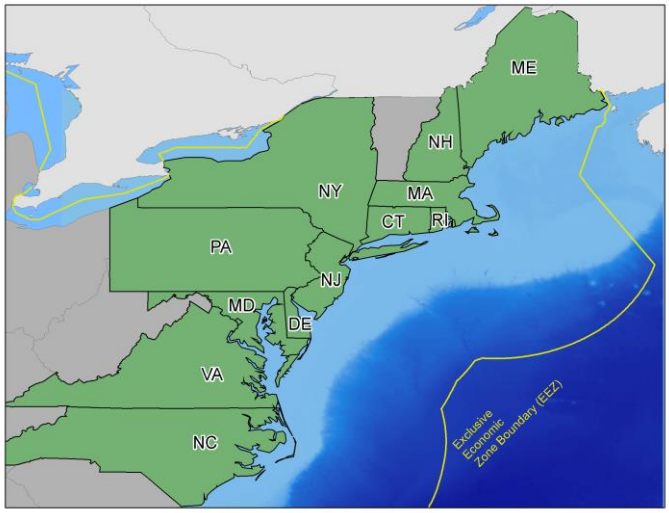
NORTHEAST REGION COORDINATING COUNCIL

SPRING 2019 MEETING

May 16-17, 2019

Francis Marion Hotel – Charleston, South Carolina



Meeting Briefing Book Table of Contents

(*hyperlinked*)

2019 SPRING NRCC MEETING AGENDA

Francis Marion Hotel – 387 King St, Charleston, SC

All times are approximate

Thursday, May 16

1330-1335

1. Welcome, Introductions, Announcements
   (Beal, Gilbert)

1335-1530

2. Offshore Wind Energy
   Discussion leaders: Pentony/Hare
   Guest presenters: Sue Tuxbury (GARFO), Andy Lipsky (NEFSC)
   - Receive a broad overview of offshore wind energy development in the region
   - Discuss impact to NEFSC surveys
   - Discuss strategies for continued engagement

1530-1730

3. Stock Assessment Schedule and Related Topics
   Discussion leader: Simpkins
   - Finalize 2019-2020 intercessional updates to management and research track schedules
   - Provide update on progress toward convening working groups or steering committees
   - Review and discuss the draft assessment communications framework
   - Discuss any adjustments to 2023-2024 research tracks and proposed research track efforts for 2025

1730 Adjourn Day 1

1900 - Dinner at Hank's Seafood Restaurant, 10 Hayne Street *(hanksseafoodrestaurant.com)*

Friday, May 17

0830-1030

4. Jurisdictional Issues and Shifting Stocks
   Discussion leader: Beal
   - Continue discussions on management and science challenges
   - Update on the discussion that occurred at the March 2019 South Atlantic Fishery Management Council meeting
   - Discuss possible division of tasks; different approaches to allocation
   - Update on the status of the Atlantic Coast Science Coordination Workshop

1030-1045 Break

1045-1115

5. Herring Georges Bank Spawning Closures
   Discussion Leader: Nies
   - Discuss coordination between NEFMC, ASMFC, and NEFSC

1115-1135

6. Commercial eVTRs in the Greater Atlantic Region
   Discussion Leader: Moore
   - Discuss timeline and implications of MAFMC's action

1135-1230

7. Update on Endangered Species Act Section 7 Consultation on the Continued Implementation of Management Measures for the Northeast Multispecies, Monkfish, Spiny Dogfish, Atlantic Bluefish, Northeast Skate Complex, Mackerel/Squid/Butterfish, Summer Flounder/Scup/Black Sea Bass, Atlantic Deep Sea Red Crab, American Lobster, and Jonah Crab Fisheries
   Discussion leader: Pentony
   - Update on the work of the Take Reduction Team and timing of any regulations
   - Discuss timeline for Council and Commission review of the draft Biological Opinion

1230-1300

8. Meeting wrap-up and Other Business
   - Complete any unfinished discussions or unresolved new business
     1. Regional BSIA Framework (Pentony/Hare)
   - Review action items and assignments
   - Identify Fall 2019 (ASMFC host) meeting date
   - Adjourn meeting

1300 Meeting adjourns

Color code key:
ASMFC MAFMC
NEFMC NEFSC
GARFO NRCC

NRCC Fall Meeting 2018 Action Items

November 14-15, 2018 Portland Regency Hotel, Portland Maine

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1. Finalize and Collect Signatures for NRCC Charter
   Lead: GARFO
   Appointees needed:
   Next step(s): Collect Signatures at Upcoming Council/Commission Meetings
   Due date(s): December 30, 2018 (have in place for 2019 calendar year)
   COMPLETED

2. Consider adding ASMFC assessments if/as capacity increases
   Lead: NRCC
   Appointees needed:
   Next step(s):
   Due date(s): Ongoing

3. Specification Cycle Adjustments
   Lead: Appropriate Councils
   Appointees needed:
   Next step(s): Eventually, based on the approved management track assessment cycles, the Councils and Commission will need to initiate management actions to adjust some of the current specification cycles for various species.
   Due date(s): Ongoing as needed

4. Provide input from assessment branch regarding the NRCC's current Year 6 "wish list" for the research track assessment cycle.
   Lead: NEFSC
   Appointees needed:
   Next step(s): Identify which proposed research assessments may be most ready, based on anticipated available information.
   Due date(s): April 1, 2019 (Next NRCC Meeting)

5. Provide timeline for a delayed MRIP Operational Assessment if the assessment is pushed back past April in order to include updated 2018 catch and landings information.
   Lead: GARFO + NEFSC
   Appointees needed:
   Next step(s): This will be discussed at the NRCC intercessional call on December 17, 2018, 1-2pm.
   Due date(s): December 2018
   COMPLETED

6. DMIS/AA Workshop Follow Up
   Lead: GARFO
   Appointees needed:
   Next step(s):
   Due date(s):
   UPDATE WILL BE PROVIDED AT FALL 2019 MEETING

7. Continue Wind Energy Discussions at NRCC (presentation/update by relevant staff at next meeting)
   Lead: NRCC support staff
   Appointees needed:
   Next step(s): Add to next NRCC meeting agenda
   Due date(s): Ongoing
   SCHEDULED UPDATE FOR SPRING 2019 MEETING

8. New NRCC Assessment Scheduling Process Outreach
   Lead: NEFSC and Councils/Commission
   Appointees needed:
   Next step(s):
   Due Date(s): Upcoming Council/Commission Meetings
   COMPLETED

Winter 2018 Intersessional Call- December 17, 2018, 1-2 pm - **CANCELLED**
Spring 2019 NRCC (**ASMFC Host/Chair**) – May 16-17
Location – Charleston, SC

New England Fishery Management Council
50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
John F. Quinn, J.D., Ph.D., *Chairman* | Thomas A. Nies, *Executive Director*

April 23, 2019

Mr. Chris Oliver
Assistant Administrator for Fisheries
National Marine Fisheries Service/NOAA
U.S. Department of Commerce
1315 East-West Highway
Silver Spring, MD 20910

Dear Chris:

At our April Council meeting, we devoted an entire day to the issue of offshore renewable energy development. This dedicated session drew participation from a wide range of interests, including representatives from each of the companies with projects in development off New England. While there are many issues associated with wind farm development, I want to express our concern over the likely impacts on our ecosystem and resource surveys.

As you know, the fishery resources off the Mid-Atlantic and New England coasts have been regularly surveyed with a bottom trawl since the early 1960s. Additional surveys were added over the years including a surf clam survey, scallop survey, and protected resource surveys. Unfortunately, it is very probable that it will not be possible to conduct these surveys in the vicinity of wind farms. The enclosed chart illustrates the problem: lease areas cover as much as 44 percent of individual bottom trawl strata in the southern New England/Mid-Atlantic Bight area. Losing the ability to survey these areas will have a deleterious effect on our stock assessments. Aerial surveys for protected resources are also likely to be hindered. Even more troubling, however, is that the Council was told that at present there aren't any resources available to investigate the potential impacts and to design and implement a solution.

This is a national level issue that we believe needs immediate attention. Offshore wind development proposals extend to the southeast coast, and there is now a proposed lease area off Oregon. We urge the agency to immediately identify the personnel and financial resources needed to ensure that we do not lose the critical information provided by our ecosystem and resource surveys. Failure to do so can only weaken the scientific basis for our decisions.

Sincerely,

Dr. John Quinn
Chairman

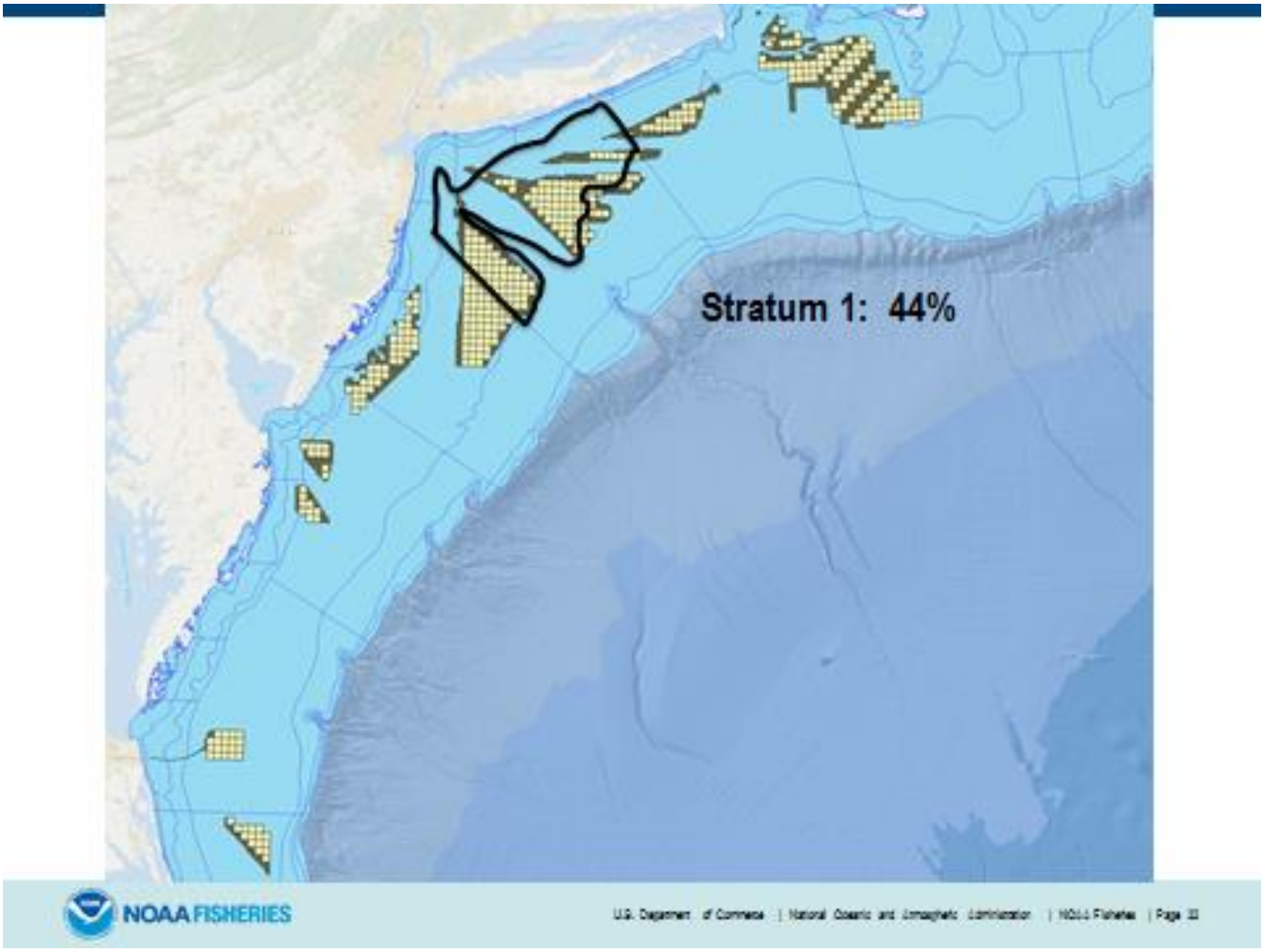


Figure 1 – Area of NEFSC BTS stratum 1 within offshore wind lease area

Strawman – Proposed: Communications Framework for NRCC Assessment Process

Disclaimer: This strawman was developed by NMFS to inform NRCC discussions. An attempt was made to provide as thorough a strawman as possible in the time allotted to provide fodder for reactions and discussion.

1 Introduction

The Northeast Region Coordinating Council approved a revised stock assessment process and long-term schedule in November 2018. This new process is explicitly designed to provide opportunities for enhanced, two-way communication regarding stock assessment outputs and information that could improve our understanding of fish stocks and fisheries. In particular, the long-term schedule provides a framework in which communication efforts can focus on sharing and gathering information that is most relevant. For example, information and ideas related to research projects that could inform our understanding of a fish stock are most relevant and useful several years in advance of a research track stock assessment, and the long term schedule indicates which stocks are "ripe" for that kind of input and action.

2 Framework Goals

The Assessment Communication Framework described here is intended to provide overall structure for the many communication efforts carried out by all NRCC member organizations. The primary goals of the framework are to provide:

- A joint communications effort with consistent messaging across all NRCC partners;
- Enhanced outreach on results of recent assessments and notification of upcoming assessments;
- Education of NRCC partner staff involved in communication to provide a better understanding of stock assessments and the assessment process to foster more effective communication to stakeholders;
- An efficient process for engaging with, and gathering information from stakeholders and partners on questions, concerns, and research ideas that can improve our collective understanding of fish stocks and fisheries; and
- A process and pathway for information from stakeholders to reach relevant NRCC partners for action, be that through inspiring research, informing assessments, or providing context for management decisions.

3 ROLES AND RESPONSIBILITIES

Implementation of the revised stock assessment process will require participation and involvement from all NRCC partners. Current member organizations of the NRCC are: Atlantic States Marine Fisheries Commission, Mid-Atlantic Fishery Management Council, New England Fishery Management Council, and NOAA Fisheries (GARFO and NEFSC).

As the lead on stock assessments, the Northeast Fisheries Science Center will continue to focus on stock assessment science, but with an improved focus on communication regarding the assessment process and results across NRCC partners and stakeholders. As part of this effort, NEFSC is responsible for the following:

- Stock Assessment Education--lead the development and implementation of education programs on stock assessment science and the assessment process; assign appropriate field staff to participate in stock assessment education efforts, both as trainees and trainers.
- Communications Planning and Coordination-- (a) participate in a yearly implementation meeting with NRCC members to plan annual communication schedule and (b) provide talking points and output from peer reviewed assessments to be used in coordinated NRCC communication;
- Field Staff Message Coordination-- (a) manage repository of shared talking points for use by field staff, (b) brief field staff on science and management talking points related to stock assessments, (c) train staff on methods for relaying fisheries questions, and (d) deliver messages and collect input via field staff;
- Gathering Input--solicit input related to our collective understanding of the stocks and fisheries through field staff as well as at existing public forums, and enter the relevant information into repository;
- Management of Stakeholder Input--develop standard pathways to collect and distribute stakeholder input to the appropriate NRCC members; and
- Close the Loop--provide follow-up on how stakeholder input was considered in greater understanding of a particular stock, fishery, and fisheries management overall, or broadly why it was not used.

The Greater Atlantic Regional Fisheries Office will continue to take the lead on communicating and creating public awareness related to changes in the fisheries. As part of this effort, GARFO is responsible for the following:

- Stock Assessment Education--assign appropriate field staff to participate in stock assessment education efforts, both as trainees and trainers;

- Communications Planning--lead development of communication related to fisheries management (e.g., convey management changes resulting from stock assessment and Council/Commission actions);
- Field Staff Message Coordination and Sharing-- (a) brief field staff on science and management talking points related to stock assessments, (b) train staff on methods for relaying fisheries questions, and (c) deliver messages and collect input via field staff in a variety of venues as well as informal direct conversations;
- Gathering Input--solicit input related to our collective understanding of the fisheries through field staff as well as at existing public forums, and enter the relevant information into repository;
- Closing the Loop--summarize, as appropriate, uses of stakeholder input that informed management decisions.

The Councils and Commission are integral to the stock assessment process and routinely build stakeholder awareness of fisheries management decisions and the level of input and science that influenced those decisions. As part of this effort, both Councils and the Commission will be responsible for the following:

- Stock Assessment Education--provide time for staff to participate in stock assessment education efforts as trainees (and perhaps as trainers);
- Communications Planning--review fisheries science messages from NEFSC and fisheries management messages from GARFO;
- Field Staff Message Coordination and Sharing--a) brief field staff on science and management talking points related to stock assessments, (b) train staff on methods for relaying fisheries questions, and (c) deliver messages and collect input via field staff
- Gathering Input--solicit input related to our collective understanding of the fisheries through field staff as well as at public events and hearings, and enter the relevant information into repository;
- Closing the Loop--summarize, as appropriate, uses of stakeholder input that informed management decisions.

4 Enhanced, Coordinated Outreach

4.1 Stock Assessment Education

In order to facilitate better communication about the stock assessment process, we will offer training to all staff involved in stock assessment outreach including port agents, cooperative research staff, council staff, and others engaged in assessments or communication efforts. These

trainings are envisioned to be a series of webinars that can be watched online at the staff's convenience (e.g., sampling, statistics, and surveys; concepts in population biology; stock assessments and modeling; science and ecosystem based management).

