order to provide a commonly understood rationale for this investigation.
- Overlay tagging, genetic, life history, and other data on the current management units to estimate rates of mixing and, conversely, independence and evaluate key assumptions of assessment models, essentially testing the "null hypothesis" of the status quo configuration.
- Develop a synthesis of those same tagging, genetic, life history, and other data to determine whether one or more alternative spatial configurations are more likely than the status quo. This synthesis should include the Gulf of Maine, George's Bank, the Mid-Atlantic Bight, and the Scotian Shelf.
- Characterize the mechanisms that drive spatial finer scale dynamics of cod populations and the fishing fleet, including habitat status and distribution, behavioral diversity, oceanography, predator-prey dynamics, and other factors.
- Provide advice on spatially-explicit management goals and strategies based on the synthesis of processes driving finer scale patterns, whether a new spatial configuration is adopted or not.

Phase II

- Summarize the practical limitations of changing stock units for both science and management.
- Analyze the advantages and disadvantages of either maintaining the status quo or adopting different spatial configurations through simulation modeling.

Phase III

- Conduct new assessments on new stock units, if warranted.

Since the need for Phase II is contingent upon the outcomes of Phase I, and likewise the need for Phase III is contingent upon the outcomes of Phase II, the work plan proposed herein focuses on Phase I only, although we propose objectives for all phases.

Proposed timeline for Phase I

(Note: Timeline based loosely on the process for a benchmark stock assessment.)

Feb. 27:	Revised plan submitted to NEFSC.
March 12-16 (3-4d):	Combined industry meeting (1 d) + data meeting (2-3 d)
March 19 – April 20 (5 wk):	Data acquisition and preparation
April 23 - 27 (2-3d):	"Models" meeting (i.e., methods for analysis & synthesis)
May 7 – June 15 (6 wk):	Application of methods
June 18-22 (2-3d):	Review of results; determine revisions as needed
June 25 – Aug. 3 (6 wk):	Revised analysis
Aug. 6-10 (2-3d):	Review and finalize outcomes

Capacity needed for Phase I

- 1-3 dedicated analysts working full-time on this issue.
- Work group/advisory panel including one or more experts[1] in:
    - Population genetics.
    - Tagging studies.
    - Life history traits.
    - Behavior.
    - Oceanography.
    - Other stock identification approaches (e.g., morphology, parasites, otolith composition)
    - Habitat.
    - Trophic interactions.
    - Stock assessment, esp. spatially structured.
    - Spatial ecology/theory.
    - Spatial modeling.
    - Fishing behavior, esp. spatial patterns.

[1] Involvement of Canadian experts will be important given the need to address linkages to the Scotian Shelf.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northeast Fisheries Science Center
166 Water Street
Woods Hole, MA 02543-1026

April 2, 2012

Capt. Paul J. Howard
Executive Director
New England Fishery Management Council
50 Water Street
Newburyport, MA 01950

Dear Paul:

I am writing to update you on our progress toward developing a study plan to address scientific issues raised about the recent Gulf of Maine cod assessment. I also provide information that may help the Council as it considers timing for the next assessment.

As you know, at the last two meetings of the NEFMC Executive Committee various aspects of the Gulf of Maine cod assessment were discussed, including terms of reference and timing for the next assessment. In an email sent to Chris Legault and myself on March 2, 2012, Tom Nies provided a spreadsheet listing four different timeline scenarios (extending from February 2012 through May 2014) for addressing the scientific issues of concern identified by your SSC and for conducting the next assessment. Tom's spreadsheet has been very useful to us as we evaluate the logistical and informational tradeoffs required to accommodate a GOM cod assessment later this year.

Our discussions have focused on:

(a) How much new information can be developed in the short-term on the four scientific topics highlighted by the SSC [i.e., discard mortality; LPUE/CPUE; incorporation of MRIP data; and cod stock structure].

(b) Existing Center stock assessment (and PDT) responsibilities and commitments for the remainder of 2012, specifically the SAW/SARC 54, the TRAC meeting, 2012 Mid-Atlantic stock updates, and SAW/SARC 55.

(c) Analytical work required to support SSC and Council activities on 2013 ACL and groundfish FMP specifications.

(d) The need for peer-review of any new scientific data included in the next GOM cod assessment.

In developing our own plans for addressing these topics, we have relied heavily on the workplans that were developed by the SSC. Even though we are currently moving forward to address the

cc: TN, PMF (4/10)

research needs for each of these topics, we will be unable to complete our own work plans until the Council has indicated its preference regarding the timing of the next GOM cod assessment. Once this has been done, we will finalize our plans and provide them to the Council.

In terms of timing for management actions, we recognize that an August 2012 assessment would allow the SSC and the Council to use their standard timelines for incorporating new stock assessment results while setting ACLs and FMP specifications for the 2013 fishing year. Results from a December assessment, on the other hand, would require initiating a "framework" process in fall 2012, using a range of outcomes within which the December assessment results are likely to occur. Although not typical, this approach has been used by the Council in the past.

Regardless of whether the new assessment takes place in August or December, we would plan to incorporate catch and survey data collected during 2011. Furthermore, we expect to be able to consult with industry and other scientists regarding discard mortality rates within the next two months and, therefore, alternative discard mortality rates could be available for an August assessment.

The outcome of our CPUE/LPUE investigations is uncertain, and the amount of time necessary to complete this work will depend, to some extent, on preliminary results. Therefore, if useful information is derived from these analyses, it may be possible to incorporate the results in an August assessment, but focusing on a December assessment would be more realistic.

Similarly, while it is possible that we could be able to consider new recreational fishing mortality (MRIP) estimates in an August assessment, it is more realistic to assume that this would not be possible until December. This is because guidance on analytical procedures for incorporating MRIP data in stock assessments are not yet available from the March workshop on this topic; furthermore, we have been informed that MRIP-based estimates of recreational fishing mortality for 1998-2003 will not be available until August 2012 at the earliest.

The scenarios that Tom Nies provided are particularly useful for considering the timing of future GOM cod assessments relative to the availability of new information on cod structure. It is important to bear in mind that while we are committed to careful evaluation of the questions related to this issue, we do not expect to be able to bring substantive new information on cod stock structure to bear in any cod assessment work we conduct during 2012. Thus, the Council may want to pay particular attention to Tom's suggestions regarding future (2013 and beyond) cod assessments as the results of the stock structure work become available.

If the new GOM cod assessment does take place in December, it would be included within SAW/SARC 55, and peer review of the assessment would be completed within the SAW/SARC process. However, we are already planning to complete three stock assessments during this SAW/SARC and it would, therefore, be necessary to substitute GOM cod for one of these three (surf clams, white hake, Georges Bank cod) and to work with the Council to address the consequences.

I understand that this matter needs to be discussed by the Council at its next meeting, and I hope this provides the information necessary to support the Council's deliberations. Please let me

know if you would like any additional information, and if you would like us to make a presentation on this issue at the April Council meeting. I think it will also be important for us to discuss concerns regarding the timing of the next GOM cod assessment, and the tradeoffs related to other assessment work being carried out at the Center this year, at the May meeting of the NRCC.

I look forward to continuing to work with you and the Council on this matter.

Sincerely,

William Karp

William A. Karp, Ph.D.
Acting Science and Research Director

cc: S. Rauch
R. Merrick
C. Selberg
R. Brown
F. Serchuk
J. Weinberg
P. Rago
T. Frady
D. Morris (NERO)

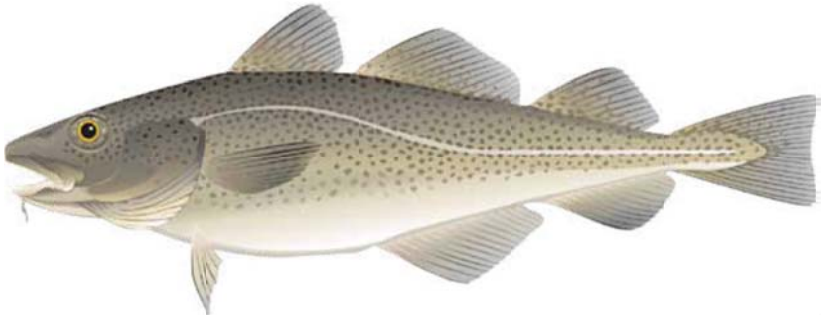
REPORT OF THE WORKSHOP

ON STOCK STRUCTURE OF ATLANTIC COD

IN THE GULF OF MAINE REGION

JUNE 12 – 14, 2012

PORTSMOUTH, NH



JULY 24, 2012

Project Lead Institution:

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Gulf of Maine Research Institute
Science. Education. Community.

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

CINAR
Cooperative Institute for the North Atlantic Region

- There is a general decline in survey abundance for cod in the wider region even if data are binned by alternative stock boundaries at scales finer than the current stock areas
- Preliminary simulation modeling results suggest that failure to consider stock mixing among the GOM, GB, and 4X cod stocks had limited impacts on ASAP-based stock assessment for GOM cod, perhaps resulting from limited mixing between GOM cod and the other two stocks. Data quality associated with catch and abundance indices might have larger impacts on stock assessment results.
- Other preliminary simulation modeling indicated that stock status estimated from data pooled across spatial components can result in an over- or under-estimate of productivity depending on the manner of data collection. Ignoring the spatial complexities of population structure and connectivity can lead to misperceptions of stock status and subsequent mismanagement of the resource.

Session 10 Summary: Overall Conclusions and Recommendations

- Overall conclusions and recommendations on most likely stock structure and appropriate management units
- Identify gaps in the data and analyses and recommend actions to address them
- Recommend next steps

Session chair: Steve Cadrin

Overall conclusions and recommendations on most likely stock structure and appropriate management units

The Workshop agreed on the following statements on broad-scale stock structure:

1. Conceptualizing the most likely biological stock structure is essential for the next steps of evaluating alternative management units and whether they are more likely to achieve fishery objectives.
2. Any management unit boundary will be a simplification of a more complex ecosystem, but if the simplification sufficiently reflects reality, we can meet our fishery and conservation objectives (optimum yield, preventing overfishing, etc.).
3. All information from U.S. waters indicates that there are three genetic stocks: 1) Offshore - Eastern Georges Bank (with some connectivity with the Scotian Shelf); 2) Inshore - Northern, Spring-Spawning Complex; and 3) Inshore – Southern, Winter-Spawning Complex.
4. Information from more traditional stock identification information generally supports the genetic perspective (e.g., tagging, growth, larval dispersal).
5. Cod in the eastern Gulf of Maine appear to be distinct from other groups.

The Workshop agreed on the following statements on fine-scale stock structure:

1. Larval retention and multi-year fidelity to local spawning sites suggest fine-scale meta-population structure.

2. Some traditional spawning groups were depleted, and have not been re-colonized by more productive groups.
3. Depletion of historical spawning groups is most apparent in the eastern Gulf of Maine, the Mid-Atlantic, the 'Plymouth Grounds,' and recently Nantucket Shoals.

The Workshop agreed that all genetic information available from U.S. waters is not entirely congruent with current management unit boundaries. Many of the workshop participants felt that there was compelling evidence that the current management units need to be revised. However, some participants felt that there were data gaps that needed a closer examination before biological stock boundaries could be defined. Therefore, the Workshop did not reach any conclusions on what the most appropriate representation of biological stock units might be. This will require further data analysis and modeling in order to complete Phase I of the SSC recommended process.

Identify gaps in the data and analyses and recommend actions to address them

The gaps in the data and analyses were separated into two groups based on the timeframe in which they could be addressed – (1) short term (next 6 to 12 months); and (2) longer term (greater than 12 months).

Short term

1. Identify, collect, and analyse any further available key data and information required to complete Phase I and move to Phase II. Such data and analyses could include, but not be limited to, the following and should include data from the Scotian shelf and other appropriate Canadian waters:
   a. Any further existing genetic data
   b. Additional tagging data and estimation of movement rates from entire dataset
   c. Life history parameters
   d. Further consideration of larval dispersal from key spawning grounds, e.g. Georges Bank
   e. Further evaluation of the advantages and disadvantages of alternative management unit scenarios on stock status and yields from the cod stocks in the region (Gulf of Maine, Georges Bank, Mid-Atlantic bight, and Scotian Shelf).

Longer term

1. Stock composition analysis in Gulf of Maine fishery (e.g., using otolith cores)
2. Collection and analysis of further genetic data from key areas, e.g. Georges Bank, eastern Gulf of Maine (including archaeological data), and perhaps Canadian waters.

Recommend next steps

The Workshop did not explicitly address and propose the next steps in the process. The Workshop Steering Committee subsequently discussed the next steps required to complete Phase I and lead up to Phase II of the recommended SSC process.

The Steering Committee recommends that an inclusive but focused Working Group meeting be held involving a small group of Canadian and US scientists to consider the results of the Workshop. This Working Group should be provided the short-term data and analyses identified as missing by the Workshop. Using that information, as well as the conclusions from the Workshop, the Working Group should determine the most appropriate representations of biological stock structure to complete Phase I of the process. The results from this Working Group meeting should be evaluated through an independent peer-review process. These peer-reviewed results should be used in Phase II of the process to make recommendations on the most appropriate management units.

A Proposed Process for the Evaluation of the Stock Structure of Atlantic Cod (*Gadus morhua*) in NAFO Divisions 4X, 5YZ and 6ABCD

Northeast Fisheries Science Center
Draft, last update: July 2, 2013

BACKGROUND

In 2012, the New England Fishery Management Council's (NEFMC) Scientific and Statistical Committee (SSC) proposed a three-phase process for the re-evaluation of, and possible revisions to, the spatial basis for assessment and management of Atlantic cod (*Gadus morhua*) in the northeast United States. Currently, U.S. Atlantic cod are managed as two separate management units: the Gulf of Maine (NAFO Div. 5Y) and Georges Bank (NAFO Div. 5Z and 6ABCD). Because of the co-management of area 5Ze cod with Canada, and the known interchange of fish between U.S. regions and the Canadian Southern Designatable Unit (DFO 2011), such a re-evaluation must also extend to Canadian waters. Cod in the Southern Designatable Unit are assessed as two separate management units: Southern Scotian Shelf and Bay of Fundy (NAFO Div. 4X and the Canadian portion of 5Yb), and Eastern Georges Bank (DFO statistical areas j and m in NAFO Subdivision 5Z and US statistical areas 551-552 and 561-562). The Eastern Georges Bank portion of the Georges Bank stock area is a Canadian management area and considered by the U.S. to be a sub-component of the larger U.S. managed Georges Bank stock (Figure 1).