We will also provide education to members of the fishing industry through targeted outreach. This will include a web presence dedicated to explaining the stock assessment process and schedules, data types, and key messages. We will supplement this website with hands on informational materials that can be provided via field staff.

4.2 Communications Planning and Message Coordination

The goal is to ensure coordination among all NRCC partners in developing and sharing important information to the public and stakeholders about fisheries stock assessments and management actions. Effective engagement relies on providing up to date and consistent information externally. To accomplish this goal, NRCC partners would commit to: 1) An annual communications planning process; and 2) a streamlined method to develop, approve and disseminate up to date information to the public. NRCC partners would work together to convey common information about the timing of upcoming assessments and outputs of recent assessments.

4.3 Strategic Communications Planning

Annual Planning Event: To kick off the implementation of the new NRCC assessment process, NRCC partners would participate in an initial and then yearly planning meetings. The goal of these meetings would be to develop an annual planning schedule, put together by an external facilitator in year 1 and as needed in the out years, for all stock assessments performed that year. This yearly planning schedule would identify high and low interest assessments and lay out timelines for communications around all major science and management actions. The planning schedule would list major public and stakeholder engagement events for the year and include timelines for developing, reviewing, and delivering key messages. The planning meeting would also allow NRCC partners to share public/stakeholder input collected in the past related to those stock assessments. While this would be an annual planning event, the expectation is that subsequent years would require less effort by NRCC partners and be focused on updating the planning schedule template developed in the year one kickoff meeting. A policy lead and a communications lead for each NRCC member would participate in this yearly planning session.

Peer-Review Communication Plans: The annual planning schedule would also identify a timeline for development of a more detailed communication plan for each of the four peer-reviews that

year (two management track and two research track peer reviews). These communications plans would be focused on the high interest assessments and would list in more detail key audiences, planned engagement events, products (e.g., web content, graphics, handouts), and key messages. Each plan would lay out a schedule of known or planned events (internal and external) and guidance for how to handle unplanned events. In general, events focused on science would be led by the NEFSC, and management-focused events would be led by the Councils, Commission, or GARFO with support from others as needed. Plans would be vetted by all NRCC members (through a designee for each member) prior to implementation. The communications plan for each peer review should include details on how and which NRCC field staff would be used to deliver key messages, as outlined below under the "Message Development and Delivery" section.

4.4 Message Development and Delivery

There are two main stages in message development and delivery (Figure 1). Stage 1 would be initiated by the NEFSC and refers to a science-focused message prior to any management actions by the Councils and/or Commission. Stage 2, initiated by the GARFO, would be a more complete science and management-focused message taking place after management actions (in response to the assessment) have been initiated or are under consideration. Each stage has four distinct message coordination and delivery steps (Figure 1; A through D).

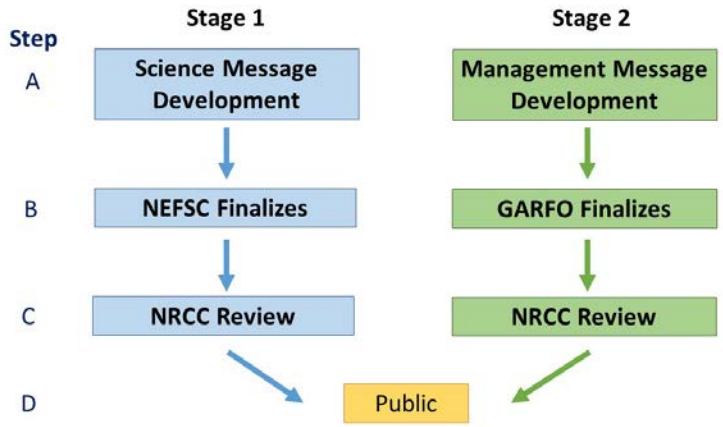


Figure 1 - Steps and stages in message development and dissemination. Stage 1 is focused on science messages prior to management actions, while Stage 2 focused on a more complete science and management update.

Message Development - Step A:

The fisheries assessment scientist (Stage 1) and GARFO fishery management plan lead (Stage 2) work together to enter, and later update, basic information about the assessment/fishery in a shared Google template. This document would capture simple and easy to understand information about key outcomes, data inputs, issues, and management action. This document would also capture research gaps/questions for the next assessment to aid in the gathering of input (section 5.2). This is the first step in the development of a key messages document for each stock assessment.

NOAA Fisheries Review - Step B:

The key messages document would be edited by a communications specialist and finalized by the NOAA Fisheries NRCC designee. Stage 1 would be completed by the NEFSC and Stage 2 would be completed by the GARFO.

NRCC Review - Step C:

The key messages document would be shared through a Google site with a designee for each NRCC member to perform a final review. NRCC member designees would be responsible for coordinating the internal review (as needed) under their respective organizations and ultimately approving the final version.

Message Delivery - Step D:

The final NRCC cleared key messages document would now be shared more widely within each NRCC member organization, and ultimately for public dissemination. This document would be the source of information used in all communications and outreach efforts by NRCC partners specified in the communications plans outlined under the Strategic Communications Planning section. These common messages would eventually be tailored to the target audiences and delivery modes identified in each peer-review communications plan. An NRCC-focused website portal will be needed to share up-to-date science and management information to the public.

The focus for Stage 1 is to communicate major science outputs before and while management is underway, particularly for high interest stock assessments. Management questions or concerns raised under Stage 1 would be redirected to a schedule of opportunities for public input and anticipated management actions. The majority of the external communications efforts would take place at Stage 2, which would include a more complete package of information with management actions and resulting regulatory changes. While it is expected that the communications products between NRCC members may vary slightly based on the target audience(s), the stock assessment key messages and NRCC Communications Framework overarching goals should be included in all communications efforts.

Messages would be delivered through a variety of methods ranging from ad hoc interactions with field staff to planned and unplanned events, as laid out in the communications plan for each peer review. Communication delivery methods include:

- Planned events: Standing meetings (NRCC, Council, Commission meetings), targeted outreach meetings (i.e., in ports of interest), recreational and commercial fishing shows, and Maine Fishermen's Forum and other annual fisheries association meetings. These also include internal briefings for staff and leadership as needed.

- Unplanned events: Media interviews, public meetings or speaking opportunities as they arise.

- Field staff engagement: Direct (targeted or opportunistic) engagement by field staff with stakeholders where they live and work.

- Other modes of message delivery: Web postings, email announcements, social media (Facebook and Twitter), Fish Online, NOAA Navigator, and informational products such as infographics, handouts, etc.

4.5 Field Staff Message Coordination/Sharing/Clearinghouse

Direct stakeholders (commercial harvesters, recreational sector participants, processors, support services) are constantly asking assessment related questions of NOAA Fisheries, Council, and Commission staff. These may range from relatively straightforward questions such as "is a stock overfished," to more complex assessment process questions. It is important to address these queries in a timely and consistent manner, regardless of who is asking or responding. It also is important to proactively share information on recent or upcoming assessments to keep stakeholders and partners up to date with the latest information.

All NRCC members have a number of staff who interact in-person with fisheries participants. Within NOAA, such staff may work for GARFO, NEFSC, or the Office of Law Enforcement, but all have as one of their prime responsibilities sharing information and responding to questions including those concerning fisheries management, scientific processes, and stock status. Other NRCC members have staff with similar responsibilities who also participate in such two-way communication efforts with stakeholders.

In order to provide proactive information and respond to queries with a consistent, well thought-out message, it is essential that there is a central clearinghouse for key messages. With the

number of staff involved, and potentially the number of queries that may need to be addressed, this will be a resource intensive effort, at least initially. Over time, as the message clearinghouse becomes more comprehensive, the effort involved should decrease. The most likely host and manager of such a repository would likely be NMFS, either NEFSC or GARFO.

4.6 Field Personnel Message Delivery

It is expected that field staff will be the prime distributors of information in this effort. Although some "field staff" are located at the main offices of NRCC members, others are located in remote offices, and can be difficult for them to obtain the latest talking points on a hot topic. Many carry with them to the field smart devices that are connected to the internet and are used to look up publicly available information on relevant websites. These are indispensable for obtaining current regulations, quota status, and other information currently made available to the public. However, publicly available information is often not sufficiently responsive to a question at hand. Finer details or process information is often more helpful than the current status of a topic.

In order to respond to these needs we propose to develop a web-based system for all staff to obtain background information and to consolidate links to public information, grouped by some high level category such as by fisheries management plan. This system would be accessible by any NRCC partner staff participating in this communication effort.

The message delivery system would be opened to all identified staff; however, only a limited number would have access to post new information. Any information posted would be final, having already been approved through the development process. When new or updated information is posted then all staff would be notified.

Over time, it is likely that there will be a sufficient number of questions on a similar topic, or there will be new broad based efforts that will require training sessions (i.e., linking back to section 4.1 above). These would serve as opportunities to distribute knowledge more broadly and for staff to provide input on what type of material(s) would be most useful by including both subject matter experts and communications managers.

5 Collaboration with Stakeholders and Partners

5.1 Expectations

When communicating with stakeholders and soliciting any ideas or information they may have, it is critical to clarify what information is most useful and how various types of information would be used. To be successful in this, it is important that NRCC member staff that are involved in

communicating be educated on assessments, the assessment process, and associated management processes, so that they can be well equipped to identify information and input that is relevant and important to capture. Similarly, it is important that NRCC member staff provide some context and education of stakeholders, to ensure that conversations are well informed and productive. Both of these aspects of education, of staff and of stakeholders, are discussed in section 4.1.

To take the most advantage of communication efforts, this framework envisions collecting a fairly wide array of information, and then funneling that information to the correct NRCC member organization. In the broadest sense, our engagement is interested in **collecting information and insights to improve our collective understanding of fish stocks and fisheries**. The focus is not solely on getting new quantitative data streams or parameter estimates that will plug into existing stock assessments, nor is it simply focused on collecting research ideas. The communication efforts may also collect information on fisheries, ecosystems, markets, etc., that could inform management. Given that the focus of this framework is on assessments, it is likely that most collected information will focus on improving our understanding of fish stocks, but, again, that should not be limited to just new parameters or data for an existing assessment. A wide variety of input can be useful in developing new research ideas, inspiring investigation of various factors that could influence an assessment, and providing context to help interpret assessment results when making management decisions. When appropriate, communication efforts can be further informed and focused by general areas of scientific interest identified by NRCC members or by specific questions or issues identified by assessment scientists or other NRCC member staff.

5.2 Gathering Input

The revised stock assessment process includes a multi-year assessment schedule and is designed to provide opportunities for enhanced two-way communication with stakeholders to enhance engagement and improve our understanding of fish stocks and managed fisheries. While this revised stock assessment process will provide for more opportunities for NRCC field staff to deliver key messages about stock assessments to stakeholders, it also provides an opportunity to solicit questions, concerns, and ideas to inform our broader understanding of the fisheries that we collectively manage. This information sharing could happen in several ways, either informal or formal.

On an informal level, these conversations are already happening with NRCC member staff in the field. Port agents routinely summarize information from casual conversations into the Fathoms blog that is distributed to GARFO and NEFSC staff, and available to council staff. Cooperative Research staff routinely collaborate with fishermen and are involved with data collection and research design. What is missing from this process is a standardized data collection method. A Google form could be created for submission of fisheries related questions, concerns, and ideas.

On an informal level, the structure of the form could be left fairly simple. A POC would be responsible for funneling this information to the appropriate NRCC member staff, be that an assessment scientist, ecologist, economist, or resource manager.

On a more specific level, the stock assessment communications lead should meet annually with stock assessment biologists and Cooperative Research staff to determine if there are targeted questions or specific topics of interest for stock assessments that are 3-5 years out. Feedback could also be provided to the stock assessment communications lead through other NRCC processes such as PDTs, SSCs, etc. These targeted questions, could then be worked into casual conversations with targeted stakeholders. If there is a targeted group to survey, formal interviews would need to be cleared through the Paperwork Reduction Act, which could take 6 months to a year to complete.

5.3 Consideration of Input Received

Information collected should be directed to the appropriate group on a continuing basis. This information would also be available to all NRCC members.

Information that is useful to assessments should be considered by the lead assessment biologist. The new assessment process lays out a formal approach to considering input when developing assessment plans, which are then vetted by the Assessment Oversight Panel.

Not all information collected will be able to be used directly in stock assessments. A review of information collected may provide insight into potential scenarios that are evident in the assessment, and/or questions they may receive from stakeholders or peer reviewers. Some information may be more relevant to improved understanding of ecosystems, socioeconomics, or management options, and, in those situations, the inputs would be distributed to relevant NRCC member staff, and in some cases perhaps onward to external research groups.

5.4 Closing the Loop

As part of message development and delivery for each peer review, specific messaging should be developed for letting stakeholders and partners know how their input was considered (or not) to inform an assessment; improve understanding of a stock, fishery, or ecosystem; or otherwise inform management actions. Similarly, a process should be established for conveying this information.

A standard reporting-out template and process should be developed during the first annual communications planning meeting, and reviewed and refined each year. This should include common messages focused on key inputs received from stakeholders, and how these inputs were considered. Messages should also manage expectations regarding our ability to respond to their comments. For example, we may not respond to every comment, but will focus on broader trends in information received. While some individual comments may be influential, they can consist of more general viewpoints and input that help frame research questions to improve our scientific understanding of the stock.

Information that is not related to the assessment process will be distributed to the relevant subject matter experts via a similar process as the assessment information. This type of information may be more relevant to non-stock assessment research, impacts of management actions or their implementation, or inform the development of future management actions. For example, information about economic changes in the fishery would be forwarded to the Social Sciences Branch and the relevant Council for consideration or research.

Description of New England and Mid-Atlantic Region Stock Assessment Process

Overview

The Northeast Region Coordinating Council (NRCC) developed the enhanced stock assessment process described here with the goals of (a) improving the quality of assessments, (b) allowing more improvement to occur within the routine assessment process, and (c) providing more strategic and longer-term planning for research and workload management. The process described here lays out two tracks of assessment work: a management track that includes the more routine assessments but with more flexibility to make improvements than in the past, and a research track that allows comprehensive research and development of improved assessments on a stock-by-stock or topical basis. The process provides clear opportunities for input and engagement from stakeholders and research partners, and the process also provides a longer term planning horizon to carry out research to improve assessments on both tracks, but particularly the research track. A key aspect of this process is the NRCC's development and negotiation of long-term management track cycles for each stock (i.e., how often each stock is assessed and in what years) as well as a five-year research track schedule, which will be updated through time by the NRCC.

Roles and Responsibilities

Northeast Region Coordinating Council

The Northeast Region Coordinating Council (NRCC) consists of members from the Atlantic States Marine Fisheries Commission (ASMFC), Greater Atlantic Regional Fisheries Office (GARFO), Mid-Atlantic Fishery Management Council (MAFMC), New England Fishery Management Council (NEFMC), and Northeast Fisheries Science Center (NEFSC). The NRCC fulfills several functions, and, in the context of stock assessments, the NRCC's primary roles and responsibilities focus on setting priorities and scheduling of assessments. With respect to assessment priorities, the NRCC (a) sets long-term (five-plus year) schedules for both the management and research track, (b) reviews and adjusts those schedules as needed, and (c) recommends priorities among complex management track assessments (i.e., assessments requiring expedited or enhanced peer reviews) in situations where more complex assessments are proposed than can be accommodated. Designated deputies from each NRCC member organization form the "NRCC Deputies" panel, which reviews and approves research track stock assessment working groups as well as external experts nominated to serve on management track or research track peer review panels.

Assessment Oversight Panel

The Assessment Oversight Panel (AOP) consists of four members (a) the Chief of the Populations Dynamics Branch, NEFSC, or his/her designee, who serves as Chair of the AOP, (b) the Chair of the NEFMC SSC, or his/her designee, (c) the Chair of the MAFMC SSC, or his/her designee, and (d) the Chair of the ASMFC Assessment Science Committee, or his/her designee.

The primary responsibilities of the AOP are to (a) review and approve management track assessment plans in the context of guidelines for permissible changes under each level of management track peer review, (b), in the near term if they have not yet been developed and reviewed in a prior assessment peer review, review and approve plans for any alternative (i.e., "Plan B") approach to be used if the peer review finds primary management track assessment is not suitable for providing management advice, (c) review and approve revisions to management track assessment plans developed in response to new data or based on advice from the AOP generated from review of the original plan, noting that any changes that would require upgrading or downgrading the assessment tier would require NRCC consultation; and (d) provide a summary report to the NRCC on an annual basis of AOP actions taken.

Assessment Oversight Panel meetings are open to the public. Council, Commission, and GARFO staff are welcome to participate, and those staff with lead responsibilities for stocks under consideration will be requested to serve as invited participants. At least one staff representative should participate from GARFO and each Council and Commission with stocks under consideration.