The three-phased approach outlined by the SSC had the following objectives:

Phase I

- *Summarize the potential implications of defining inappropriate stock boundaries and ignoring sub-stock structure within stock units, as well as the potential advantages and disadvantages for both science and management of revising the status quo units, in order to provide a commonly understood rationale for this investigation.*
- *Overlay tagging, genetic, life history, and other data on the current management units to estimate rates of mixing and, conversely, independence and evaluate key assumptions of assessment models, essentially testing the "null hypothesis" of the status quo configuration.*
- *Develop a synthesis of those same tagging, genetic, life history, and other data to determine whether one or more alternative spatial configurations are more likely than the status quo. This synthesis should include the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the Scotian Shelf.*
- *Characterize the mechanisms that drive spatial finer scale dynamics of cod populations and the fishing fleet, including habitat status and distribution, behavioral diversity, oceanography, predator-prey dynamics, and other factors.*
- *Provide advice on spatially-explicit management goals and strategies based on the synthesis of processes driving finer scale patterns, whether a new spatial configuration is adopted or not.*

Phase II

- *Summarize the practical limitations of changing stock units for both science and management.*
- *Analyze the advantages and disadvantages of either maintaining the status quo or adopting different spatial configurations through simulation modeling.*

Phase III

- *Conduct new assessments on new stock units, if warranted.*

In June 2012, with the sponsorship of the Northeast Fisheries Science Center (NEFSC), the Gulf of Maine Research Institute (GMRI) convened a workshop to begin Phase I of the SSC's work plan. The workshop was summarized in a July 2012 report (GMRI 2012). The overall goal of the workshop was to review data (genetic, life history, tagging, etc.) to evaluate the "null hypothesis" of the status quo management units (Figure 1). Invited participants from the fishing and scientific communities gave presentations on a range of topics with opportunities for discussion. Unfortunately, no Canadian scientists with cod expertise participated in the workshop. While many of the workshop participants felt that there was compelling evidence that the current management units needed to be revised, the workshop did not reach any conclusions on what the most appropriate management units might be. The overall conclusion of the workshop was that further data analysis and modeling would be required to complete Phase I of the SSC recommended process. The workshop report also identified gaps in the data and analyses and recommended actions to address these gaps.

While the workshop did not explicitly address and propose the next steps in the process, the Steering Committee recommended that an inclusive, but focused, working group (WG) be assembled involving a small group of US and Canadian scientists to: a) consider the results of the workshop, b) evaluate short-term data and analyses identified as missing by the GMRI workshop, and c) if possible, determine the most appropriate representations of biological stock structure. The Steering Committee recommended that Phase I would culminate with an independent peer-review of the WG products. The GMRI report provided no recommendations for the completion of Phases II and III.

The purpose of this document is to formalize a process to complete the evaluation of the Atlantic cod stock structure as outlined in the SSC's work plan.

PROCESS

The proposed process will complete the SSC's work plan on cod stock structure while building on the progress from the GMRI workshop. The stock structure review process will be coordinated by a ten member working group with assistance from external experts as necessary. There will be five discrete stages within the process, with each stage conducted in sequence. The first four stages constitute the scientific scope of the stock structure review process as outlined in the terms of reference (TOR). Stages 1 and 2 will focus on reviewing all available information and conducting a holistic evaluation of likely cod stock units. Stage 3 will evaluate the impacts of any recommended revisions to the stock structure on the scientific advice derived from stock assessments. Stage 4 will constitute an external peer-review to determine whether the work products of the working group adequately address the terms of reference. Stage 5 will evaluate the management implications of stock unit revisions. At the completion of Stage 5, a decision will be made by the relevant science and management authorities whether or not to incorporate any of the proposed revisions to the Atlantic cod stock units into future operational stock assessments and fisheries management programs.

Comment [TAN1]: Who makes these decisions? That should be spelled out. Suggested text shown.

Working Group Membership

An inclusive but focused Atlantic Cod Stock Structure Working Group (ACSSWG, or WG) will be assembled to complete the review of Atlantic cod stock structure. Collectively, the WG membership will have a broad range of expertise and skills including stock assessment modeling, biological reference point determination, knowledge of regional fisheries-dependent data collection systems, tagging experiments and modeling, stock identification, genetics, otolith microchemistry, life history traits, morphometrics,

larval dispersal and regional oceanography. Given the management implications of any revisions to stock structure, the WG will also have at least one member from the NEFMC (e.g., SSC, Plan Development Team member, Council staff). Based on the criteria of expertise and inclusiveness, the following membership of the ACSSWG membership is proposed (with candidate members identified):

- NEFSC assessment scientists: Michael Palmer (NEFSC), Loretta O'Brien (NEFSC)
- NEFSC population biology scientists: Richard McBride (NEFSC), Mark Wuenschel (NEFSC)
- NEFMC representatives: Jamie ~~Courname~~ Cournane (NEFMC staff), Jake Kritzer (NEFMC SSC)
- Canadian scientists: Don Clark (Canada DFO), George Rose (Memorial University)
- Academic scientists: Lisa Kerr (GMRI)
- Environmental/ecosystem scientists: Kevin Friedland (NEFSC, member GMRI Steering Committee)

The ACSSWG will be limited to no more than 10 members. Given the transboundary nature of cod stock structure issues, the WG should be co-chaired by a U.S. and a Canadian representative. It is recognized that the WG will require assistance from outside experts; in these situations, non-WG members will be asked to contribute analyses and scientific reviews as the WG deems necessary.

Terms of Reference

1. Inventory and summarize all information presented at the GMRI Workshop on Stock Structure of Atlantic Cod. Evaluate the relative importance of the information with respect to developing a holistic understanding of Atlantic cod stock structure.

2. Identify and evaluate any new or existing data, including the effects of environmental conditions, on the stock structure of Atlantic cod in NAFO Divs. 4X, 5 and 6 not considered at the GMRI Workshop. Integrate any additional information into the inventory developed in TOR 1.

3. Identify any major information gaps in the existing research with respect to cod stock structure. Develop a prioritized list of research recommendations to address these gaps. Comment on the feasibility and time horizon (e.g., short-term, long-term) of the proposed research recommendations.

4. Using a holistic approach, synthesize all available information (TOR 1 and 2) and determine whether one or more alternative biological stock structures are more likely than the status quo management units. In developing alternative stock structures, consider the temporal stability of stock structure and how the available information can inform the knowledge of stock structure over time.

5. Provide advice on spatially-explicit ~~management goals~~ processes ~~and strategies based on the synthesis of processes~~ driving finer scale patterns, and whether these processes should be considered in management, whether new management units are adopted or not.

6. Evaluate the historical and contemporary fisheries-dependent and -independent data collection programs, and evaluate whether these programs will support newly proposed stock units. Summarize the practical limitations of changing stock units for science and management (e.g., data and modeling limitations).

Comment [TAN2]: This WG seems heavily weighted to NEFSC scientists (5 of 10 members). This is a critical issue, as in stage 2 (see below) the ACSSWG is charged with the determination of the most likely stock structure.

Which of these scientists are geneticists? We believe it would be important to add someone with this expertise to the panel in replacement of one of the NEFSC scientists.

Comment [TAN3]: Our perception of stock structure may be affected by climate change. We want to make sure this possibility is explicitly addressed.

Comment [TAN4]: It does not seem appropriate to ask a scientific panel to provide advice on management goals and strategies. Rather, the panel should identify those spatially-explicit processes that are important to the health of the resource, and advise on the implications of not considering those issues. The suggested wording is an attempt to get to this point.

7. If possible, develop revised stock assessment modeling approaches that incorporate any new insights and understanding of Atlantic cod stock structure. Develop methods to determine biological reference points using the revised models. Summarize differences between status quo assessment results and the assessment results developed using the new approaches.

8. Conduct a consequence analysis summarizing the stock assessment risks associated with not considering the most likely stock units compared to the status quo. If possible, comment on any additional scientific or management resources that may be required to implement any revised stock or management units for cod.

Process outline

Stage 1: Creation of the WG and evaluation of information content

Similar to the Stock Assessment Workshop (SAW) process, the stock structure review process will rely on a working group to complete the terms of reference (TOR). Consistent with the recommendations of the GMRI Steering Committee, the Atlantic Cod Stock Structure Working Group (ACSSWG, or WG) will consider the results of the GMRI workshop and evaluate any newly available information identified as missing at the GMRI workshop. Should the WG conclude that the available information is insufficient to make definitive conclusions on stock structure it should establish a prioritized list of research tasks with clear guidance as to what items the WG considers critical for the evaluation of stock structure.

~~*"The combination of some data and an aching desire for an answer does not ensure that a reasonable answer can be extracted from a given body of data."* (Tukey 1986)~~

Comment [TAN5]: Delete. This is unnecessary and will be viewed a clever way to influence the WG results.

Stage 2: Provide recommendations on most likely stock units

Once the WG has concluded that the information content is sufficient to support a thorough re-evaluation of stock structure, the WG will evaluate the information and determine the most likely stock units. This evaluation should adopt a holistic approach to stock identification relying on a broad spectrum of techniques and information to identify likely stock units:

"Regardless of its precise definition and biological underpinnings, the stock concept really has to do with the interaction between a fish species and its management. Consequently, the purpose of such definitions is to direct management efforts to taxon levels below that of the species…The strongest inferences on stock structure are drawn from a suite of complementary techniques that cover multiple aspects of the biology of a fish species. This is partly because the definition of a `stock', for management purposes, is not strictly a genetic construct, but represents a semi-discrete group of fish with some definable attributes of interest to managers. Integration of the results of each method used in a multiple or `holistic' stock identification approach maximizes the likelihood of correctly defining stocks - , however, defined by management (Hohn, 1997)." (Begg and Waldman 1999)

Types of information that should be considered include: distribution patterns, mixing rates between regions, spawning locations, life history traits (growth, maturity, spawning periods, etc.), larval dispersal patterns, meristics, morphometrics, otolith morphology, otolith microchemistry, genetics, and molecular chemistry. Reliance on several different techniques mitigates the shortcomings of any single method. By considering multiple identification techniques, the WG will achieve a generalized and robust understanding of stock structure sufficient to meet the needs of fisheries management. It should be stressed that any stock structure delineations will be imperfect and subject to some degree of uncertainty.

Stock structure may be dynamic and vary temporally. The determination of current stock structure as informed from recent studies (e.g., genetics, tagging), while important, may have limited immediate value in population models without an understanding of historical stock structure. Specific consideration should be given to historical distributions and environmental influences on stock dynamics.

Should the WG conclude that an alternate understanding of stock structure is more appropriate than the status quo, the WG should evaluate the feasibility of supporting the alternate understanding within a stock assessment framework. For example, it is appropriate for the WG to consider whether historical and contemporary data collection systems could support any proposed modifications to the management units. If the alternate understanding of stock structure requires new modeling approaches (e.g., box-transfer models), the WG will need to determine whether these new models or methods can be run from existing software. Any stock structure recommended by the ACSSWG should be supportable by both historical and contemporary data collection systems, as well as available modeling approaches. The WG should be very specific in its recommendations as to how the revisions to stock structure will be accommodated in a stock assessment framework.

Stage 3: Evaluate the impacts of stock revisions on assessment models

If possible, the WG should apply the new understanding of stock structure into scientifically valid methodologies and models to serve as the baseline model in future operational assessments. All new assessment models/approaches will be tested on datasets from the last operational assessment. The WG will also develop methods to determine ~~biological reference points (BRPs)~~ status determination criteria (SDCs) that are consistent with the revisions to stock structure and/or any newly-developed assessment model or methodologies.

The WG should also conduct a consequence analysis summarizing the risks to stock assessments and subsequent management advice associated with not considering the most likely stock units compared to the status quo. To the extent possible, the WG should also comment on the resources needed to effect the improvements in scientific advice resulting from revisions to the status quo management.

Stage 4: Peer-review of the scientific results

Work products will undergo an independent peer review process, which may be similar to that used in the Stock Assessment Review Committee/SARC process (e.g., a sequential peer review involving the Center for Independent Experts and chaired by an SSC member). A recommendation will be made by the peer reviewers as to whether (a) the work products are adequate to replace the existing operational baseline model; (b) the new model(s) or methods can be run either from the assessment model toolbox or through other available software; and (c) the revised/new BRPs are technically appropriate.

Stage 5: Management considerations and adoption into new baseline operational assessment model(s)

Stock structure considerations vetted and approved through the scientific process may require an additional step before modifications are formally incorporated into an operational baseline assessment. Though external to the scientific process, management limitations are important to consider because these may influence how the scientific results get incorporated into the operational assessment and management process. With respect to Atlantic cod, there are at least two critical management issues that require further consideration before changes to management units are implemented. First, the co-management of the Eastern Georges Bank cod resource with Canada necessitates that any revisions to this management

Comment [TAN6]: Shouldn't there be a benchmark/research assessment first? Or are stages 3 and 4 essentially a benchmark/research assessment?

Comment [TAN7]: Edited to use the terms in NSG1. NSG1 uses "reference points" to include ABC and ACL, which the WG is not being asked to develop.

Comment [TAN8]: Why? What bearing does this have on the products? If the products are adopted shouldn't the necessary models/tools be developed?

unit— or the development of alternate assessment models that include movement rates (e.g., box-transfer models) —would require review through the Transboundary Resources Assessment Committee (TRAC) and possibly the Transboundary Management Guidance Committee. Revisions to stock structure may affect the nature of the U.S./Canada Resource Sharing Understanding. Second, the US groundfish fishery is currently managed through a sector management system where sector stock allocations are based on historical landings corresponding to the current management units. Any changes to the management units may influence future sector allocations, thus having significant management and economic implications.

Ultimately, the decisions to modify the management units of Atlantic cod in NAFO Divisions 4X, 5YZ and 6ABCD will be a management decision informed through the scientific process. This stage is not the purview of the ACSSWG.

Timeline

The process for the review of Atlantic cod stock structure is envisaged as a five-stage process. During each stage, management authorities will be provided updates on working group progress.:

- *Stage 1: Creation of the WG and evaluation of information content (TOR 1-3)*
  - July-August 2013 – Coordinate with NEFMC to finalize the Atlantic cod stock structure review process and agree on working group membership.
  - September-November 2013 – Assemble the ACSSWG and begin to address TOR 1. The initial work can be done via correspondence among WG members as coordinated by the chairs. Identify any newly completed or ongoing research (TOR 2) and reach out to responsible groups to gain an understanding of research progress and timelines.
  - Quarter 1, 2014 – The ACSSWG will convene a public workshop (3-5 day meeting) with the following goals:
    - Summarize TOR 1.
    - Provide an opportunity for researchers to present new information (TOR 2).
    - Identify any remaining information gaps and prioritize these consistent with TOR 3.
    - The WG will produce a workshop report addressing TOR 1-3.
- *Stage 2: Provide recommendations on most likely stock structure (TOR 4 and 5)*
  - Quarter 2, 2014 – This work will be conducted by the ACSSWG.
    - The WG will meet in person to formulate final decisions on likely stock structure (1-3 day meeting).
    - The WG will produce a report addressing TOR4 and 5.
- *Stage 3: Evaluate the impacts of stock revisions on assessment models (TOR 6-8).*
  - Quarters 3 and 4, 2014 - This work will be conducted by the ACSSWG with assistance from external experts as necessary.
    - The WG will meet in person to evaluate all associated analyses (3-5 day meeting).
    - The WG will produce a report addressing TOR 6-8.
- *Stage 4: Peer-review of the scientific results*

- Quarter 3, 2014 – Identify and secure at least three external reviewers for the peer-review panel in addition to a member of the NEFMC SSC to serve as panel chair (chair cannot be a member of the ACSSWG).
- Quarter 1, 2015 – Hold a public peer-review meeting similar to SARC review meetings (3-5 day meeting).
  - The peer-review panel will produce a report describing their conclusions and evaluating whether the TOR were adequately addressed by the WG.