Northeast Fisheries Science Center

Fish stock assessment scientists from the NEFSC support both management and research track assessments. NEFSC assessment scientists have primary responsibility for planning and carrying out management track assessments for all federally-managed stocks, as those assessments are conducted on a routine basis and require consistent capacity and expertise. As part of the management track process for stocks with NEFSC lead responsibility, NEFSC assessment scientists develop initial plans for assessments and alternatives (i.e., "Plan B") in advance of upcoming assessments and revise those plans if necessary in response to new data; where possible, alternative approaches should be developed in advance in prior research track assessments. NEFSC assessment scientists provide initial management track assessment plans for review by the AOP, which in turn reviews and provides recommendations to the NRCC. In unusual situations where more assessments are proposed for expedited and enhanced peer review than can be accomplished in the time available for peer review, then the NEFSC consults with the NRCC to determine which assessments to "downgrade" to a lower assessment level and peer review. NEFSC assessment scientists, as well as other NEFSC scientists and other federal, state, academic and other non-governmental scientists participate in research track assessments.

Atlantic States Marine Fisheries Commission

ASMFC Technical Committee and Assessment Science Committee members may support both management and research track assessments. The ASMFC has primary responsibility for planning and carrying out management track assessments for several state-managed stocks, several of which require substantial NEFSC staff engagement and are managed according to the assessment process described here. As part of the management track process for jointly managed stocks with ASMFC lead

responsibility, the relevant ASMFC Technical Committee develops initial plans for assessments and alternatives (i.e., "Plan B") in advance of upcoming assessments and revises those plans if necessary in response to new data. The Technical Committees' initial management track assessment plans are reviewed and approved by the Assessment Science Committee, which then provides those assessment plans to the AOP for its review and subsequent recommendations to the NRCC. In unusual situations where more management track assessments are proposed for expedited and enhanced peer review than can be accomplished in the time available for peer review, then the ASMFC consults with the NRCC to determine which assessments to "downgrade" to a lower assessment level and peer review. For ASMFC managed stocks that are scheduled following the process described here, ASMFC may opt to follow the AOP and management track peer review process, or use traditional ASMFC planning and review processes, though care must be taken to coordinate with the management track process to avoid any work or review conflicts. ASMFC Technical Committee members, as well as NEFSC scientists and other federal, state, and academic scientists participate in research track assessments.

Peer Review Panels

Peer review panels are convened to review expedited (level 2) and enhanced (level 3) management track assessments and research track assessments. Peer review panels review the assessment(s) for technical merit and provide recommendations to the relevant Agency, Council(s), and or Commission on the whether the assessment should or should not be used for management. For management track assessments, the peer reviews will be conducted by a small panel of relevant SSC members with additional external experts if/as needed; reviewers will be nominated by the relevant Council(s) and/or Commission and confirmed by the NRCC Deputies. When nominating and confirming membership for management track peer reviews, consideration should be given to providing some continuity from one peer review to the next, to promote consistency in decisions across peer review panels. For research track assessments, peer reviews will likely, but not exclusively, be provided by the Center for Independent Experts (CIE). In some cases, it may be preferable to convene a research track peer review panel outside of the CIE process; in those cases, the relevant Council(s) and/or Commission will nominate panelists, which will be reviewed and confirmed by the NRCC Deputies. Consideration should be given to including SSC members in the peer review, including the possibility of having an SSC member chair the peer review; this approach has been helpful in the past to provide some continuity across the peer review and subsequent SSC review.

Scheduling Process

During 2016-2017, the NRCC developed a process for scoring and prioritizing stocks for both management and research track assessments, and the resulting information was used to inform the development of the initial management and research track schedules. The scoring and prioritization process built off of the process described in the National Marine Fisheries Service's "Prioritizing fish stock assessments". An NRCC working group evaluated the scoring process and factors recommended by the NMFS report, selected the factors that were most relevant to NRCC stock assessment scheduling, modified the factor descriptions and scoring rubrics, and added entirely new factors as needed. The working group then organized these factors into six categories: management needs, fishery importance,

stock status and trend, ecosystem importance, assessment information, and stock biology. The resulting scoring factors are described in [*insert scoring document as link or appendix*]. Briefly, and generally speaking, NRCC working group members scored each stock within their jurisdiction for each factor[1], and then those scores were averaged across all members for each factor, averaged across all factors for each category, and then averaged across categories for each stock, resulting in one overall score for each stock. A different suite of factors was used to calculate the final score for management track vs research track assessment priorities, and a few factor or category scores were provided independent of the overall score because they were deemed particularly important for developing assessment schedules.

With the resulting scores as information, the NRCC working group developed initial strawman schedules for both management and research tracks. Those strawman schedules, prioritization scores, and other information were used by the NRCC to develop an initial five-year schedule of research track assessments and an initial schedule of management track assessments, with each management track assessment assigned a starting year and a certain cycle or periodicity ranging from annual management track assessments to 6-year intervals between management track assessments. The resulting schedules were informed, but not driven, by the prioritization scores; final decisions regarding the schedules were made through NRCC negotiation.

In order to maintain a five-year research track schedule each year, as what had been the fifth year becomes the fourth year, the NRCC will consider the existing research track schedule, research track scores, and other information and identify which stocks or topics should be addressed in the new fifth year of the schedule. The NRCC will also consider any changes to the existing research or management track schedules as needed. In the absence of changes, the management track schedule will continue with the same periodicity for each stock.

The prioritization scores developed for both research and management tracks in 2016-2017 may degrade in terms of relevance over time. When the NRCC feels those scores are no longer relevant for informing scheduling discussions, the scoring process will be conducted again to provide fresh scores to inform the scheduling process. Because the scoring process is laborious, the NRCC anticipates refreshing the scores on an infrequent basis, perhaps once every 5-7 years.

Management Track Process

Management track assessments are designed to provide routine, scheduled, updated advice to directly inform management actions. Management track assessments are designed to be simpler, quicker, and more efficient than research track assessments. However, the management track provides some flexibility to allow assessments to improve over time by building off the previously accepted assessment, without requiring a research track assessment for every step along the way. The modifications allowed within the management track are intended to provide the analyst with the flexibility needed to improve

[1] NMFS working group members scored all stocks; GARFO scored factors related to management and regulations, and NEFSC scored factors related to science. The Councils and Commission scored their respective stocks.

the science and update a previously accepted assessment when issues arise or new data become available.

Management Track and Peer Review Levels

The flexibility in management track assessments allows for different levels of complexity and extent of changes that can be applied when conducting a management track assessment. These different levels of complexity and extent of changes, in turn, call for different levels of peer review and public engagement. For consistency sake, the levels of peer review, extent of public engagement and changes allowed under each management track level are described below. Generic terms of reference for management track assessments are also provided below.

When developing the list of permissible changes, it was recognized that all possible changes that would warrant consideration could not be anticipated given the evolving nature of science and assessment methods. Consequently, the following lists represent specific changes that are permitted under each level but should not be considered exhaustive. If a change proposed by an analyst is not detailed below, the AOP will determine whether the modification is permissible and which level of peer review would be required.

During and prior to the assessment planning stage, stakeholders will be able to provide input on all assessments. During the "input" phase of management track assessments (described below), NEFSC, ASMFC and NRCC partners will work together to engage with stakeholders, academic and state partners to solicit new data and ideas for any and all levels of upcoming management track and research track assessments. Additional stakeholder engagement would occur during the public comment periods of the AOP meeting (described below) where the assessment plans presented by NEFSC and ASMFC analysts will be reviewed. Opportunities for public engagement during assessment reviews are specific to the assessment level and are described below.

Data Updates

In some cases, data updates may be requested by a Council or Commission between scheduled Management Track assessments. Data updates are just that, summaries of new data that have become available since the last Management Track assessment. Data updates do not involve rerunning any assessment model and in most cases do not provide a formal update of stock status. The NEFSC is actively working to automate much of the assessment data processing, with the goal of being able to provide standardized data updates through an automatic reporting system. Previously, some requested data updates were quite extensive and required data processing and manipulation that would be challenging to automate, and in some cases those requested data updates required as much work as what would be considered a Level 1 assessment in the current process. In addition to cases needing additional work beyond updating available data, cases where data must be acquired from sources outside of the NEFSC (e.g. state index datasets) may take additional efforts and may not be possible in a data update framework. If such extensive data examinations are requested in the future, they would need to be added to the Management Track schedule to account for the workload requirements. However, requests for standardized, automated data updates would not need to be added to the Management Track schedule because they could be provided at very low cost in terms of staff time.

During the, hopefully short, timeframe while NEFSC develops the automated data update system, any data update requests will need to be negotiated through the NRCC.

Standardized, automated data updates are not formally considered as Management Track assessments and do not undergo any peer review, just normal quality assurance and control procedures. The intent of data updates is to provide reassurance that multi-year specifications set based on the most recent Management Track assessment are still appropriate, without requiring a new assessment. Such updates are most useful when they are formally accounted for within a fishery management plan with clear decision rules on what action should be taken if a data update implies a strong change in stock status. Without such decision rules, data updates may just highlight a concern that cannot be addressed without a formal management track assessment, which would require adding an assessment to the schedule on short notice, or waiting for the next scheduled assessment.

Level 1: Direct delivery

A level 1 management track assessment is essentially a simple update of the previously approved assessment with new data. This level of assessment update will be delivered directly from the NEFSC to the appropriate Council or Commission technical body (e.g., SSC) and will not undergo peer review beyond that conducted by those technical bodies. Furthermore, although there will be opportunities for public input on assessments in advance during the input phase described below, there will be limited opportunity for public engagement during the assessment review, which will occur during the public comment period of the technical body's meeting. Given the limited peer review and public engagement, only minor changes, such as those detailed below, are permissible.

- Model that has been updated with revised data, with minor changes (such as small adjustments to data weights, fixing parameters estimated at bounds, correcting minor errors in previous model)
- Incorporation of updated data from recent years in the estimation of biological information (growth, maturity, length-weight relationship)
- Evaluating effects of delayed seasonal surveys or missing strata on fishery-independent measures of abundance
- If adding or revising data reveals problems in model performance, analyst should identify concerns that may need further analyses and/or review
- Standard QA/QC procedures employed by the NEFSC

Level 2: Expedited review

A level 2 management track assessment can involve a little more flexibility for deviations from the previously accepted assessment, but that flexibility is limited to allow for efficient peer review of multiple assessments in one peer review meeting, similar to what previously had been carried out for groundfish operational assessments for the NEFMC. Level 2 assessments will undergo a formal, but expedited (1-2 hour maximum), peer review by a small panel of SSC members from the relevant Council(s), along with additional external experts if desired, before submission to the appropriate Council or Commission technical body. In addition to opportunities for public input on assessments in advance, opportunities for public engagement will occur during the public comment periods of the

public review meeting and the subsequent meeting of the Council or Commission technical body. Given the moderate level of peer review and engagement, level 2 assessments will generally use the same assessment structure and data as the previously accepted assessment, but some changes are permitted (detailed below) that warrant review by an external body. In this level, the cumulative impacts of the number of changes should also be considered; any individual change may be minor, but if there are several changes, the overall impact could be substantial and may warrant shifting an assessment to level 3 and providing enhanced peer review. Changes permitted in level 2 assessments include those noted in level 1, and:

- Updated discard mortality estimates, when based on peer-reviewed experimental evidence
- Evaluating effects of delayed seasonal surveys or missing strata on fishery independent measures of abundance if significant analysis is required to characterize the effects
- Recalibrated catch estimates (e.g., transition to Marine Recreational Information Program, area allocation tables, conversion factors (whole to gutted weight))
- Simple changes, corrections, or updates to selectivity, including but not limited to:
    - Changes to most recent selectivity stanza
    - Changes to historical selectivity stanza if they are corrections or reinterpretations of previously used block timeframes
- Retrospective adjustment to management metrics following established retrospective adjustment protocols

  Technically, when either the rho-adjusted SSB or F (point estimate / (1 + Mohn's rho)) falls outside the 90% confidence interval of the terminal year estimate, the retrospective adjustment is applied for both status determination and to the starting population for projections.
- Adjustment of method for estimating biological information (growth, maturation, sex ratio, changes to length-weight relationships, etc.), when based on methods developed with sufficient peer review or justification for its use
- Calculate new values for the existing BRPs

Level 3: Enhanced review

A level 3 management track assessment will permit more extensive changes than a level 2 assessment and therefore requires a more extensive peer review (one-half to a one full day). The flexibility in level 3 provides an opportunity to make progress within the management track toward the Next Generation Assessments envisioned in the Stock Assessment Improvement Plan, by including more detailed spatial, temporal, environmental and species interactions within existing model frameworks. It is important to note, however, that full achievement of Next Generation Assessments will likely require research track efforts as well. As in level 2 assessments, public engagement opportunities will occur during the public comment periods of both the public review and the subsequent meeting of the Council or Commission technical body, as well as during the input phase of the assessment process as described below.

Level 3 assessments will be reviewed by a small panel of SSC members from the relevant Council(s) as well as additional external experts as needed; any external reviewers outside of the SSCs will be nominated by the Council or Commission and confirmed by the NRCC Deputies. Given the enhanced

peer review, changes to most assessment elements, with the exception of stock structure, would be permitted in level 3 assessments; however, cumulative impacts should be considered when making a determination between the changes permissible within the "enhanced review" level and changes that would require switching to the research track process. Changes permitted in level 3 assessments include those noted in levels 1 and 2, and:

- Inclusion of new or alternate interpretations of existing indices
- Changes to estimation method of catchability, including but not limited to:
    - Empirical estimations
    - Changes in habitat/availability/distribution on catchability
    - Use of informed priors on catchability in a model
- Updating of priors based on new research if done on a previously approved model
- Recommend significant changes to biological reference points, including but not limited to:
    - Change in the recruitment stanza
    - Number of years to include for recent means in biological parameters
    - Suggestions of alternate reference points if based off a similar modeling approach (e.g. age-based, length-based, etc.)
- Updating of historical selectivity stanzas
- Changing recruitment option used, meaning using a stock-recruitment relationship, or cumulative distribution function, etc.
- Changes to selectivity functional form (i.e. such as a new selectivity model) if supported by substantial empirical evidence.
- Changes to fleet configuration
- Changes to natural mortality (M)
- New modeling framework, if the new framework was evaluated during a previous research track topic investigation, and the species in question was one of the examples evaluated. Through research track topics focused on methods, new models could be implemented in parallel with an accepted model and provide a basis for eventual shift to a new model through a level 3 management track assessment. This would allow model evolution, technical innovations, and testing without the penalty of forgoing research on stock dynamics until a new Research Track process is scheduled.

Management Track Assessment Terms of Reference

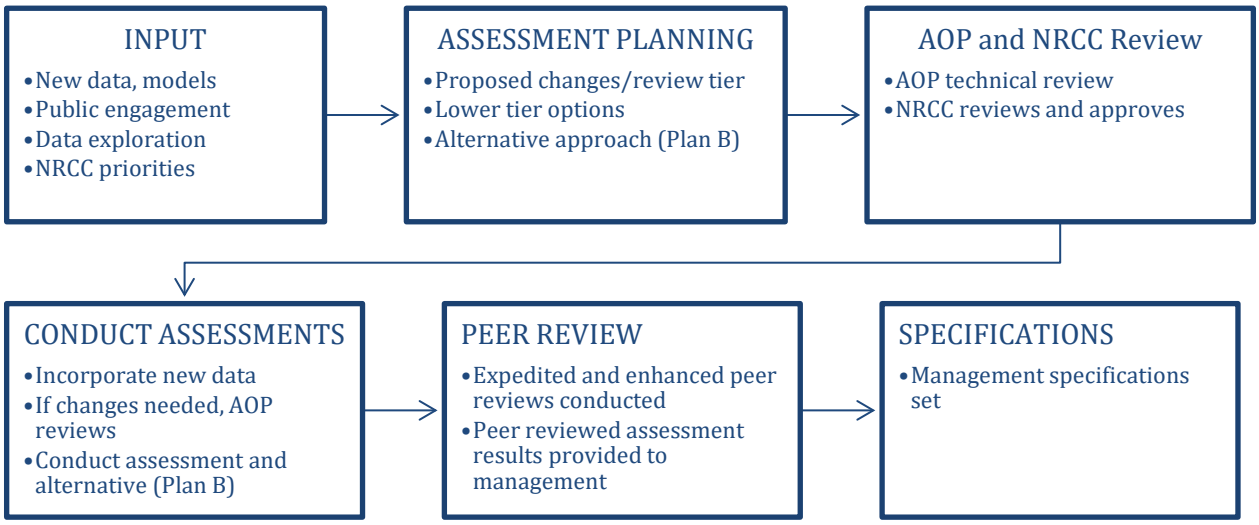
Generic Terms of Reference (TORs) for assessment updates that will be used directly for management (Management Track assessments) are provided below. They include the TORs necessary for updating the necessary input data (catch and survey), assessment model, biological reference points and short-term projections but do not include the research-oriented TORs that are included in Research Track assessments.

1. Estimate catch from all sources including landings and discards.
2. Evaluate indices used in the assessment (e.g., indices of relative or absolute abundance, recruitment, state surveys, age-length data, etc.).