Comment [TAN9]: Who does the peer review panel report to?

- *Stage 5: Management considerations and adoption into new baseline operational assessment model(s)*
  - Quarter 2, 2015
  - This stage will be completed by the relevant U.S. and Canadian management and scientific authorities.

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FIGURES

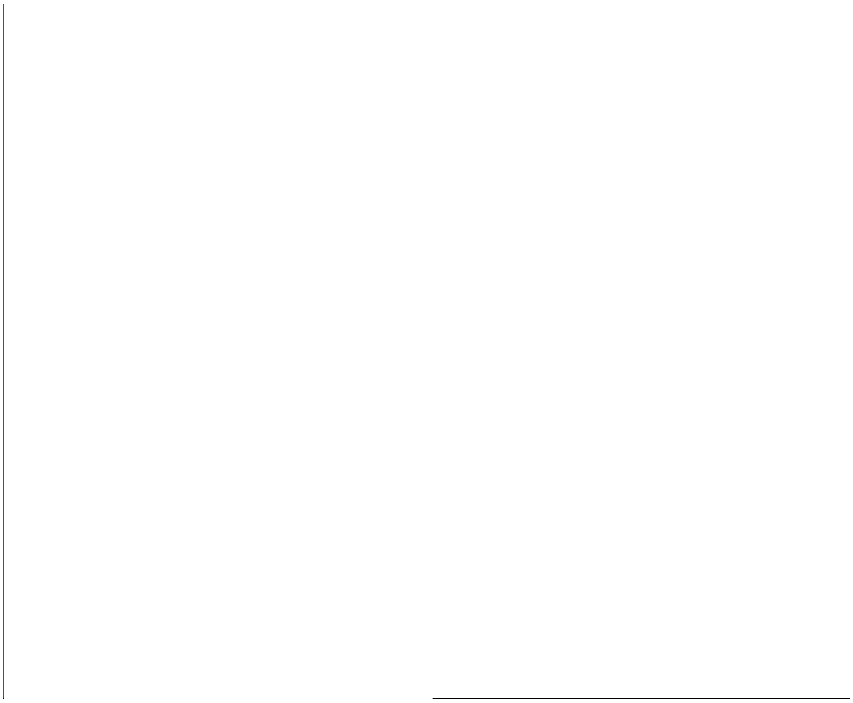


Figure 1. Map showing the current management units used in the assessment and management of Atlantic cod (*Gadus morhua*) in NAFO Divisions 4X, 5YZ and 6ABCD.

2. Maine Department of Marine Resources (Portside Bycatch)

The portside commercial catch and bycatch sampling provides two important functions; collection of commercial herring samples for aging, spawning condition, and other biological attributes, and to serve a secondary role cross checking at-sea observations of bycatch events. Without federal, state, or ACCSP funds this program would end. Given Maine's and NOAA Fisheries current budget (Inter-jurisdictional Fisheries funds have been cut drastically during the past ten years) it is unlikely that this type of data would be collected particularly given the reduction in federal port agents.

Ending of this project would have three severe impacts on the management of Atlantic herring by ASMFC and our federal partners. Unless funded by another source these would include:

1. Elimination of the current age structured model. The current model formulation relies heavily on the commercial catch composition. Maine DMR is the only partner which collects and ages these commercial samples. Without these samples and aging, the assessment would most likely move to either an index or biomass based assessment. This in turn would increase the scientific uncertainty around quota setting. Given the latest reauthorized MSA, this would directly impact the herring industry and bait availability with lower quotas to account for this increased uncertainty.

2. Elimination of current ASMFC spawning closure management. Currently Maine DMR uses commercial samples to document and inform ASMFC spawning closure management within year. Reduced or non-existent sampling during this time would result in the spawning area closures moving to their default dates. Given the variability in spawning activity from year to year, this would increase the likelihood of prolonged spawning closures or the landing of spawning fish. Currently ASMFC is undergoing the amendment process (Amendment 3) to increase spawning area management activities.

3. Elimination of state involvement in haddock and river herring bycatch/incidental catch monitoring. The state-run portside bycatch sampling program serves as a secondary check on bycatch data primarily developed using federal at-sea observer coverage. These data determine area closures for the herring fishery on Georges Bank, and Southern New England. Additionally investigations on the comparability between at-sea and portside bycatch sampling could allow the industry to utilize portside sampling at a much reduced cost. •

- The project has supplied yearly sample data since 2002 for the Atlantic herring that is collected and processed to the Data Warehouse. There are approximately 100,000 records with Date, Location (lat/lon), Sex, Length, Weight, Age, and Gonadal Weight
- The project since its beginning funding in 2004 has successfully and consistently met its stated objectives using standard accepted protocols through well thought out methods and schedules •

- The project covers the sampling of the landed commercial catch from Maine to New Jersey. The analyzed data is used in the development of both FMPs for NEFMC and ASFMC

Regional impact of project: This project collect portside data from New Jersey through Maine. Regional management organizations, such as ASMFC, will benefit from the biological and bycatch information from the proposed project.

1.0 MA DMF AND ME DMR PORTSIDE SAMPLING PROGRAMS

1.1 PORTSIDE SAMPLING OVERVIEW

In an effort to increase the number of trips sampled and reduce the uncertainty surrounding fishery-wide estimates of bycatch, portside sampling programs have been initiated in Massachusetts and Maine by MA DMF and ME DMR respectively. The portside sampling programs in these two state programs also offer opportunity to collect data in an inexpensive but efficient and accurate way as well as collect important samples for biological analyses.

The methodologies applied to the two State programs are very similar and consistent with NOAA and ACCSP protocols for sampling. The primary difference is that the MA DMF samplers focus on monitoring entire offloads from a fishing vessel, while ME DMR samplers work on "lots," which may represent one full offload or a portion of an offload from a particular vessel. While every landing location and every landing event is different and poses its own set of challenges, the general approach/methodology for sampling is the same.

The ME DMR program takes advantage of normal processing plant operations by quantifying bycatch that enters the facilities. The sampling takes place at processing plants and bait dealers in Maine, New Hampshire, Massachusetts, Rhode Island and New Jersey. At each port, random herring samples are collected directly off the incoming vessels and brought back to the lab at DMR in Boothbay Harbor, Maine. Fish are processed in the lab and data are collected on gonad development, age (determined from otoliths), length, and weight. A sampling level of five percent of the entire herring fishery is targeted. The mackerel fishery will be sampled if the target levels for the herring fishery are being reached or when herring samples are not available. This scenario is most likely to occur in the winter months when many of the herring vessels switch to the mackerel fishery.