3. Estimate annual fishing mortality, recruitment and stock biomass (both total and spawning stock) as possible (depending on the assessment method) for the time series using the approved assessment method and estimate their uncertainty. Include retrospective analyses if possible (both historical and within-model) to allow a comparison with previous assessment results and projections, and to examine model fit.
    a. Include bridge runs to sequentially document each change from the previously accepted model to the updated model proposed for this peer review.
    b. Prepare a "Plan B" assessment that would serve as an alternate approach to providing scientific advice to management if the analytical assessment were to not pass review
4. Re-estimate or update the BRP's as defined by the management track level and recommend stock status.
5. Conduct short-term stock projections when appropriate.
6. Respond to any review panel comments or SSC concerns from the most recent prior research or management track assessment.

Management Track Process and Logistics

Management Track Process Flow Chart



Step 1: Input

Throughout the year data come in and new ideas are generated. As part of the new management track assessment process, the NEFSC and ASMFC will work with NRCC partners and others to engage with stakeholders, academic and state partners to solicit new data and ideas. This engagement strategy will involve ongoing, regular two-way communications with stakeholders and partners using a variety of approaches, which could include, but not be limited to, social media and web interactions as well as face-to-face stakeholder engagement meetings convened by NRCC members or hosted by stakeholder groups. The engagement strategy will adapt as needed to improve two-way communications, but at a

minimum will involve biannual engagement efforts to provide updates on the most recent management and research track assessments and to seek input on upcoming assessments. This engagement will solicit input on all levels and types of assessments, but will particularly focus on research track assessments where there are not only more opportunities for change and improvement but also opportunities for joint research planning and direct collaborative research efforts with stakeholders and partners, which the NRCC is particularly interested in fostering. All input received will be provided to the assessment leads to support development of their assessment plan. Six months or more in advance of a scheduled management track assessment, the NEFSC or ASMFC assessment lead for the stock compiles available input and does initial exploratory work to determine how complex the next management track assessment should be in terms of new data streams or model changes incorporated.

Step 2: Assessment planning

Following data input and exploration, and based on the explicit management track guidelines, the assessment lead proposes to the AOP the extent of assessment changes to be explored and the associated level of peer review. The assessment lead also provides proposals for assessment complexity under lower levels of peer review, to provide options for consideration. In the case of ASMFC led stock assessments, this initial proposal is developed by the relevant Technical Committee and reviewed by the Assessment Science Committee before being proposed to the AOP. The resulting assessment plans should indicate what input was considered and how it will be addressed, included or excluded, in the assessment; this provides the explicit connection between public or other input and the assessment plan.

Step 3: AOP and NRCC review

After data have arrived and exploration has occurred, the AOP is convened to provide technical review of the proposed management track assessment plans for the upcoming year. For any assessment proposed for level 2 or 3 peer review, the AOP considers the changes suggested (and "Plan B" if not previously vetted by a research track or prior management track assessment) and approves those changes (and Plan B) and applies the peer review level guidelines to confirm the level of peer review for the most complex proposed version of assessment (i.e., levels 2-3 above).

At the completion of the AOP review, the NEFSC, which manages the logistics of the peer review process, reviews the AOP approved suite of assessments to ensure that the peer review logistics are feasible. In unusual situations where more assessments are proposed for expedited and enhanced peer review than can be accomplished in the time available for peer review, the NEFSC consults with the NRCC to determine which assessments to "downgrade" to a lower assessment level and peer review. The resulting recommendations from the AOP, modified if needed and approved by the NRCC, are then implemented by the NEFSC and ASMFC assessment leads.

Step 4: Assessment conducted

This step may include several phases. First, each assessment lead evaluates any new data that have arrived since they developed the original proposal for assessment complexity and level (see step 2). If any changes to the approved assessment plan are needed in response to new data, the assessment lead proposes those revisions. If those proposed revisions could result in changes in the peer review level,

then the AOP provides technical review and applies the management track peer review guidelines to determine the appropriate level of peer review, likely via conference call or virtual meeting. In unusual cases where such changes could result in substantive changes to the overall suite of planned peer reviews, the NRCC would be consulted with respect to priorities. The assessment leads then carry out the management track assessment within the scope of the approved assessment plan for each stock.

Step 5: Peer review

Expedited and enhanced (levels 2 and 3, see above peer review levels) management track peer reviews are scheduled and convened, as described below, seeking to combine peer reviews as appropriate for efficiency and to optimize the ability to provide timely peer reviewed results to as many fishery management action processes as feasible. Outputs of peer reviews are provided as expeditiously as possible to the appropriate Council or Commission technical bodies and then to the Councils and/or Commission to inform management action (Step 6 in the management track process flow chart). These outputs will be provided in the form of summary reports and will address the assessment terms of reference (see above). For the usual situation where multiple management track assessments are reviewed at one time, the summary reports would likely be compiled as chapters in one overall summary report, and the peer review comments and recommendations would likely be incorporated within each chapter. In all cases, associated data and analytical details will be accessible. Early in the implementation of this process, the NRCC will develop and approve standard report templates for each level of management track assessment (and data updates).

General Timing of Management Track Process

Two management track peer reviews for level 2 and 3 assessments will be conducted each year to accommodate the variation in fishing year among stocks and minimize the time lag between the final year of the assessment model and the subsequent implementation of new specifications. Each peer review could include both level 2 and level 3 assessments, and the peer review panel would be composed appropriately with SSC members from the relevant Council(s) and any additional experts as needed. For the majority of stocks, the fishing year starts at the beginning of January or May. Consequently, a peer review will be conducted during the beginning of September for those stocks with fishing years around May 1 and another peer review will be held at the end of June to accommodate stocks with fishing years beginning around January 1 (see table below). This timing is designed to ensure that products from the assessment review can be provided in time to meet the associated management timelines. Assessment models examined during the September peer review will incorporate data through the end of the previous year. For the suite of stocks that undergo peer review in June, it will be difficult to incorporate fishery catches through the end of the previous year due to timing constraints of data availability; it is likely that assumptions may need to be made for the terminal year catch. Assessment reviews for transboundary stocks carried out under the auspices of the Transboundary Resources Assessment Committee will continue to be scheduled based on bilateral negotiation.

Level 1 management track assessments will be delivered directly to the appropriate Council or Commission technical body and are not evaluated as part of the two peer reviews. If desirable, some level 1 assessments can be prepared and delivered throughout the year according to the Councils' and Commission's current delivery schedules. If, upon incorporating the most recent year of data, a level 1

assessment needs to be upgraded to a higher level that requires peer review, delivery of the assessment will be delayed until the next peer review, typically resulting in a delay of weeks to a few months. In such situations, the relevant Council or Commission would be consulted to discuss the needed changes and the resulting delay. In some situations, changes may be required to provide valid scientific advice to management. In others, the changes may be needed to provide improvements to the quality of the advice, in which cases the relevant Council or Commission may prefer to maintain the original delivery timeline while sacrificing the improvement. Furthermore, as the management track schedule comes into effect and workloads, timing, and demands shift, one way to enhance the efficiency of the process may be to simplify the delivery system to have most or all level 1 assessments coincide with the timing of the peer reviews, eliminating the need for some additional consultation and sacrifices.

Fishing year and peer review dates for each species or fishery management plan (FMP)

Species or FMP	Beginning of Fishing Year	Management track peer review
Golden Tilefish	November 1	End of June
Northern Shrimp	December 1	End of June
Bluefish	January 1	End of June
Mackerel/Squid/Butterfish	January 1	End of June
Fluke/Scup/Black sea bass	January 1	End of June
Surf clam / Ocean quahog	January 1	End of June
Atlantic herring	January 1	End of June
Striped bass	January 1	End of June
River herring / Shad	January 1	End of June
Red crab	March 1	End of June
Jonah crab	Undefined	End of June
Sturgeon	None	End of June
Scallop	April 1	Beginning of September
Spiny dogfish	May 1	Beginning of September
Monkfish	May 1	Beginning of September
Groundfish (NE multispecies)	May 1	Beginning of September
Hakes (Small mesh multispecies)	May 1	Beginning of September
Skates	May 1	Beginning of September
American Lobster	July 1	Beginning of September

Research Track Process

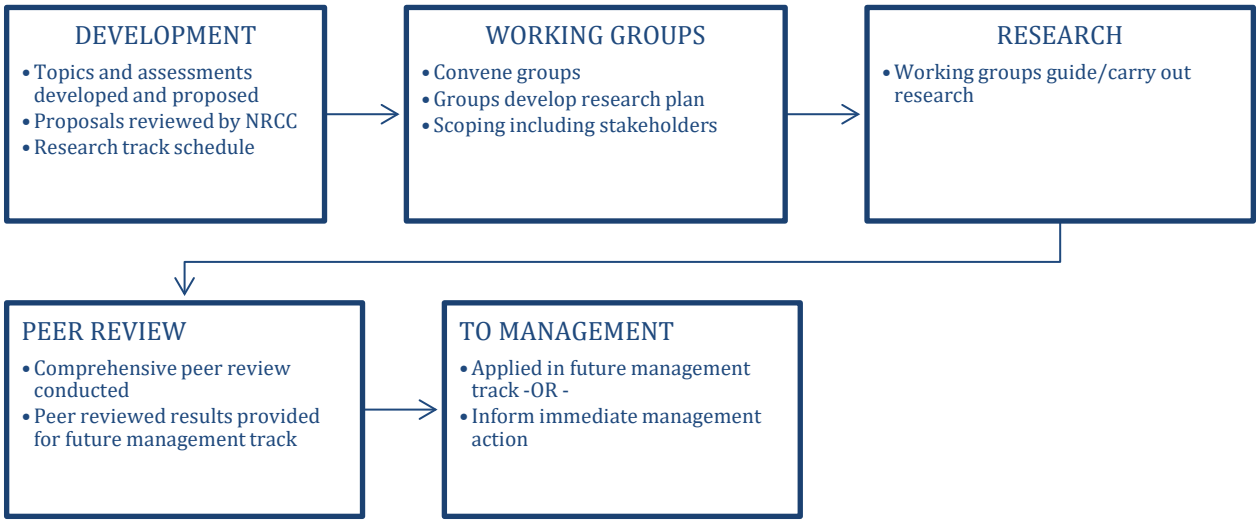
Research Track Assessments and Topics

Research track assessments and topics are complex scientific efforts focused either on (a) assessments of individual stocks with comprehensive evaluation of new data streams and model changes or (b) research topics that apply to assessments of several stocks. Generally speaking, applied scientific efforts in the fish stock assessment arena lie along a continuum from "research" to "research track" to "management track," with each step informing the next and getting closer to directly informing management decisions. Generic "research" may be designed to inform the research track, but typically

is not designed to directly inform the management track. Research track efforts, on the other hand, are designed to directly inform future management track assessments, but may not immediately inform management decisions. Research track efforts can inform management track assessments by, among other things, (a) direct examination and development of an assessment or (b) tackling analytical, data, or other issues facing multiple assessments.

Research Track Process and Logistics

Research Track Process Flow Chart



Step 1: Research Topic and Assessment Development

Initial research track topics and assessments are developed and proposed to the NRCC via individual NRCC members. These proposals can derive from ideas or recommendations proposed to or developed by Councils or Commission, through ideas or proposals developed by NEFSC or ASMFC scientists, or through ideas or proposals submitted through the NEFSC or GARFO. NRCC member organizations will work together to develop effective stakeholder engagement processes to solicit ideas (see Management Track – Step 1 above for more on input), which in turn could develop into research assessment or topics that would be proposed by one or more NRCC members. These proposals are then evaluated through the scheduling process described above.

Step 2: Working group(s)

Once a research track assessment or topic is scheduled, NEFSC and/or ASMFC assessment lead(s) are assigned and reach out to stakeholders, academics, and NRCC and management partners, etc., and consult existing sets of research recommendations (e.g., from past assessments or Council or Commission research priorities) to identify research needs to inform a given research track effort. This outreach effort could include formation of a working group or steering committee to carry out the outreach, or that working group or steering committee could be formed after the initial outreach and focus primarily on developing the plan for the research track effort.

Given the potential long-term nature of research track efforts, in some cases a steering committee to guide work may be established initially. The purpose of such a steering committee would be to identify research needs and provide guidance for the research that is undertaken, to ensure that the eventual research outputs are useful and able to be considered within the eventual research track assessment or topic. Given that purpose, members of a steering committee should be recognized experts in fields of study relevant to the priority research needs for a given research track assessment or topic; this could include federal, state, and academic scientists as well as industry or non-governmental experts engaged in developing or guiding cooperative research studies. Membership of a steering committee could be somewhat dynamic and change through time for longer term research track efforts, as research progresses and different expertise is needed to provide research guidance. Steering committee members would be nominated by NRCC members as well as solicited through public outreach; steering committee membership would be reviewed and confirmed by the NRCC Deputies, with a focus on ensuring that all members have significant, relevant expertise. Care should be taken to avoid any perceived or real conflicts of interest, for example if steering committee members advocate for research that would be conducted by their host institution. A steering committee chair would be nominated and approved by the NRCC Deputies from the suite of steering committee members, and that chair would guide the overall work of the steering committee and seek to avoid conflicts of interest.

For stock-specific research track assessments, a formal stock assessment working group will likely be convened in addition to, or instead of, a broader steering committee. Those working groups would be formed following the process established for past Stock Assessment Workshop working group protocols.

Research track working groups, both topical and stock-specific, will be tasked with developing and implementing the research plan and terms of reference based on scoping. The research plan should indicate which outputs will be applied, and how, to future management track assessments and/or management actions. This is most critical for research topics, where the terms of reference at the start should clearly indicate what outputs will inform future management track assessments, and how they would do so. For stock specific research track assessments, consideration should generally be given to development of alternative approaches to providing management advice if a research track or future management track assessment should be deemed unsuitable for use in management, i.e., development of “plan B” assessment advice approaches. In most, if not all cases, such “plan B” approaches would be evaluated by the peer review panel after the panel completed its review of the research track assessment; “plan B” approaches should be considered as backup plans for any future problems with an assessment, not an alternative to the developed research track assessment, unless of course that assessment is rejected for use in management advice. In situations where a “plan B” approach has been developed and approved through a research track peer review, the expectations are that approach would be applied in future management track assessments as a backup, and the AOP would not need to repeat the review and approval of that “plan B” approach.

Step 3: Research

Once the research plan and terms of reference are established, the steering committee and/or working group guides and/or carries out the necessary research and compiles the results to inform the research track effort, incorporating public planning, data, and analytical meetings as appropriate. In some cases,

funding, staff, or other resources may limit research efforts, and, in those cases, the steering committee or working group should set priorities and ensure the most critical research is accomplished. When resources are limiting, the steering committee or working group should also inform the NRCC, whose members may be able to seek out additional resources to support the required work.

In order to promote an effective and innovative research track, topics and stock-specific assessments in this track typically will be carried out over longer time frames and with fewer requirements for using the most recent data, etc. In the two-track approach, the research track is intended to be the opportunity for extensive and comprehensive research and analysis, so it is helpful to remove timing constraints as much as possible. This is different than the management track, which is very much driven by the need to meet specific management timelines and apply the most recent data feasible. As appropriate and feasible, the research and management track schedules will be designed to have management track assessments for specific stocks immediately follow research track assessments for those stocks, which allows for the comprehensive and innovative research to occur with less limitations but ensures immediate application of the research results with the inclusion of the most recent data in a management track assessment.

Step 4: Comprehensive peer review

Research track peer reviews are considered to be "comprehensive" peer reviews, in contrast to the expedited and enhanced peer reviews carried out for management track assessments. These reviews generally require 1.5-4 days and are intended to consider all aspects of the research topic or stock-specific assessment and provide advice on the validity of the research and analyses conducted as well as provide recommendations as to whether the outputs are suitable for use in future management track assessments and/or to inform future management actions. Typically, but not exclusively, peer review panels would be provided through the Center for Independent Experts (CIE) and would include at least one relevant SSC member to provide continuity with later Council, Commission, and SSC reviews and actions. As mentioned previously, in some cases it may be preferable to convene a research track peer review panel outside of the CIE process; in those cases, the relevant SSCs, NEFSC, and/or ASMFC Assessment Science Committee will nominate panelists, which will be reviewed and confirmed by the NRCC Deputies.

Outputs of research track peer reviews are provided as expeditiously as possible to the NEFSC and/or ASMFC Assessment Science Committee for use in future management track assessments. These outputs will be provided in the form of an assessment summary report, a peer review report, and a comprehensive assessment document that covers the full suite of work carried out. The peer review report could either be one panel report, or a compilation of individual peer review reports along with a summary panel report. Working group papers, associated data, and background materials will be accessible if needed. If immediate management action is required based on the outcomes of a research track assessment, the outputs also will be provided to the appropriate Council or Commission technical bodies and then to the Councils and/or Commission to inform management action.

Step 5: Translate to Management

In many cases, research track outputs will be incorporated into future management track assessments, as indicated in the relevant initial research plan. In some cases, research track outputs may also be used to directly inform immediate management actions. This would typically occur when research track outcomes indicate important or urgent changes in stock status that require immediate attention; otherwise, the expectation is that it usually will be more appropriate to take the research track outcomes and apply those with updated data in the next scheduled management track assessment to inform future management action.