ME DMR also samples mackerel and because the Atlantic herring and Atlantic mackerel show bycatch in both fisheries on a routine basis. Therefore, commercial catch samples of mackerel are collected by randomly selecting 100 fish from each fishing vessel. These fish are measured and weighed and then a sub-sample (n=25) is frozen and transported to the NMFS Northeast Regional Science Center, where they are aged and logged onto a database. If the mackerel in the catch sample are larger than 35 cm all fish are frozen for aging (n=100).

The MA DMF program goal is to document landing activities and record and quantify catch composition, including size and age, of the fish landed by the North West Atlantic herring and mackerel pelagic fishery. MA DMF and ME DMR collaborate to implement consistent dockside sampling protocols in the Atlantic herring and Atlantic mackerel fisheries in both port sampling studies and to enhance the quantity of information and trip sampling resolution being collected. MA DMF will provide biological information and samples that may be utilized in stock assessments as well as assisting fisheries managers through assessing and analyzing state and federal landings and vessels trip reports, sea sampling and port sampling.

MA DMF utilizes Atlantic herring and mackerel samples from processing plants and wholesale bait dealers from two states, Massachusetts and Maine due to the 2007 NMFS database (VTR data) indicating the 90% of the landings are attributed to these two states. Also, during 2007

91% of all Atlantic mackerel landed were in Massachusetts. All vessels and dealers that reportedly land Atlantic sea herring and Atlantic mackerel will be sampled with a target sampling rate of 10% of all trips. If time and funding allows, sampling in other states with landings greater than 1%, which include Maine, New Jersey (4.8%), Rhode Island (4.0%), and New Hampshire (0.7%) will be sampled during this initial phase of the study. Other states with less than 1% annual landings will not be sampled unless additional grant funds are received and the scope is expanded to include these additional areas. Within Massachusetts the three major ports where landings occur are: Gloucester, New Bedford and Fall River.

Generally, the sampling methodology will be as consistent as possible between ME DMR and MA DMF with some modifications to reduce potential sampling bias. Due to the large quantities of fish that are typically landed in the Atlantic herring fishery, sub-sampling will be required at certain times. Sub-sampling is used when the volume of fish that the sampler is attempting to quantify is too large to obtain actual weights or if the amount of by-catch is too abundant. During sub-sampling, the sampler will collect smaller batches of fish, sort and weigh by species and then extrapolate to the total catch. All sub-sample weights will be actually weighed (actual weight) and hail weights (for both truckloads and fishing vessels) will be acquired from the plant managers or vessel's captain and therefore estimated (estimate weight). Further explanation or sampling and sub-sampling protocols between the two programs will be explained below.

1.1.1 ME DMR Sampling and Sub-Sampling Procedures

The samplers collect and quantify all bycatch from individual lots of fish (transported by trucks or vessels) that enter the processing facilities. Samplers position themselves at the point of entry into the facility along an assembly line or at the base of the hoppers where the fish are unloaded. Sampling is conducted before grading or sorting of the catch occurs. All bycatch is removed from the assembly line or hopper and placed in bushel baskets or buckets specific to each species. The total weight of any observed bycatch is recorded along with species identification, total species weight, individual lengths and weights of all fish according to a NMFS and ACCSP specified protocol. If there is a large amount of one species, the total weight is recorded and then length frequencies and weight are gathered from a sub sample of n=50. The information collected for each bycatch study is recorded on the data sheets and entered into the DMR biological database.

A sub-sampling protocol is sometimes utilized when sampling a large volume of catch. Instances where this is likely to occur include sampling sites where vessels land an entire catch (as much as one million pounds) to a single facility. Sub-sampling is also appropriate in instances when there is an overwhelming amount of bycatch and/or non-targeted species mixed in with the lot of fish. In these cases it can be impossible to use the complete sampling protocol regardless of the amount inspected (< 80,000 lbs.). These situations are likely to occur when vessels are fishing mixed groups of herring and mackerel, some of which have a 50-50 composition.

Sub-samples are to be collected using bushel baskets at timed intervals during the pumping or unloading process following the NMFS at-sea observer sampling protocol. To accomplish this type of sub-sampling one will need to know the total lot weight and the duration of time it will take to unload the catch. After sampling the bushel basket of fish should be sorted by species, and total weight of each species and length frequencies should be recorded (sub sample n=50, for length frequencies if more than fifty of any species occurs).

1.1.2 MA DMF Sampling and Sub-Sampling Procedures

In most situations, sampling will be conducted over the entire offloading period to capture any stratification that may occur throughout the entire fishing activity (e.g. while being pumped aboard out at sea, due to the difference in species size and composition between tows, settling in the vessel's holding tanks, etc.). Because the catch is not unloaded the same way at every dealer and plant, sampling techniques will vary. Typically samples will be collected systematically at set intervals with predetermined sample sizes. All samples will be sorted by species and actual weights will be taken. Lengths will be taken according to the NOAA Observer Program species priority list by statistical area. Haddock, alewife, blueback herring, and American shad have been specified as specific species of concern by MA DMF and therefore if available, the number of lengths taken will be increased from the NOAA Observer Program standard 50 per trip to 200 per trip. Two length frequency samples will be randomly selected, one during the first half and the second during the second half of the offloading period. MA DMF has sampling procedures for processing plant, wholesale bait dealers, and lot sampling are briefly described below.

Information collected will be entered into MA DMF Excel spreadsheets and using the ratios established through the sub-sampling procedure, extrapolations will be made to quantify the total catch landed. Partial trip samples (lots) are no longer conducted.

Processing Plant Procedures

Samplers are usually positioned at the discard vat where all bycatch and damaged fish are deposited, however samplers must always remain in a safe location and in an area no to disrupt plant operations. The name of the vessel should be recorded and hail weight, date landed, and general location fished (statistical area, known piece of bottom, etc.) should be collected from the plant manager or vessel captain. If possible, hail weight should be confirmed after unloading process is complete and all fish have been processed. In addition, a processing rate (kg of catch processed/minute) should be calculated by dividing hail weight by the time it took to offload the vessel. To eliminate bias caused by periodicity, prior to the beginning of the offloading process, the sampler will use a random number table and pick a random start time between 1 and 30 minutes. Once the start time has been determined a basket will be positioned in the discard vat and a sample will be collected. Once the basket has been filled it will be weighed, sorted by species, and then weighed by species. Lengths will be collected according to NOAA Observer Program sampling protocols. This process will be repeated for thirty minutes until the sub-sampling period has been completed. If fish being sent to the bycatch vat is too abundant and sampler cannot weigh all fish being sent to the discard vat, then sub-sampling may be required to get an estimate of total bycatch per 30-minute sampling period. This sampling process will be repeated every other 30-minute interval during the entire pump offloading process.

Wholesale bait dealer

Samplers are usually positioned at the apparatus used to separate the seawater from the fish, called the dewatering box. They should be located where they have access to the offloaded catch prior to any sorting or grading by processing plant staff and in a safe location that will not interfere with plant operations. Prior to initiation of the sampling, the sampler should record vessel name and attain a hail weight, date landed, and general location fished (statistical area, known piece of bottom, etc.) from the plant manager or vessel captain. Typically when catch is offloaded into trucks it is a process that has a lot of stoppages and, unlike processing plants, there is not always a steady stream of fish. Due to the irregular offloading process, sampling will be conducted as fish become available in the dewatering box. One basket samples will be systematically obtained from the dewatering box on a 5-minute interval. Baskets will be weighed, catch sorted, and weighed again by species. Length frequencies will be taken according to NOAA Observer Program sampling protocols. If catch is being unloaded such that there is a steady supply of fish available in the dewatering box, then a sub-sampling scheme can be adopted with sampling periods of 30-minutes on and 30-minutes off. If this technique is to be used, then a random start time within the first thirty minutes of the offloading process should be established. To capture any stratification of catch that may occur during fishing operations, sampling should be conducted over the entire offloading process. Once sampling is finished, a species catch ratio will be calculated and these ratios will be expanded to represent species composition for the total offloaded catch.

Lot Sampling

The most typical lot sampled by MADMF is a delivery of fish from a vessel by a truck to a bait or processing facility. Two types of trucks are most commonly used to transport herring and/or mackerel – a tank trailer and a flatbed trailer. A tank trailer is an insulated container style trailer that is typically used for hauling liquids. Tank trailers commonly hold approximately 18mt (40,000 lbs) of fish and are off loaded through a levered hatch in the rear of the trailer. If access is available to the hatch while the tank trailer is being offloaded, a systematic basket sample can be collected. Similar to the above examples, the time expected to unload the tank is estimated, and basket samples are collected at a set interval. Target sample size is 3% of the total tanker, or approximately 18 baskets. The flatbed trailer can carry 20-24 insulated vats which hold approximately 1 mt of fish. These vats are commonly referenced to by their manufacture name Xactics or Dynovat. When sampling a flatbed trailer the sampler uses a large shovel, bucket, or dip net to collect a representative sample from each vat. Similar to the tank trailer, the target sample size is 3% of the total trailer load. When sampling a lot at a bait or processing facility, the sampler records the vessel name from which the fish was trucked and contacts the owner/operator of that vessel to find area fished and hail weight. Basket samples for both tanker and flatbed trailers are processed using the same protocols as described in the above examples. Catch ratios are also calculated as described above, but the ratios are only expanded to represent the lot and not the entire vessels landed trip.

1.2 DATA MANAGEMENT

Generally, MA DMF and ME DMR, record all data onto standardized field logs and then edit the data before entering it into an Excel spreadsheet for data storage. If time and funds allow, an Access database will be designed to expedite data entering and analysis. Sampling data and information will only be released to end users under the MA DMF confidentially rules. Plants, fish dealers, trucking companies, fishing vessels, or other study participant's identity will be withheld to maintain data integrity and confidentiality. Data from the vessel, plant, or dealer that was sampled will be made available to them immediately after the editing and keypunching has been completed. Consistent with the objective of the study, MA DMF will continue to collaborate with ME DMR and share and/or combine all port sampling data. Also, the sampling protocols will be compared with ME DMR's protocols for consistency and standardization. These efforts have been initiated and several joint sampling trips and planning meetings have occurred.

1.3 ME DMR AND MA DMF FUTURE FUNDING/COVERAGE

1.3.1 ME DMR Funding/Coverage

Funding for Maine DMR regarding the portside sampling program is through July of 2014 with a grant from ACCSP. The ACCSP grant is a state-federal cooperative partnership between twenty-three entities responsible for fisheries management and fisheries data collection on the Atlantic Coast. The program, established in 1995, addresses deficiencies in the data available for fisheries management along the Atlantic Coast. The goal of ACCSP is design, implement, and conduct marine fisheries statistics data collection programs and integrate those data into a single data management system that will meet the needs of managers, scientist, and fishers.

ME DMR provided portside sampling data form 2008-2013 for river herring and shad (RH/S). The portside sampling data includes states from Maine to New Jersey with a portside coverage rating average of 3.66%; the 3.66% portside coverage rating applies to the portside bycatch studies from fishing years 2008-2012. The data is preliminary from Jan. 1, 2013 – March 31, 2013.

Table 1 provides the total lbs of Atlantic herring and the total lbs of Atlantic herring sampled from 2008-2013 as well as including the amount of RH/S bycatch totals, % total bycatch, and % of bycatch in the Atlantic herring. The data represents minimal percentage rates below 11% in comparison to the total lbs of Atlantic herring landed from 2008-2012. It is too early to presume the bycatch ratings for 2013 regarding RH/S.

Table 1 ME DMR Portside Sampling Data for River Herring and Shad Bycatch in comparison to Atlantic Herring (2008-2013)

Year	2008		2009		2010		2011		2012		2013*	
Total lbs of Atl. Herring	181,968,679		226,696,187		144,713,947		180,109,804		192,067,277		46,111,848	
Total lbs of Atl. Herring Sampled	5,588,661		6,225,790		8,655,546		5,827,992		6,225,173		1,640,994	
RH/S	RH	Shad	RH	Shad	RH	Shad	RH	Shad	RH	Shad	RH	Shad
RH/S Total Weight	7,707	1,076	1,637	67.2	14,635	356	5,496	129	2,988	232	22,882	181
% Total Bycatch	8.2	1.1	4.4	0.181	11.0	0.266	9.5	0.094	1.7	0.048	73.3	1.4
% Bycatch in Herring	0.138	.019	0.026	0.001	0.169	0.004	0.22	0.002	0.13	0.004	0.058	0.01

Note that river herring (RH) contains both alewife and blueback herring.
**2013 data is preliminary (Jan.1, 2013-March 31, 2013).*
Source: ME DMR

Table 2 provides the percent of bycatch on river herring and American shad. The data is broken down by sampling event and gear type (purse seine, pair trawl, small mesh, and single trawl) for fishing years 2008-2013. As indicated above, the 2013 data is preliminary and it is too early to presume RH/S bycatch levels. Furthermore, the percent of bycatch for both river herring and shad are yearly averages for the RH/S sampling events.

Overall, the data indicates that the sampling events are reasonably consistent amongst river herring and shad throughout 2008-2012. In regards to gear type the small mesh gear samples are consistently higher in river herring % of bycatch for 2010 and 2011 than that of the pair trawl gear samples, which is the opposite for the shad % of bycatch. However, the number of pair trawl coverage events are consistently higher from 2008 – 2011 for both river herring and shad. It is important to note that the difference between river herring % of bycatch and shad % of bycatch possibly due to less shad sampling events than river herring sampling events as indicated in Table 2.

Table 2 Percent Bycatch of River Herring and American Shad by Sampling Event and Gear Type (2008-2013)

Year + Gear Type	RH (sampling event)	RH % of Bycatch (average)	Shad (sampling event)	Shad % of Bycatch (average)
2008				
Purse Seine	2	0	2	0.74
Pair Trawl	32	0.42	11	0.03
2009				
Purse Seine	6	0	0	0
Pair Trawl	19	0.092	4	0.02
Small Mesh	2	0.415	0	0
Single Trawl	3	0.003	2	0
2010				
Purse Seine	1	0	0	0
Pair Trawl	25	1.06	6	0.73
Small Mesh	4	0.53	1	0.06
Single Trawl	3	0.14	1	0.03
2011				
Small Mesh	6	1.76	1	0.07
Pair Trawl	22	0.37	4	0.085
2012				
Small Mesh	8	0.3625	2	0.105
Pair Trawl	6	0.105	2	0.16
2013*				
Small Mesh	19	2.27	3	0.12
Pair Trawl	9	0.384	0	0

**2013 data is preliminary (Jan.1, 2013-March 31, 2013).*
Source: ME DMR

1.3.2 MA DMF and SMAST RH Bycatch Avoidance Program

Currently, funding for the two river herring bycatch avoidance programs in Massachusetts are represented by the Sustainable Fisheries Coalition (SFC) working in partnership with Massachusetts Division of Marine Fisheries (MA DMF) and UMASS Dartmouth School of Marine Science and Technology (SMAST). The current (ongoing) SFC river herring bycatch avoidance project has been funded by the National Fish and Wildlife Foundation (NFWF) and is currently expected to end June 31st of 2013. There has been a proposal to extend the funding from NFWF, but no response as of present. Furthermore, MA DMF collects all the data for this program and SMAST acts as a partner on the grants and has full access of the data collected by MA DMF. The intent of MA DMF and SMAST is to reduce river herring bycatch with midwater trawl vessels landing Atlantic herring/mackerel in Massachusetts ports. It is important to note that if funding is not available through NFWF that the state of Massachusetts will have a baseline coverage program to monitor RH/S bycatch, but it will not be able to sustain the current coverage without the monetary assistance from NFWF.