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

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Jessica McCawley, Chair | Mel Bell, Vice Chair
Gregg T. Waugh, Executive Director

March 20, 2019
LN#201906

Mr. Mike Luisi
Chair, MAFMC
Maryland Department of Natural Resources,
Fishing, and Boating
580 Taylor Ave.
Annapolis, MD 21401

Mr. G. Warren Elliott
Vice Chair, MAFMC
800 North State Street, Suite 201
Dover, DE 19901

Dr. Christopher M. Moore
Executive Director, MAFMC
800 North State Street, Suite 201
Dover, DE 19901

Dear Mike, Warren, and Chris:

Thank you for attending our March Council meeting and sharing your views with Council members on the topic of "How to address species expansion northwards?". The opportunity to talk with you during the meeting and outside of the meeting was very beneficial. I believe we all have a better understanding of each other's views and I am glad we identified a way forward that will allow us to work together on a solution. The following information is taken directly from the final Habitat Protection and Ecosystem Based Management Committee report:

Atlantic Coast-Wide Discussions: How to address species expansion northwards?
Council staff opened the March 2019 joint session by providing an overview of the Council Coordinating Committee (CCC) discussions to date. The Committee then discussed each group's views on coordination to address movement of species to the north. NEFMC views were expressed by Dr. John Quinn (Chair), Terry Stockwell (Vice-Chair), and Tom Nies (Executive Director); MAFMC views by Mike Luisi (Chair), Warren Elliott (Vice-Chair), and Chris Moore (ED); ASMFC views by Bob Beal (ED); and SAFMC views by Jessica McCawley (Chair). There was a general discussion about the need for research/data systems to be ready to pick up new species and the need for a governance system that preserves each group's authority.

There was agreement to move forward with the following two groups/activities:

1. Science/Data – the Northeast and Southeast Fisheries Science Centers are leading this effort and a workshop is currently being scheduled. The Councils want to be involved in the workshop/discussions, in part to ensure ongoing fishery independent data collection programs continue (e.g., SEAMAP, NEAMAP, SEFIS, and State programs). The South Atlantic Council's Citizen Science Program is also exploring a mechanism for the public to act as an early warning system to report when new species show up in an area.

2. Governance – the CCC members of the New England, Mid-Atlantic, and South Atlantic Councils and the ASMFC Executive Director will work to develop a way to manage these species that clearly identifies each groups roles/responsibility without any group losing any authority. This group should meet more frequently as needed via conference calls, webinars, and additional in-person meetings in conjunction with other meetings of the partners (e.g., NRCC meetings). The CCC/ASMFC group will designate staff from their respective organizations to evaluate the following approaches:
    a. Options included in Attachment A5 from this meeting.
    b. Scenario Planning Exercise used by the Pacific Council.
    c. Base Realignment and Closure (BRAC) approach used to consider potential military base closures.
    d. Identify roles for each group in this "obligatory partnership".

On Friday at full Council, the SAFMC approved the following motion: "Coordinate with MAFMC, NEFMC and ASMFC to address both governance and science focus areas associated with species moving north as directed in the March 2019 SAFMC meeting."

We look forward to continued discussions at the CCC meetings, various other meetings, and phone calls/webinars to accomplish our shared goal of collecting data on and managing these species as they occur in new areas. We look forward to our next discussion on this topic at the May CCC meeting in Charleston.

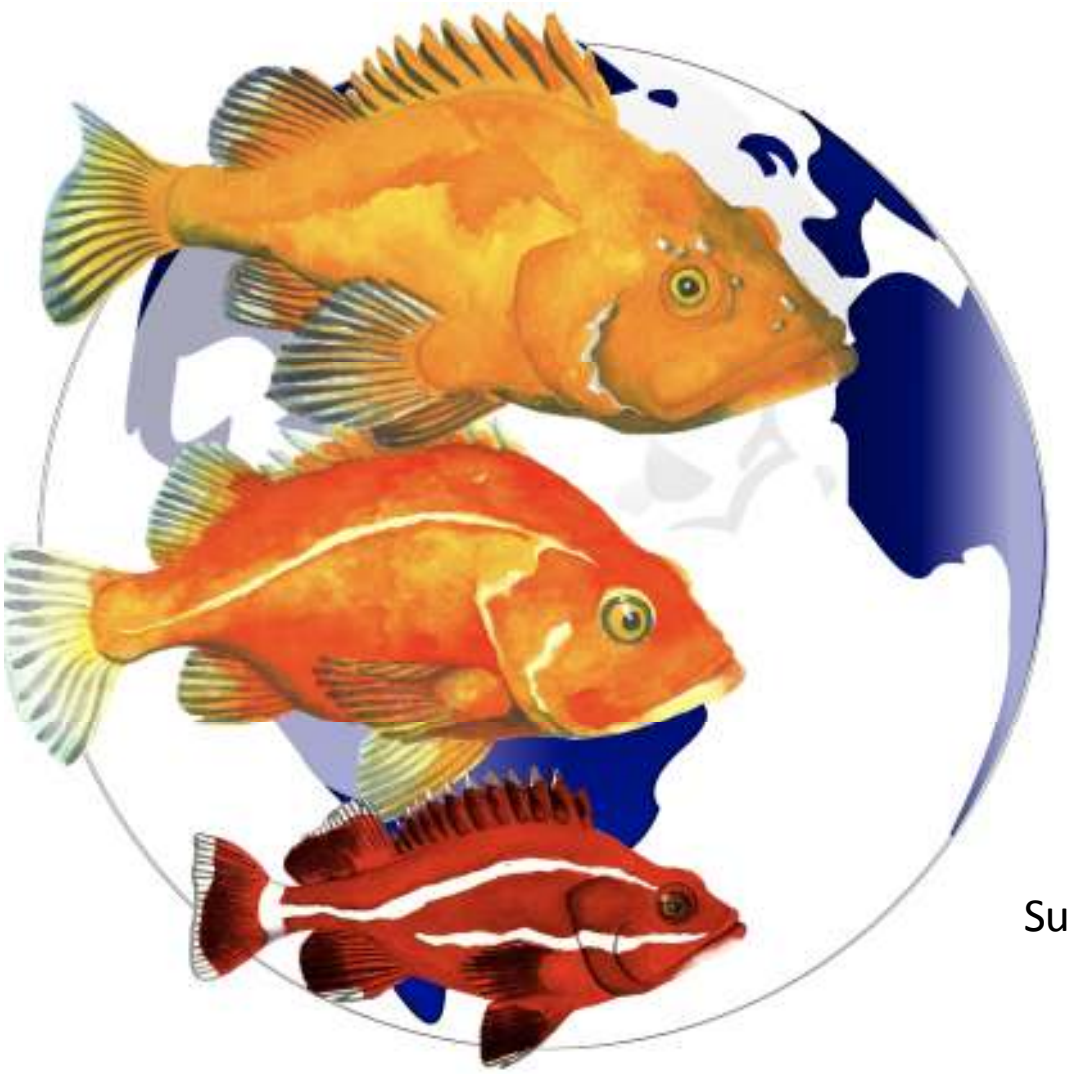
Sincerely,

Jessica McCawley, Chair
South Atlantic Fishery Management Council

cc: Council Members and Staff
Council Executive Directors
Sam Rauch and Alan Risenhoover
Scientific and Statistical Committee
John McGovern, Andy Strelcheck, and Rick DeVictor
Monica Smit-Brunello
Cisco Werner and LeAnn Hogan
Clay Porch, Theo Brainerd, and Erik Williams
Jon Hare and Nicole Cabana
Michael Pentony and Kimberly Damon-Randall

The Nature Conservancy
Climate and Communities Initiative Workshop

Portland, Oregon
May 15-16, 2018



Summary Report

The Nature Conservancy
Protecting nature. Preserving life.

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"Projections for changes in the ocean for the next 20–30 years are off the charts that cross ecological thresholds. Temperature ranges will be outside of historical experience. It will be a different ocean, which will bring new and greater challenges. Infrastructure is 50–100 years old, which makes it vulnerable to sea level rise, damage, and degradation. Dams are showing signs of vulnerability. We need to position fisheries and communities for a changing era in the forseeableforeseeableforseeable future."

~QUOTE FROM A WORKSHOP ATTENDEE

Executive Summary

The Nature Conservancy hosted the Climate and Communities Initiative Workshop in Portland, Oregon on May 15-16, 2018. A total of 67 individuals representing a variety of disciplines and organizations convened to participate in the third initiative, the *Climate and Communities Initiative* (Initiative), undertaken by the Pacific Fishery Management Council (Council). The primary goal of the workshop was to develop a set of recommendations to guide the Council in its implementation of the Initiative, which is being developed under the Council's Fishery Ecosystem Plan. This report is intended to provide information for the Council to use in crafting Initiative details. It is important to note that this is not a full transcript of the workshop, rather it is a description of the information presented at the workshop as well as the outcomes of breakout sessions that explored the drivers of climate change and corresponding effects on fisheries and communities, potential pathways for addressing these issues, information gaps, and opportunities for the Council to play a role in addressing climate change issues to best position fisheries and communities for a changing era

The workshop was kicked off by panel of management, fishing, science, and tribal experts, focusing on the premise that this is the time to embark on this initiative. Panel participants shared that climate change is already here on the West Coast. Fishers and communities are experiencing the effects of climate change stressors at a variety of scales, intensities, and durations. While carbon dioxide emissions and greenhouse gases are the key drivers for climate change, with limited actions for the Council to take to impact these drivers, the Council can take significant actions to preserve stocks and ecological functions, and provide mechanisms to ensure vibrant fisheries and coastal communities. The Initiative is one way for the Council to develop and implement a suite of adaptation and mitigation strategies to ameliorate climate change effects.

Workshop presentations on the information necessary to set the stage for discussions, was focused into three sessions, with group discussions and breakout sessions following. The first session focused on the management and science foundations needed to frame the workshop context. Key agency climate staff were invited to share the current understanding of ecological and social impacts of a changing ocean. Workshop participants learned about direct and indirect impacts of climate changes in four areas: species, habitats, fishery management, and community/fisher behavior.

The second session was focused on Community and Tribal Foundations. Presenters framed the community and tribal context for workshop discussions and reflected on the importance of considering communities in relation to the impacts of climate change on Council managed fisheries. Workshop participants learned about the concept of community and that fishing communities are tied to place, practice, and cultural

identity. Tribal communities have strong cultural needs and often lack the ability to shift harvest areas and times. Participants also learned about the current social and economic considerations in the annual Integrated Ecosystem Assessment.

The third set of workshop presentations contained information on up and coming research that will inform the future climate change understanding. Presenters shared examples of the disciplines and methods of social science research to support Council consideration of communities relative to climate change.

During the workshop, attendees discussed several **potential Council principles that could guide the development of the initiative:**

- Ensure continued protection of ecological resources and functions.
- Continue to focus on existing Council priorities of reducing overfishing and appropriate management of target fisheries and bycatch.
- Incorporate a systems-level ecosystem-based approach to the management of fisheries.
- Incorporate social sciences, traditional ecological knowledge, and informal knowledge into the Council management structure and decision making
- Build trust and interaction with communities and fishers
- Enhance communication and outreach associated with climate change awareness.
- Recognize a regional, collaborative approach including a suite of stakeholders, such as fishers, fishery managers, industries, agencies, scientists, consumers, and policy makers, among others.
- Support adaptation by implementing changes to the management structure that allow for more resilient and adaptive fisher portfolios.
- Consider Council management actions in the context of all fisheries in adjacent jurisdictions (i.e., states and countries).
- Prioritize, on an ongoing basis, activities to address emerging climate change issues and the science and data needs to support those issues.

Throughout the discussions, attendees developed and honed a series of **actions the Council could take to implement the initiative**. The Council could pick a number of these actions to fill out the work of the initiative, building climate resiliency into the process and Council managed fisheries. The actions are summarized below.

I. **Recognize, identify, and communicate the underlying drivers of climate change, including how they both constrain fisheries and affect the execution of Pacific Fishery Management Council authorities.**

- Workshop participants discussed the underlying drivers of climate change and what actions the Council could take to recognize, identify, and communicate the impacts of a changing ocean, including:
    - Communicate climate change drivers and effects with lawmakers, fishers, and others to inform national level policies;
    - Enhance flexibility using regional ecosystem-based solutions; share predictive tools;
    - Advocate for a reduced carbon footprint;
    - Develop a shared understanding of the management process and factors influencing predictions; and
    - Draft a resolution about climate change indicators so that the public is aware changes in the ocean are expected.

II. **Establish a measurable, achievable, relevant, and timely (SMART) prioritized objectives for the initiative.**

- Workshop participants provided several examples of objectives:
    - Improve understanding and awareness;
    - Ensure reliability of fishing as an activity;
    - Create opportunity to access resources (both commercial and recreational);
    - Monitor and assess impacts at varied scales; and
    - Enhance resilience, stability, and flexibility.

III. **Develop a framework that identifies the most useful social, economic, and environmental climate change indicators and the science and data needs that best inform those indicators.**

- Examples of science and data needs discussed include:
    - Obtain contemporary information on baselines;
    - Develop case studies to estimate significant change that requires flexibility and adaptation;
    - Assess community resilience to ensure Council decisions do not have a negative compounding effect;
    - Use real-time information to develop fishery specifications;
    - Use more intensive management systems that monitor and manage what is happening and can inform allocations;
    - Incorporate informal data in stock assessments;
    - Assess fishery infrastructure needs;
    - Address the increased need for information in an environment in which funding to obtain information is decreasing; and
    - Establish science and data standards and protocols.

IV. **Identify a suite of management tools available to ameliorate climate change effects.**

- Examples included:
  - Lessen the spottiness of fishery openings and closures by better coordination among the states and tribes;
  - Monitor and incorporate species range shifts and identify the corresponding impediments to community adaptation to these shifts;
  - Address the reduced flexibility of limited entry fisheries;
  - Increase monitoring using citizen science;
  - Develop consistent protocols for monitoring and management;
  - Better understand equity and distribution impacts within and across sectors;
  - Streamline and enhance flexibility of regulations;
  - Consider ecosystem optimum yield versus fishery optimum yield;
  - Address access issues to alleviate community impacts;
  - Facilitate group coordination (e.g., community cooperatives) and co-management;
  - Implement regulatory mechanisms using scenario planning to respond more rapidly to a set of conditions;
  - Ease the regulatory path to new fisheries access;
  - Fast-track/streamline the Exempted Fishing Permit (EFP) process;
  - Maintain/offer open access fisheries;
  - Reduce maximum sustained yields to create an uncertainty or variability buffer; and
  - Establish mutually agreed upon criteria to use community set-asides.

V. **Develop solutions to roadblocks by developing an institutional framework that is flexible, creative, and adaptive.**

- Examples provided include:
  - Expand partnerships to achieve enhanced equity among fishers, supporting;
  - Support fisher diversification to enhance resilience;
  - Increase engagement with fishers to develop scientific information needed to fish unexploited stocks and support greater innovation;
  - Work collaboratively with state-managed fisheries; increase opportunities for open access;
  - Facilitate succession planning to foster intergenerational equity; seek standardization across state and federal entities; and
  - Encourage fuel efficiency of fishing vessels through incentives.

The broad themes heard throughout the workshop were summarized in closing remarks from Council members, Rich Lincoln and Dorothy Lowman. Themes included metric, indicator, and data development and collection, using case studies to inform needs, providing flexibility in the management system, and connecting with communities. They ended the workshop noting the significant role of the Council as a leadership voice for issues, including climate change, facing the ocean environment.

I. Background

The Nature Conservancy hosted the Climate and Communities Initiative Workshop in Portland, Oregon on May 15-16, 2018. A total of 67 individuals representing industry, management, science, tribal, and non-governmental organizations as well as Pacific Fishery Management Council (Council) members (Appendix A) convened to participate in the development of the third Fishery Ecosystem Plan initiative, the *Climate and Communities Initiative*, undertaken by the Council. The goals of the workshop were to provide an opportunity for managers, scientists, and stakeholders to provide input into the Pacific Fishery Management Council's development of a climate and communities initiative through the Council's Fishery Ecosystem Plan by:

- Increasing understanding of climate-related changes, the drivers of change, and the scientific information available;
- Developing a shared understanding among the Council, its science and management advisors, industry and the public to discuss and respond to climate-related changes;
- Sharing perspectives on the region's most pressing issues related to climate variability and change;
- Considering the pathways for addressing these issues including specific management and non-management actions;
- Identifying information needs to support action and further considerations; and
- Providing ideas and information to support the Council's development and implementation of the Climate and Communities Initiative.

Workshop participants were provided with documents to review in advance of the workshop. Documents that were identified as "highly recommended" reading/viewing are:

- Webinar series on climate and communities from January and February 2018
- Ecosystem Working Group Report 1, Ecosystem Working Group Report 2 (presented at the March 2018 Pacific Fishery Management Council meeting)
- Ecosystem Working Group Report (presented at the April 2018 Pacific Fishery Management Council Meeting)
- Ecosystem Based Fishery Management Roadmap
- National Climate Science Strategy
- Western Regional Action Plan

- 2018 California Current Integrated Ecosystem Assessment and appendices
- Lenfest Fishery Ecosystem Plan Evaluation

In addition, workshop steering committee members encouraged review of the following materials:

- Feeny, D., F. Berkes, B.J. McCay, and J.M. Acheson. 1990. The Tragedy of the Commons: Twenty-Two Years Later. *Human Ecology* 18(1):1–19.
    - Focuses on Hardin's Tragedy of the Commons model, which predicts eventual overexploitation or degradation of resources used in common, encouraging expansion of the model to incorporate institutional arrangements and cultural factors to inform analysis and prediction.

- Clay, P.M., and J. Olson. 2008. Defining "Fishing Communities": Vulnerability and the Magnuson-Stevens Fishery Conservation and Management Act. *Human Ecology Review* 15(2): 143–160.
    - Addresses vulnerability in fishing communities in the context of inclusive and holistic forms of management, noting Magnuson-Stevens requires managers to minimize economic impacts and sustain participation in fisheries.

- Coulthard, S. 2012. What does the debate around social wellbeing have to do with sustainable fisheries? *Current Opinion in Environmental Sustainability* 4:358–363.
    - Explores the concept of eudaimonic wellbeing, living a life that is valued and worthwhile as well as a three-dimensional framework that includes material, social, and subjective wellbeing, both of which can contribute to sustainable fisheries via articulating social and subjective impacts of fisheries declines and fisher behavior.

- Bell, R., and J. Odell. 2018. Actions to promote and achieve climate ready fisheries: Summary of current practice. A publication of The Nature Conservancy.
    - Identifies and compiles examples of implementing climate-ready fisheries principles and actions to reduce and mitigate impacts of climate change on the fisheries sector.

II. Workshop Framing and Purpose

To frame the purpose of the workshop, six individuals shared perspectives on drivers, need, and timing for the Climate and Communities Initiative. Panel participants and workshop attendees were asked the following questions:

- Why do you think a climate and communities FEP initiative is timely and valuable?
- What climate-related impacts are you experiencing or concerned about?
- From your perspective, how can this workshop contribute and add value to the Council's consideration of a Climate and Communities Initiative?

Presentations

Caren Braby, *Manager of Marine Resources Program at the Oregon Department of Fish and Wildlife*

Caren highlighted the scope of the climate change problem, noting the water off the Oregon coast during the summer months originated in the poles 60-80 years ago. Carbon dioxide sinks in the cold water, equilibrates, and is transported in long-term ocean currents that are now reaching our region and causing changes in species distribution and abundance because of ocean acidification. Hypoxia has driven distribution changes that have been observed in Dungeness crab, Pacific oyster, halibut, Pacific cod, and salmon. The Council needs to understand the changes taking place to ensure accurate fishery predictions.

Joshua Etherton, *Quileute Tribe*

The Quileute Tribe, located on the northern half of the Olympic Peninsula, harvests marine species year-round in usual and customary areas. Tribal members have observed changes related to climate change, including ecological regime shifts and ocean acidification. The community makes its living in association with the marine system. Baseline data is lacking relative to economical, ecological, and infrastructure concerns associated with climate change. Clear communication is critical to collaborate and build rapport, and art is a form of communication that can effectively transfer information. Disciplines outside of science can help connect information, people, and regions.

Walter Chuck, *Recreational angler, Oregon Department of Fish and Wildlife advisor*

The emphasis on sustainable demand requires good management and science from fishing communities. Changes are being seen more frequently, including domoic acid levels influencing shellfish production, hypoxic areas, shellfish closures, reduced recruitment of juvenile fish, and increasing warm water species. Oregon coast freshwater is groundwater; there is little snowpack. Increased populations on the coast will increase the demand for water – how will it affect fish? If rain events are becoming more intense, then our ability to store the water will be a challenge. Fishery disaster declarations affect our ability to provide services. The increase in disasters makes it more difficult for new people to be recruited to recreational and commercial fisheries. We need to ask ourselves

about constraints, the impacts of the changes, how fishing effort will shift along the coast, how agencies will work together, and how communities will be affected.

Nate Mantua, *Southwest Fisheries Science Center*

Nate acknowledged the challenges associated with addressing climate change issues, providing an example of how whale entanglements increased with the delay in the opening of a fishery, a decrease in krill populations, and an abundance of whales inshore feeding on anchovies. There are more frequent and intense impacts associated with drought, floods, and warm ocean conditions, which affect resources. Shifts in food webs and harmful algal blooms have negatively impacted species. He asked workshop attendees to think about ways to incorporate flexibility into fisheries management strategies.

Scott McMullen, *Oregon Fishermen's Cable Committee*

Scott shared information on carbon dioxide associated with a recent trip to Cape Point, South Africa. The carbon dioxide concentration at Mauna Loa Observatory was the highest ever in recorded history during the end of April of 2018. He asked workshop attendees to think about ways to address the issue. He shared the graphic on page 15 of the Council's Fishery Ecosystem Plan, which documents the food web of the Northern California Current Ecosystem—a snapshot of the 1960s documenting standing biomass and biomass flux of prey to predators—and asked workshop attendees to think about how this complex food web would shift as a result of climate change effects.

Corey Ridings, *Ocean Conservancy*

Corey asked attendees to think about how we manage an environment that is more variable, where change is occurring rapidly. He asked attendees to evaluate our conservation, use, and community goals so that we can manage for the future, improving on and tracking goals through time so that the change in environmental variability considers both fisheries and communities. Climate change is driving changes in fish productivity and stocks as well as habitats. Droughts in California, hypoxia, and ocean acidification are affecting numerous species. The East Coast is experiencing geographically shifting stocks.
We need to ask ourselves what changes are happening here—in our fisheries and communities. This workshop can add value by gathering perspectives on the most important climate-related issues the Council can address.

Session Discussion

Workshop attendees addressed topics of interest in the panel presentations as well as why they think the Climate and Communities Initiative is timely and valuable, climate-related impacts of concern, and ways the workshop can add value to Council efforts. The following are relevant comments from participants during the discussion:

Timeliness and value of the Climate and Communities Initiative

- Stock assessments may help to inform climate change impacts and response. It is timely to ask what gaps exist and what steps may be taken to close the gaps.
- Ocean acidification is an intellectually challenging concept such that people erect walls to protect themselves against the emotional challenges it presents. What is happening in our oceans has never happened on this planet both in human terms and in geological scales.
- The water upwelling off our coast now could be 80 years old. We would still have 60–80 years of this train moving at us, even if we acted to eliminate carbon emissions today. We need to ramp up our response, which has been meager compared to the size of the problem. We must respond dramatically.

Climate-related impacts of concern

- We are not addressing the fact that people are burning fossil fuels at an unprecedented rate; we need to incentivize society to reduce the carbon footprint.
- There are numerous climate change-related effects, such as on birds and traditional cultural values (e.g., Yurok and eulachon). The Council has been proactive (e.g., bans on krill, investigating environmental characteristics of sablefish recruitment). Fisheries impacts due to climate change are important, but there are other things facing society that other organizations without restrictive legislative mandates may be able to explore.
- Financial resources will be needed to address climate change effects, such as sea level rise, on fishing communities. Changes in fishing gear will need to occur to adapt to changing fisheries, and infrastructure will need to be addressed.
- The ability to process fisheries will become more necessary, yet the infrastructure to process these fisheries is declining. Oregon is changing—the population and dynamic is changing. The values of people and the emphasis on fisheries may not be as great as it was in the past. Fishers see real changes that need to be incorporated into management decisions.

Additional Takeaways

- The Council needs to be more adaptive to correspond to changes in the environment.

- We control capacity (i.e., effort) in fisheries through restricted access and permitting, but need to be more flexible to allow fishers to pursue targets available to them at a time.

- Climate change information should be more formally incorporated into Council processes and communication, despite the lack of certainty.

- Researchers could add value to the types of information collected and presented on climate change issues by working more closely with fishery managers and the Council.

- Involve fishers in research. When fishermen are involved, they need to understand how their data is being used in real time, not 4–5 years later.

- When you connect with people, talk about climate change solutions that resonate with their own values and what they care about.

- Provide a clear message on the drivers of climate change- emissions and greenhouse gases and the issues of the impacts on fisheries.

III. Management and Science Foundations

Five individuals gave presentations to frame the management and ecosystem context for the workshop, reflecting on how both might inform the initiative.

Presentations

Yvonne deReynier, *West Coast Regional Office*
PFMS Fishery Ecosystem Plan and the Climate and Communities Initiative

The West Coast has one fishery management council and four fishery management plans that address more than 100 species. In 2013, the Council completed the development of an ecosystem management plan that describes Council's priorities for the California Current Ecosystem (i.e., the Fishery Ecosystem Plan; FEP), including an appendix with policy process and ideas that cross fishery management plans—topics such as addressing bycatch and the long-term structure of managed stocks. The FEP defines a process developed to ensure continued work on ecosystem issues (i.e., Initiatives).

The first ecosystem initiative completed by the Council prohibited currently unmanaged forage fish, to protect the forage base. The second ecosystem initiative reviewed the

indicators reported on in the annual Ecosystem Status Report, an educational tool to help people understand the California Current Ecosystem and create an annual story, to tailor them more closely to the needs of the Council. The third initiative—the Climate and Communities Initiative—is intended to examine potential long-term effects of climate on fish stocks and fisheries by exploring ways to improve flexibility and responsiveness to the climate changes we are experiencing.

This workshop should address strategies for improving the flexibility and responsiveness of our management actions to near-term climate shifts and long-term climate change while increasing the resilience of our managed stocks and fisheries to those changes.

Chris Harvey, *NOAA Northwest Fisheries Science Center*
California Current Integrated Ecosystem Assessment (IEA) and Science Center Webinar Series

The integrated ecosystem assessments (IEA) is provided to the Council annually, with the goal of establishing a framework for developing integrated science support in partnership with end users. There are seven major types of components—focal ecosystem components, habitats, climate and oceanographic drivers and pressures, human activities, human wellbeing, local social systems, and social drivers. The process includes establishment of targets, metrics that reflect the status and trends of targets, quantifying the uncertainty and the risk in achieving the goals and targets, and then simulating and comparing strategies to implement, defining tradeoffs, and providing science support to management. Indicators, targets, and risks have been developed for the Council—this workshop is intended to help achieve other elements of the IEA. California Current IEA scientists are working on all components of the ecosystem. Enhanced communication and coordination with management and stakeholder partners is needed to inform management-relevant and management-ready science.

In support of the Climate and Communities Initiative, IEA scientists and colleagues described the state of science of climate change effects on the California Current ecosystem via four webinars:

- **Webinar #1:** *What is expected to happen in the California Current under climate change*—Temperature and droughts will increase; primary production, dissolved oxygen, and pH are likely to decrease; upwelling is expected to increase slightly in the north, and decrease strongly in south; climate stress tests (such as El Niño/blob) are more likely in the future because climate change is pushing us into thresholds and unknown territory that will lead to changes in species distribution and salmon fishery disasters. Caveats—it may

take several decades for climate change signals to distinguish from interannual, interdecadal variability.

- **Webinar #2:** *The state of the art for ecological forecasting at short, medium and long-term time frames*—Forecasts can be tailored to specific Council needs and should include rigorous skill assessment and estimation of uncertainty. These include seasonal forecasts (6–9 months) of oceanographic conditions (e.g., temperature, dissolved oxygen) and species distributions; and long-term (up to ~50-year) forecasts of climate scenarios, ocean acidification, food web dynamics and potential fishery dynamics and economic impacts in different ports. A key gap is models that forecast 1–20 years with skill.

- **Webinar #3:** *Distributional changes of West Coast species and impacts of climate change on species and species groups*—Fall Chinook salmon stocks are expected to shift north in warm years, but the shifts are modest and there are many exceptions. Spatial models that include habitat effects indicate groundfish distribution is mostly static or shifting north, ranges of some rockfish are contracting, and this changes accessibility to ports. Large pelagic species distribution correlates with temperature and chlorophyll a; this can be mapped and projected forward. Caveat—future effects will be a function not just of climate and oceanography, but also surviving in that habitat.

- **Webinar #4:** *Modeling changes in fishery participation and economic impacts in response to climate variation and climate change*—NOAA scientists are studying links between environmental change, species dynamics, social motivation and fisher behavior, and how this linked system responds to environmental or economic shocks. Connections to broader coastal/regional economies can be tracked with economic input/output models.

Michelle McClure, *NWFSC*
NMFS Western Regional Action Plan and Climate Vulnerability Assessment

The NOAA Fisheries Climate Science Strategy (Strategy) is the federal approach to increase the collection and use of climate-related information needed to meet fishery management needs. From the strategy, the Western Regional Action Plan (WRAP)was born. The WPAP, with a 3-5 year lifespan, identifies current and future priority needs and specific actions, such as a coordinated climate program that builds on the existing IEA work by sustaining scientific expertise, coordinating and optimizing survey and observation efforts, conducting Management Strategy Evaluations, and disseminating information, that will implement the Strategy on the West Coast.

The Climate Vulnerability Assessment (CVA) is a key analysis included in the WRAP. The CVA assesses the vulnerability of fish species to a changing climate to provide relative vulnerability rankings, identify key attributes/factors and life stages driving vulnerability, identify key data gaps or information needs, provide input to management options at the regional and Council level, and contribute to life cycle modeling efforts. Vulnerability is a combination of exposure, sensitivity, and whether response (adaptive capacity) can reduce impacts. To assess stock vulnerability, scientists have compiled information on exposure (e.g., sea surface temperature, sea surface salinity) and sensitivity (e.g., prey specificity, acidification) and asked experts to score exposure and sensitivity for each of the factors.

A range of vulnerability occurred across the 80-species analyzed. Analysis showed that salmon (e.g., Chinook and coho), green sturgeon, and yelloweye rockfish were the most vulnerable to impacts from changing ocean conditions. Demersal species, such as rockfish tended to be more vulnerable, while mobile and highly migratory species tended to be less vulnerable, as they have a greater likelihood of changing location in response to climate change.

Kristin Marshall, *NWFSC*
Incorporating Climate and Ecosystem Information in Stock Assessments and Management Strategy Evaluation

There are multiple on-ramps for climate and ecosystem information in stock assessments and management strategy evaluations. Existing examples and on-going research demonstrate diverse tools and approaches. More isn't always better; prioritization is needed.

Climate and ecosystem information can inform tactical management and strategic planning—tactical management cycles (short to longer term). Assessments happen short term versus management strategies on a longer time frame.

Using Climate and Ecosystem Information in Stock Assessments—Bycatch target, bycatch other, habitat, climate, diet, predation, and competition are pieces of information used in U.S. stock assessments—there is quite a bit of information on the ecosystem side (quantitative). A total of 14% of these assessments included climate information, such as catchability factors (temperature dependent), catch (temperature-dependent assignment), productivity/recruitment (environmental indicators), and growth. Lessons learned:

- Progress has been made including climate and ecosystem information in US stock assessments

- More isn't always better, multiple pathways exist

- Inclusion may be influenced by life-history, overfishing, data availability, and other factors

- Potential extension: develop guidelines for prioritizing use of system-level considerations

Management Strategy Evaluation (MSE) is a good practice that improves decision making, tests the robustness of a current management strategy to current and future uncertainty and alternative hypotheses about the fishery system, and develops and screen alternative strategies. MSE is a highly engaged, stakeholder-driven process.

Dan Holland, *NWFSC – Human Dimensions*
Human Dimensions of Ecosystem-based Fisheries Management and Climate Change

Along the West Coast, fisheries revenue and relative shares change through time primarily because of fish productivity and prices. Many key species have variable productivity (landings). Most fishers rely on the ability to fish a suite of fish species throughout the year (portfolios). Resilience is increased in communities that have a diverse portfolio of fisheries, though diversification has been declining since the early 1990s, driven by limited access to fisheries and the higher cost of involvement in multiple fisheries. In 2016, 50 percent of fishers earned less than $50,000 in gross revenue. Some fishing households are doing well, however, most that are doing well, rely on other sources of income.

We are working to provide information for planning (how will the ecosystem change and when, and how are markets changing?); facilitate planning by individuals and communities; and enable adaptation—support resilience without strangling adaptation; explore alternative access regimes; consider alternative industry structures (West Coast is dominated by owner-operator structure versus cooperatives); facilitate diversification strategies. The missing link is assessing what happens off the water—we understand how the natural system works, and we have some understanding of what happens in communities, but we don't have a strong understanding of what drives investment decisions, how it affects what is caught and landed, and what drives the locations of processing plants.

Session Discussion

Workshop attendees discussed the panel presentations as well as what they viewed as strengths of existing information foundational to the development of a climate change initiative, and how they envisioned climate-related information being integrated into management and decision making. Specific takeaways from the discussion are:

Council opportunities

- Develop ways for the Council to address key data gaps using strategic approaches, such as where future fisheries should be focused;
- Work cooperatively with fishers;
- Conduct scenario planning with communities;
- Align vulnerability assessments with species that need to be monitored more closely;
- Explore opportunities to transition to different organizational structures such as community-based cooperatives as the fleet ages[1];
- Assess how much diversification is practiced by fishers (e.g., not just in terms of fish harvested, but activities such as ecotours); and
- Explore the potential for enhanced adaptability (e.g., we may see more production as well as shifts in the timing and geography of fisheries).
- Reduce maximum sustainable yields to create a buffer to improve resilience and enhance flexibility,.

Vulnerability assessments

- Across the suite of reasonable exposure and biological sensitivity factors, a suite of species seems to be more vulnerable than others. Every species is exposed to ocean acidification, but we don't know how it will affect each species. Nearshore communities could be more impacted by climate change.