Over the duration of this RH bycatch avoidance project, sampled midwater trawl landings averaged 227mt with a minimum size of 5mt and a maximum of 800mt. Under ideal circumstances 227mt would take roughly six to twelve hours to sample, but the project has sampled offloads that have taken as long as 32 hours. An average of 47 subsamples were taken during offloads with a maximum of 155 (trip hail weight was 670mt and took 26 hours). In contrast, Rhode Island small-mesh bottom trawl vessels, which land daily with an average 33mt per landing, take one to three hours to offload, and an average 14 basket subsamples.

The NFWF grant, working with up to 15 midwater trawl vessels, has been operating since October 2010. To date 252 whole-boat samples have been collected from Atlantic herring Management Areas 1A, 1B, 2, and 3. The 2013 data is currently preliminary data (Table 3). Over 49,000 metric tons of landings (herring and mackerel) were sampled under this grant (Table 4).

Table 3 Midwater trawl trips landed in MA ports that were sampled (by MA DMF only) 2010-2013.

Number of trips sampled during NFWF grant		Atlantic Herring Management Area				
Year	**Month**	**1A**	**1B**	**2**	**3**	**Grand Total**
2010	October	4				4
	November	15		3	1	19
	December	4		5	1	10
2011	January		2	6		8
	February			5		5
	March			6		6
	April		2			2
	May				5	5
	June				8	8
	July				10	10
	August				7	7
	September		3		6	9
	October	17				17
	December			1		1
2012	January		6	22		28
	February		3	13	1	17
	May				6	6
	June				2	2
	July				20	20
	August				11	11
	September	1		1	8	10
	October	4			2	6
2013	January		3	9		12
	February		7	8	1	16
	March			10	1	11
	April			2		2
Grand Total		**45**	**26**	**91**	**90**	**252**

Source: MA DMF database

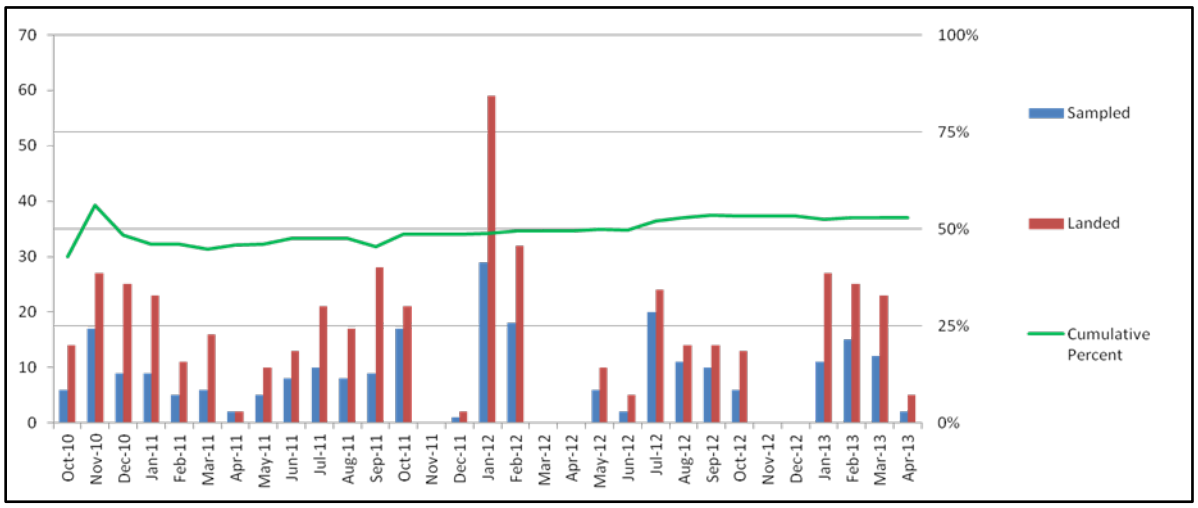
Table 4 Weight of Landings Sampled, by Month, by Area

Metric Tons sampled, by month by area		Atlantic Herring Management Area				
Year	Month	1A	1B	2	3	Grand Total
2010	October	904				904
	November	2,937		950	190	4,077
	December	687		1,533	65	2,285
2011	January		335	1,661		1,996
	February			1,360		1,360
	March			783		783
	April		199			199
	May				1,585	1,585
	June				1,098	1,098
	July				1,969	1,969
	August				1,201	1,201
	September		1,170		1,531	2,701
	October	3,939				3,939
	December			287		287
2012	January		2,052	4,716		6,768
	February		790	2,626	15	3,431
	May				1,870	1,870
	June				560	560
	July				4,750	4,750
	August				2,170	2,170
	September	120		350	2,226	2,696
	October	1,940			440	2,380
Grand Total		**10,527**	**4,546**	**14,266**	**19,669**	**49,008**

Source: MA DMF database

During this time period (October 2010 – April 2013) an estimated 481 trips were landed by the 15 participating vessels in Massachusetts. Under the NFWF grant a target was established to sample 50% of all midwater trawl trips landed in MA ports. To date, approximately 52 % of midwater trawl trips landed in MA have been sampled by MA DMF (Figure 1).

Figure 1 Midwater trawl trips sampled and landed in MA ports, by month



Source: MA DMF database

Number of Trips – The Nature Conservancy / RI Small-Mesh Bottom Trawl

The Nature Conservancy grant, which works with up to six Rhode Island-based small-mesh bottom trawl vessels focuses specifically on the Area 2 winter fishery that is conducted in and adjacent to RI territorial waters. To date, 169 whole-boat samples have been collected (Table 5). Collaboration with Maine DMR and NOAA CRPP Study Fleet added an additional 21 sampled trips (5 in 2011 and 16 in 2012) which were incorporated into the avoidance system, but are not represented in table 4. Over 4,500 metric tons of landings were sampled during this grant (Table 6).

Table 5 Rhode Island Small-Mesh Bottom Trawl Trips Sampled and Landed by Month during TNC grant

Year	Month	Trips Sampled by MA DMF	Total Trips Landed	Percent Coverage, by trip
2011	December	9	27	33.3%
2012	January	29	93	31.2%
	February	20	60	33.3%
2013	January	41	105	47.6%
	February	39	62	72.6%
	March	23	30	80%
	April	3	3	100%
Grand Total		169	380	44.5%

Source: MA DMF database and NMFS VTR database

Table 6 RI Landings (mt) Sampled, by Month

Year	Month	Total
2011	December	248.6
2012	January	1,226.3
	February	792.9
2013	January	1,067.0
	February	732.3
	March	386.3
	April	49.9
Grand Total		4,503.3

Source: MA DMF database

Overall, portside sampling programs can be beneficial towards the river herring species because it provides a fair comparison with the data derived from at-sea under the Northeast Fisheries Observer Program (NEFOP). Though the NEFOP observers may provide a less precise estimate of bycatch than a census of discards, it is the retention of bycatch species that presents an opportunity to sample the catch when it is offloaded at port.