- There are 6,000 square miles of federally designated wilderness areas in Idaho, which contain high elevation spawning and rearing habitat, a sanctuary for salmon. Protecting cold water refugia and habitats critical for life stages of some species will enhance resilience to climate change stressors.

[1] The fleet is aging (median age is higher than 60), yet there are few replacements; as fishers age, they don't fish as much, but retain their permit (which becomes part of their retirement portfolio). A young fisher doesn't have the resources to buy into multi-million-dollar fisheries. In the south, there is an interest in individual marketing, which omits the processing sector portion of the industry. An opportunity exists to transition to a different organizational structure, such as community-based cooperatives, as the fleet ages.

IV. Breakout #1–Impacts to Fisheries and Communities

Following the presentations described above, attendees explored the potential direct and indirect impacts of climate change to Council-managed fisheries and communities by convening in three separate breakout sessions, and then sharing the results of their discussions. There were a few pre-planned questions (below) developed to initiate the discussion and then talks continued in an open format.

- How do you anticipate that climate and ecosystem variability and change could impact the Council's managed fisheries, fishery participants, and communities?
- What management tools and strategies are used in each fishery or example? To what extent do you feel they are robust or responsive to change? What attributes make fisheries more or less resilient to change?
- How might climate change increase or change interactions and intersections with other species and fisheries (e.g., state managed fisheries, bycatch, effort shifts, protected species interactions, emerging fisheries)?

Overall themes of discussions were focused on Council process, impediments to policy/regulatory change, opportunities, and access to fish. Participants identified the following impacts to species, habitats, fishery management, and community/fisher behavior:

Species—Changes to fish stock abundance and distribution, changes to community structure for indefinite periods of time, alterations of fish migratory routes and timing (which could inform treaty changes), distribution and feeding behavior of fish, and absence of forage fish.

Habitats—Increased numbers and intensity of harmful algal blooms (pH declines, ocean temperature increase, harmful algal blooms increase), and loss of habitats (e.g., kelp).

Management—Increased risk and uncertainty (which affects investment decisions), unintended consequences (example given: whales switched prey to anchovy, then domoic acid affected the delay of the crab opening, which resulted in increasing number of whale entanglements), shortened or closed fisheries, increasing interceptions in trawl bycatch, changes in the fishery itself[2], response to the precautionary approach to uncertainty (which doesn't encourage risk), uncertainty of the ability of some climate change indicator signals (e.g., sea surface height for sablefish recruitment) to be picked

[2] Examples given included the ability of larger boats to fish further offshore; the ability of some boats to process their fish at sea, which allows them to stay at sea longer; and an enhanced focus on other fish species because of the limited offshore access.

up via stock assessments (and a mismatch in surveys and species distribution), changes to and closures of fishing seasons (noting the only way to control is to manage the fishery, especially when drivers, such as drought in California, are outside of the jurisdiction), the ability to access abundant stocks in locations where weak stocks exist, such as fishing below the minimum escapement level (e.g., Klamath), forecasting a few years in advance (which is possible when the exploitation rate on a certain age fish is determined, and the response is a restructuring of a season that would result in an expected number of an age class available for harvest the following year), recognizing the tradeoffs that exist when adaptation occurs, e.g., further north, fishers are taking advantage of the distribution shifts, but communities that harvested those fish as part of their portfolio are impacted, the need to maintain port infrastructure to respond to changes in fisheries (e.g., Oregon ports don't have the ability to offload squid), the effects of limited entry (which is dependent on the species, e.g., it is more difficult for an albacore fisher to switch to another species than it is for a salmon fisher)[3], introduced variability and its effects on the current harvest control rule, the need to reassess assumptions[4], lack of in-season assessment tools, spotty fishery openings and closures, transboundary impacts (e.g., hake, groundfish, sardine and distances fishers must travel).

Community/fisher behavior—Loss of faith in the management system by fishers, trawl permit fishers using pots and longline harvest larger fish (affecting future abundance)[5], reluctance to invest in ephemeral fisheries because of the inability of the management system to respond in a timely manner, loss of institutional knowledge as fewer people enter fisheries, increased barriers to new entrants, and consolidation of fleets.

Specific takeaways from the discussion include:

Communication

- Openly discuss climate change impacts on fisheries to inform national level policies.
- Use the ability of individual Council members to independently provide information, if asked by Congress.
- Use existing communication avenues with fishers to inform them of the tools available, e.g., harmful algal bloom models.

[3] And even if people gear switch, having a broad portfolio is needed to make ends meet.

[4] If the reference points that control catch limit no longer have the same meaning with changing environmental conditions, it would suggest stock is not at expected levels.

[5] Gear and vessel type affects impacts of climate change – and permitting regimes. Some vessels better allow for the ability to participate in multiple fisheries with the same vessel, e.g., Dungeness, groundfish, salmon.

- Disaster declarations—Encourage states to obtain disaster relief associated with harmful algal blooms.
- Advocate for reduced carbon footprint.
- Better communicate the management process, explaining factors influencing predictions.

Partnerships

- Work with fishermen along the coast to distribute the pain and the benefits equitably.
- Better define roles and expectations of levels of Council structure and NOAA science and regional offices.
- Coordinate and frame the issues of access and flexibility to support fisher diversification.
- Engage with fishers to develop scientific information needed to fish unexploited stocks.
- Support greater innovation and partnerships and how to obtain resources to fill gaps.
- Work in collaboration with state-fishery managers.
- Use subpanels and management teams as think tanks to identify threats and provide feedback.

Science and Information

- Account for uncertainty about distribution, abundance and through time, species persistence.
- Obtain contemporary information on baseline, which is in flux constantly, not flatline (some existing baseline dates back to the 1970s and 1980s). Develop a few case studies where we estimate significant change that requires flexibility and adaptation and will require us to adapt—framework adaptive decisions based on scenario.
- Assess community resilience to ensure Council decisions do not have a negative compounding effect.
- Foster nimbleness, using real-time information to base the development of fishery specifications – or use more intensive management systems that monitor and manage what is happening and can inform allocations.
- Consider informal data in stock assessments.
- Determine what is needed to install new processing facilities, including permits, zero waste fishery consideration.
- Address the dichotomy of the need for information, which is increasing, while funding for obtaining information is decreasing.
- Assess how to use systems-level thinking to fulfill needs.

- Review objectives to ensure they are strong quantifiable statements and then prioritize which are most important, which will drive the science support needed.

Management approaches

- Move faster to implement pop-up experimental fisheries (e.g., market squid, use of Exempted Fishing Permit\ \
- . Use institutional creativity to establish a framework that has sideboards and would allow a variety of activities, including access to pop-up fisheries.
- Lessen the spottiness of fishery openings and closures by better coordinating among the states and tribes.
- Think about distribution and abundance. Abundance may be constant, but distribution is shifting, or both abundance and distribution may be changing. Range shift (constant overall abundance) versus range expansion (greater overall abundance) leads to different management solutions.
- Strategize ways to address the reduced flexibility that limited entry fisheries cause (e.g., permit banks attached to communities or ports, with reduced transferability, assess the dynamic between state and federal permit systems, more diverse fishers are less likely to leave fishing)
- Increase monitoring to inform adaptive management, enlisting fishers in the collection of the information (e.g., temperature and salinity sensors on East Coast lobster pots)
- Develop consistent protocols for monitoring and management of crab—impacts to market (monitoring needs to be responsive to human health and the market)
- Continue to seek to understand equity and distribution impacts within and across sectors.
- Describe regimes that can achieve sustainability and economic viability and provide flexibility.
- Consider a climate change insurance plan (community or fishery level insurance, similar to crop insurance).
- Review layers of regulations and seek to streamline, articulating objectives for newer, more flexible regulations.
- Consider Ecosystem Optimum Yield versus optimum yield for a cxcsingle species.
- Recognize how access to fisheries can alleviate or exacerbate community impacts.
- Implement scenario planning to respond more rapidly to a set of conditions.
- Assess how species are going to rearrange themselves along the coast, and impediments to communities adapting to that distribution to enhance community resilience.

Attendees were asked if climate change presents the Council with a fundamentally different challenge, or one additional change that requires a response. Participants agreed that we are on a trajectory toward something different that requires a fundamentally different framework for decision making. Fortunately, there are other places where lessons learned can be extracted, such as the Bering Sea crab industry, which collapsed, then adapted. The Council can identify the upper level of constraints that might be in place for populations; e.g., urbanization alone creates an upper limit for recovery—then consider that constraint to better defining the upper ceiling.

V. Community and Tribal Foundations

The objective of this portion of the agenda was to frame the community and tribal context for workshop discussions and reflect on the importance of considering communities in relation to the impacts of climate change on Council-managed fisheries.

Presentations

Melissa Poe, *Washington Sea Grant*
Leila Sievanen, *California Ocean Science Trust*
Fishing Communities 101

Fishing communities are fluid and heterogeneous—The concept of community connotes familiarity, place, and connection. Community is place-based. Magnuson-Stevens (NS8 – Communities Standard) states a fishing community is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs. Their members reside in a specific location and share a common dependency on commercial, recreational, or substance fishing. Fishing communities are both tied to place and to practice (target species, gear types); cultural identity (African American oysterman from the Gulf Coast, Vietnamese fishers, Portuguese families of New Bedford – cultural, ethnic, or racial identity); tribes (uniquely historic and place-based consideration – also comanagers with decision making authority). All of these communities are part of other non-fishing communities.

Fishing is important to communities for many reasons—Livelihoods and economic security, food security and food practices, cultural identity, social relationships, recreation and connection to ocean, health, self-determination—human wellbeing.

Communities are unevenly impacted by climate change—There is an intersection between climate-driven species vulnerability with socioeconomic vulnerability. Social indicators can help identify "climate equity hotspots" (communities most at risk). Hotspots direct attention, assistance and relief accordingly.

The ability of communities to adapt to climate change is at a variety of scales—In the California Current, adaptation is shaped and constrained by regulatory, economic, social and ecological factors. Diversification has been a key adaptation strategy to weather the vicissitudes of fisheries. Increasing regulatory inflexibility coupled with limited access and cost to engaging in new fisheries reduces the potential for diversification and thus adaptability.

Ecosystem-based fishery management allows us to think/study/account for human dimensions of fishing and ecosystems in more dynamic ways (scales, processes, interactions, connectivity, feedbacks, bio-cultural systems,). The ecosystem approach contrasts with a production-function approach of single species sectors (where marine systems are sources of economic-production/harvest for MSY and such that fishing is an impact on ecosystems). Opportunities exist to reposition communities as more than just sites of 'social impact' but rather as determinants of both fisheries dynamics and management options.

Mike Chang, *Makah Tribe*
Climate Change and Health Impacts for Tribal Communities

The Makah Tribe are based in Neah Bay, Washington. Via the 1955 Treaty of Neah Bay, they ceded 300,000 acres of land to the United States and reserved the rights to hunt, fish, gather, seal, and whale within usual and accustomed areas, maintaining co-management of resources. They are place based and place bound.

An internal climate change working group developed a set of lessons learned from climate change assessments, including: many are dense and highly technical—written by scientists for scientists; there is a lack of traditional and cultural knowledge expressed; and there is a lack of planning relevancy—how can vulnerability assessments be implemented across sectors and for multiple species?

The Makah Tribe conducted a survey and convening with tribal members to help identify community concerns, learn about community understanding of climate change, understand the level of support for climate planning efforts, and explore the challenges natural resource managers face when attempting to incorporate climate change planning into their own work. The results of the survey (140 respondents or 10% of the tribe) demonstrated climate change has already impacted and will continue to impact Makah

people's livelihoods and jobs—68% of survey respondents said they were observing climate change impacts (ocean acidification and warmer ocean temperatures were significant concerns). Fishing employs 80% of community on-reservation members. Climate change will impact Makah members and their families' ability to respond to extreme events—6–8 power outages (power is out for hours to days) per winter due to severe storm events, causing concerns for the elderly. Climate change will impact Makah cultural practice and affect people's identity and wellbeing—phenological changes are impacting subsistence harvest and seasons; impacts to fisheries will directly impact all other resources (natural and cultural); there are connections between ocean acidification and berry harvests; changing ocean conditions directly impact "being a coastal native." Some of these resources are irreplaceable for tribal communities (i.e., diversifications is not a means of resilience because the resources in question are unique due to their cultural importance).

Chris Harvey, *NWFSC*
Social and Economic Considerations in the IEA

Each March, the California Current IEA team delivers their annual ecosystem status report, which includes a human dimensions portion focused on fishing and non-fishing human activities. Indicators are reasonable proxies for social and economic conditions, but this portion of the report needs greater investment. Human activities related to fisheries, especially landings, are summarized by species, location, and state. Some non-fisheries marine activities, such as oil and gas activities and shipping, are tracked. Other activities of interest include freshwater use and basic measures related to National Standard 8 (e.g., total fishing or processing activity, infrastructure added because of climate change, etc.).

Human wellbeing—Fleet diversification is an indicator of wellbeing for coastal communities, however, it has been declining during the past several decades. Community social vulnerability is tracked using metrics that describe the vulnerability of a community due to poverty, low employment, education challenges, and other negative societal drivers. Caveats and considerations include information that is difficult to ground truth, dependence on census data, and difficulty discerning the useful spatial level at which to aggregate. Doing more requires resources, clear objectives and policies, and guidance on the most important social attributes.

Some possible ideas to consider for indicators: Mandates to National Standard 8; Information from survey work, such as what motivates people to fish, to help identify potential tradeoffs at the community level; identification of managed resources at greatest risk from climate change, including those valued most at the local, regional, or

coastal scales; other climate change effects with ramifications for coastal communities, e.g., sea level.

Session Discussion
Workshop attendees discussed the panel presentations as well as what they viewed as the impacts of climate change on communities. Specific takeaways from the discussion are:

- The Council could allocate small amounts of fish to increase the viability of a fisher portfolio, balancing the rights of those individuals that hold expensive permits. However, large boats traveling long distances leave a large carbon footprint; we want to encourage people to work small and do the right thing.

- How can the NW and SW Fisheries Science Centers be used to address climate change/community questions? Emerging research from the region is linking climate vulnerable species to climate vulnerable communities.

- Have the results of the vulnerability analysis been vetted with communities? It is intended to be part of the process. Ultimately communities are structured by human behavior that may not be captured by the assessment.

- Salmon troll fisheries are based on salmon abundance, which are linked to lingcod and halibut catch allowances. For every five salmon harvested, a fisher is allowed one halibut. Could trollers catch halibut if not fishing for salmon? That would better address the "community" approach to vulnerability.

- Tribes are important conservation partners. Some of the tribes receive funds from wetland mitigation banking, thus protecting the environment while securing valuable financial resources.

- Will dependence on commercial fisheries force a community into a higher vulnerability state? An approach to incorporate tribal community information is to incorporate the time component.

- We talk a lot about vulnerability, risk and sensitivity—disaster and risk reduction has not been mentioned.

Big session takeaways include:

- Indigenous livelihoods and economies are at risk (traditional subsistence economies – reliance on local natural resources for personal use, trade, barter, and

sharing) and commercial economies (fishing, timber, casinos, tourism, energy, and agriculture)

- Physical, mental, and indigenous values-based health are at risk—climate change is already impacting lands, waters, and species that tribes and indigenous peoples use for foods, ceremonies, historical and cultural sites and relationships; physical health disparities have direct linkages increased vulnerability to climate change impacts; health impacts are compounded by social, political and economic factors.

- Climate response actions include adaptation, disaster management, displacement, and community-led relocation. However, there remains many institutional barriers. Within the region, there are many different types of legal and recognition statuses for Tribes in Washington, Idaho, Oregon, and California, and many of these tribes and indigenous groups have to not only address climate impacts at the local scale, but also deal with issues of recognition, management status, and other barriers (such as water rights).

VI. Communities and Change: Research Highlights

Session presenters shared examples of the disciplines and methods of social science research to support Council consideration of communities relative to climate change.

Presentations

Arielle Levine, *San Diego State University*
Climate Impacts in the California Current: Exploring Fishermen's Vulnerability and Adaptive Capacity

Components of vulnerability include:

- Exposure—the degree, duration, and/or extent to which the system is subject to perturbation.

- Sensitivity—the degree to which a system is modified or affected by a disturbance or set of disturbances.

- Adaptive capacity—the ability of a system to adjust to disturbance, moderate damage, take advantage of opportunities, and cope with the consequences of the transformations that occur.

Adaptive capacity has two components—the capacity of a social-ecological system to absorb stresses and maintain function in the face of climate change; and adapt, reorganize, and change in ways that improve the sustainability of the system.

The goal of the project is to better understand how predicted changes in climate and ocean circulation will affect three key fisheries (squid, sardine and lobster), with a focus on sardine and lobster, both of which contribute significantly to the California economy.

Assessing the vulnerability and adaptive capacity of fishers is based on location, seasonal characteristics, reliance on other species or income sources, mobility, infrastructure, adaptive capacity, and perceptions and potential outcomes of management alternatives.

There are different social and ecological characteristics of each fishery. Squid catch shifts north during warmer El Niño events and shifts south in cooler conditions. Squid spawn in cooler waters, have a wide geographic range, and the fishery is characterized by large, mobile vessels. The northern limit for lobster is Pt. Conception. Lobsters are more active and achieve faster growth rates in warmer waters. Boats are typically smaller and less mobile, it is a highly territorial fishery, with no big shift difference.

Information is being gathered from fishers, with planned follow-up focal groups to assess reliance on fishing and species fished, current fishing locations, patterns they have seen and adaptations to past short-term climate variations, changes in reliance and participation in the fishery, spatial flexibility and limitations to mobility, what they would they do if the fishery was no longer viable, obstacles to adaptation, and perceptions of management measures for the fishery.

Melissa Poe, *Washington Sea Grant*
Ocean Acidification Impacts to Coastal Communities

The goal of ongoing projects is to better understand climate driven ocean changes for community wellbeing and vulnerability.

Olympic Coast as a Sentinel is an integrated social-ecological regional vulnerability assessment of ocean acidification, focused on determining the social importance of key ocean acidification-sensitive species and the role they play in community wellbeing, synthesizing existing socioeconomic data for factors that affect vulnerability and the ability to cope, assessing the social vulnerability to ocean acidification through workshop-based sensitivity analyses, and identifying community-driven strategies for responding to threats and increasing adaptive capacity.

Some of the indicators include physical health, cultural use and practice, community connections, balance/resilience, natural resources security, education, self-determination. Some decline to a greater degree than others – physical health and cultural use and practice were equally highly vulnerable, followed closely by community connections.

Dan Holland, *NWFSC*
The Dynamics of Adaptation to Climate Driven Variability

The objectives are to understand how environmental vulnerability travels through and is dampened and amplified by linked social and ecological processes in fisheries systems on the U.S. West Coast; to explore how more integrated management of fisheries can be used to increase resilience and human benefits derived from West Coast commercial fisheries; and to engage a disparate part of the fishery management community.

Big picture questions focus on biological fluctuation interactions with management, assessing how adaptations respond to system variability and robustness, understanding system dynamics to anticipate and mitigate climate change effects, and how effects across fisheries enable formation of robust fishery portfolios.

There are four themes: Linking environmental variability to marine species' recruitment and distribution; Psychological and social benefits and drivers of fishery participation and wellbeing; Linking stock status, regulation, and social motivations to fisher behavior; and Model Integration.

As part of the 2nd theme, which is focused on understanding factors other than fishery profitability that drive participation decisions of individual fishers, a mail survey of 2,800 vessel owners active in West Coast commercial fisheries produced a 50 percent response rate.

The next steps in the process include analyzing time series data on fish stock productivity with climate and ocean conditions and determining why some fish stocks' productivity varies synchronously or asynchronously.

Session Discussion

- Are there more stress-related illnesses in depressed fishing communities? For the Washington State marine spatial plan development process, they looked at wellbeing indicators, but that process is not communicating with the Council process.

- Some communities are assessing what they can do themselves, e.g., Monterey Bay Fisheries Trust [MBFT]). Four of these trusts have been established in California. A community sustainability plan was developed by the MBFT; extending it beyond the groundfish fishery and could be a model to replicate.

- Understanding the distribution of stocks through time, and the ability to both identify and ground truth social indicators could inform modeling efforts.

VII. Breakout Group #2 – Intersection of Climate and Communities

Attendees discussed the relationship between climate and communities, and the reasons for considering climate and communities as part of a linked initiative.

Linking climate to communities is an opportunity to preserve fishing conditions and culture, allowing a holistic versus solely economic assessment, assessing the increased frequency and intensity of climate impacts, not only in fisheries, but also in the community as the whole. Current tools are not adequate to plan for climate change—we need more tools to manage the changes in our environment to have fisheries and sustainable resources. Focusing on communities is a paradigm shift for the Council—we don't simply want to shift the focus from fishing to another water use. By engaging communities, we develop a partnership with communities that builds trust that generates accurate information.

- **Understand what is at stake**—What is at stake depends on how drastically and quickly our situation will change. Small changes can make big impacts on our small coastal communities.

- **Build trust and interaction with communities**—Trust can be built through a variety of programs and actions—port liaison program (NMFS had a program working with and communicating with individuals in communities to do projects); Sea Grant has developed effective tools; social scientists and academic researchers can fill gaps in NMFS (boundary organizations links researchers and management organizations, e.g., California Ocean Science Trust and graduate programs that shape their questions to answer Council questions); create a community working group to be part of the FEP process; hire social science skills as Council staff and dedicate a staff member as a social science expert; use existing forums and organizations, e.g., Western Groundfish Conference, Tuna Forum, American Fisheries Society, to share information and science, focus on a topic area and produce a research recommendation to the council.

- **Support Adaptation**—Fishers have difficulty obtaining expensive permits. Maybe portfolios of permits should be offered instead of individual permits—allocate them in a way that is more strategic or complements another fishery. How can we think about making these portfolios more adaptive and resilient and correspondingly structure management?

- **Define Community**—Consumers of fish products should be considered part of a fishing community. Is community census-based, or is it everyone that fishes? There are many decades of social science deliberations to determine "community." We have a challenge in the Pacific region defining community. We belong to so many (community of practice, place-based, social). The fluid sense of community makes it difficult to study communities. What is the scale of data we are applying to community and how are we associating it to datasets, such as Pacific Fisheries Information Network (PacFIN)? Where people land their fish isn't necessarily the place where they live, therefore, the link to fishing dependence on ports is, to a degree, unknown. We have to make inferences. "Three governs all" is one approach that is used—there are three vessels and three buyers; lump them together. There needs to be some way to mash aspects into a weighting system to assess the intensity of the impact to communities, i.e., a multi-variate approach, which would indicate issue priorities. Then use the information in the management structure. Across the United States, we are observing reductions in resource-based livelihoods in fleets, farms, and ranches—where is our food going to come from? Climate-related ocean challenges are important.

- **Advance understanding of vulnerability assessments**—Request that the NW and SW Science Centers (as part of the IEA) conduct an inventory of existing vulnerability assessments (Coastal Zone Management agencies understand where this work is occurring). Explore how to monitor the adaptability of communities and how the Council's work would enhance or disrupt that work. Define elements of existing adaptation plans as well as future needs.

Participants developed a number of items that could be included in the Climate and Communities Initiative. The following list, combined with the results of the final breakout session, provide a suite of work that the Council could pick and choose from to develop a full initiative.

- **Facilitate Group Coordination and Co-management**—Provide the flexibility for communities to purchase shares and manage based on their needs. Consider the transfer of state permits by vessel and individuals—to allow a different type of organization to exist. Develop policies that facilitate group coordination. Insert "**community group**" into the legal framework. Poundage

on the table could be directed to helping new entrants and could be community focused; it is a tool that is available, and we have the process.

Provide more flexibility for diversification:
  - Frame the discussion by mapping the tools and opportunities
  - Enhance the intersection between science and communities
  - Establish a focused group to help inform this issue and make recommendations

- **Assess Permit Constraints**—Identify existing federal and state permits and the constraints on both. What are the license structures outside of the Council that fishers are moving into? You can't limit it to what the Council has authorities to manage.

- **Increase Opportunities for Open Access**—Retain entry-level open access fisheries (limited entry), and possibly convert halibut into individual quota instead of the current derby fishery. Entry-level permits have no cost, and capital output for the gear is nominal. Fishers in these fisheries may not make a lot of money, but it's a good entry point. Opportunities for open access need to increase. The consequences of access being driven by market include lost opportunity. Open a fishery to little used species that may not have been profitable 5–10 years ago. A small group of fishers could participate, and the fishery could be capped at a lower rate.

- **Facilitate Succession Planning to Foster Intergenerational Equity**—How do we solidify the baby boomer hold on the fishery without harming the retirement nest egg of people that have been participating? In some places, traditional dependence on a fishery has been lost, causing a shift in community. How do decisions enable small-scale or diverse fisheries participation so that we're able to maintain fishing-based livelihoods for a lot of people, not just the most affluent?
  - The gig economy is driven by people self-employed across multiple jobs. There is a massive accumulation of debt among millennials, who won't be buying farms, boats, etc. The new economy will look very different from the one we have now because of the loss of the middle class. Who will be controlling the permits? Corporations? Will someone else own the share, resulting in a fisher receiving a smaller percentage of the take? It's the loss of much more than the monetary value. If corporations are the only ones that can purchase the fishing permits, then we are protecting the retirement nest egg at the risk of losing an emerging generation of fishers

- **Seek standardization across state and federal entities**—Could the Council describe their concept of Community Association, or could the state assess the potential for privatization?

- **Define community (but don't be restrictive)**—Consider tiers of priority similar to the Community-Based Subsistence Fishing Area in Hawaii. Be inclusive in defining community to incorporate fishers, buyers, consumers, and others. As climate change occurs, new fish will enter the fishery and the Council can facilitate development of products. Define communities in ways that don't build silos. Define a vision and objective with respect to communities—what other types of information do you want to inform community discussions? Let fishers be innovative and reward efficiency. Try not to maintain communities for the sake of maintaining them. Let communities change naturally to become more efficient – little niche fisheries. Understand the effect of Council decisions on all types of communities. Think of tools in terms of how they help communities.

- **Better define the Council role relative to community**—Determine the level of engagement in the Council process that scientists should be looking for (subpanels, management teams, council floor), then define the process, deadlines, and expected interactions. Understand what the Magnuson-Stevens Act informs relative to Council obligations—it may mean enhancement for some human populations and not for others. The Council can better understand the human interactions and how changes in one fishery impact another. Solicit members from other fishery management plan teams to participate in the ecosystem working group. Add social scientists, community experts, climate experts, and Sea Grant staff.

- **Enhance engagement with communities**—Establish a Council-funded Speakers Bureau (to provide travel support) that allows community members to receive presentations they are interested in. Establish travel grants to allow community members to participate in Council efforts to engage community members early and throughout processes. Promote Marine Resource Education Events: educates people about council processes and decision making without an agenda at the meeting. Connect managers and fishers. Reach out to other community leaders. Build on existing community discussions (e.g., conversations already underway with communities linked to salmon).

- **Engage on the carbon dioxide emissions issue**—Encourage fuel efficiency with fishing vessels by establishing a program and incentives to help pay for

more efficient engines and move away from the use of fossil fuels. Develop a council webpage that addresses the topic, incentives, and other work (e.g., sea grass protection that the Council commented on).

VIII. Breakout session #3 — Focusing the Initiative

Attendees were asked to reflect on workshop discussions and discuss the questions, issues, and information needs that could be addressed through this initiative.

Themes that were shared from previous discussions at the workshop included:

- Flexibility (for individuals and communities)
- Partnership
- Communication
- Risk and uncertainty
- Identifying constraints and bottlenecks that cause things to be slow to respond
- Data needs (monitoring and cooperative research)
- Integration and use of climate information
- Port and shoreside access
- Stability and continuity for the fishery
- New entrants
- Defining community
- Defining goals (for this initiative)
- Overlap and interaction between state and federal management systems
- Adaptation
- Maintaining access
- Links across fisheries ("economic keystones")
- Taking advantage of new opportunities (pop up fisheries, creating new markets)
- Baseline is changing

Discussions in this session incorporated the information learned in the workshop presentations and all previous discussions, and homed in on what the Council could accomplish in the Climate and Communities Initiative. The following bullets provide a list from which the Council could select from in determining the work to be conducted in the initiative.

- **Frame some objectives for the initiative** to create a foundation to move the action items along for Council to make progress. Think about ecosystem-level goals and objectives and indicators inclusive of the socioeconomic issues.. At the same time, maintain the current Council functions.

- **Refine ecosystem-level community goals and objectives** that are measurable and trackable, and do so through a climate lens.

- **Institutionalize the importance of climate change** by engaging communities that are not physically present at Council forums. Climate change should not be an episodic conversation; it should become engrained in all aspects of Council business. Provide climate information as handouts at Council meetings. Better connect Council priorities and science centers

- **Define the highest priority research and information needs through a climate change lens** by asking the advisory bodies what they need to know (from a community perspective as well as science). Have the advisory bodies assimilated current work to know how they are going to use it. Use a portion of allocation to fund research to address priority questions. Assess how cumulative effects and non-management actions can influence prioritization. Be open to ecosystem and cooperative research—different types of science, not just more science. Expand input, add timelines, and cross-link document with fishery management plans. Incorporate traditional ecological knowledge and social sciences.

- **Identify key indicators and data needs through a climate lens**—Ensure the indicators are relevant and broadly available to the fishing community. Indicators span a wide range of topics; how you integrate them is important.

- **Address priority regulatory impediments**—Identify existing regulatory impediments that prevent shifting and adapting to climate change. What changes to regulations can occur to reduce rigidity, enhance adaptability and flexibility, and be more efficient, providing less regulatory burden? Assess the tools we have and determine if we have the tools to achieve the goals. Map out the permitting/licensing impediments – and how to address that.

- **Conduct a retrospective** of how the Council dealt with past issues and how it could deal with future issues.

- **Look forward to increase flexibility**—Make the regulatory path to access new fisheries easier – flexibility to change permits from one species to another. What are the more resilient portfolios? What are the impediments to getting resilient portfolios? Management is getting more complex. There is a need to think about what is adequate managing species going forward. Can we achieve regulatory relief without managing every last fish? Is that feasible and doable? Simplification has a tradeoff. Instead of becoming more and more restrictive and more complex, simplify things

Assess regulatory mechanisms via scenario planning to identify impediments and respond to scenarios. Identify policy bottlenecks, constraints on flexibility, and potential changes. Have we consolidated access such that it is more difficult to access? How can we adapt it and make it flexible, perhaps by evaluating licensing and permitting issues? Assess all fisheries, not just council-managed fisheries. Provide for flexibility while ensuring management.

- **Use community set-asides to enable quick response**—Use these to address fishing for different stocks—not gear switching, but stock fishing. Use mechanisms as set aside for an emergency, e.g., allow sequential release of the sardine harvest, such that a portion of the harvest could be reserved for need, and is then released if it is not used. Establish mutually agreed upon criteria (tribal, research – ahead of time, so decision is made in advance).

- **Establish an open access portion of the quota**—In average years, quota would be allocated, but retain a portion in the case of proven climate impact (similar to the current sablefish fishery). Allow new permitted entrants into fisheries. Skiff fishing is a way people can enter. Initial low or no cost, and if they experience initial success, they may buy into more fisheries. Make it easier to transfer from the old system to a new system—make those permits easier to get.

- **Track species range shifts**—Establish a process to track and incorporate species range shifts and question assumptions.

- **Draft a resolution** about climate change indicators so that the public is aware changing in the ocean are expected.

The workshop concluded with remarks from Council members, Rich Lincoln and Dorothy Lowman. They summarized the broad themes they heard throughout the workshop, including the need for: metrics and indicators to assess the status of ecosystems; framing needs around vulnerability and life history; defining case studies that help inform tool development; diversification and connecting with communities to help them adapt using a portfolio approach; and assessing emerging fisheries; the role of the Council as a leadership voice for issues facing the ocean environment; considering opportunities to morph the Council's management structure to respond to climate change issues; developing SMART objectives can be informed by key indicators; considering how other Council initiatives connect to the Climate and Communities Initiative; regulatory actions in the pipeline that might have higher value given climate change considerations; modification and streamlining of the regulatory process to facilitate adaptive management; filling gaps in ecosystem working groups to ensure social science and climate change science is well represented.

IX. Appendices

Appendix A. Climate and Communities Initiative Workshop Attendance List

Pete Adams	Adams Fisheries Consulting
Bob Alverson	Groundfish Advisory Subpanel- Fixed Gear
Debbie Aseltine-Nielsen	California Department of Fish and Wildlife- Readying California Fisheries for Climate Change
Susan Ashcraft	California Fish and Game Commission
Rich Bell	The Nature Conservancy
Dr. Caren Braby	Pacific Fishery Management Council Member- Oregon Department of Fish and Wildlife
Kathleen Brennan-Hunter	The Nature Conservancy
Dr. Evelyn Brown	Scientific and Statistical Committee- Ecosystem Based Management Subcommittee
Linda Buell	Highly Migratory Species Advisory Subpanel- Oregon Charter
Merrick Burden	Environmental Defense Fund
Mike Burner	Deputy Director - Pacific Fishery Management Council
Gregg Casad	Exulans Consulting
Mike Chang	Makah- Climate Adaptation Specialist
Walter Chuck	Fisherman/Port of Newport Commissioner
Shaun Clements	Oregon State University
Mariel Combs	Oceana
Kit Dahl	Pacific Fishery Management Council Staff Officer: Highly Migratory Species, Ecosystem, NEPA
Lisa DeBruyckere	Creative Resource Strategies, LLC
Yvonne deReynier	Ecosystem Working Group- NOAA
Jessi Doerpinghaus	Washington Department of Fish and Wildlife – Groundfish Management Team member
Michael Drexler	Ocean Conservancy
Ben Enticknap	Oceana
Joshua Etherton	Quileute- Harvest Manager
Jeff Feldner	Fisherman
Laura Gephart	Columbia River Inter-Tribal Fish Commission
Eliza Ghitis	Northwest Indian Fisheries Commission
Kimberly Gordon	Fishery Leadership and Sustainability Forum
Marc Gorelnik	Pacific Fishery Management Council Member- California
Jennifer Hagen	Quileute- Marine Biologist
Leslie Hart	California Sea Grant
Chris Harvey	Northwest Fisheries Science Center- Conservation Biology Division
Brianna Haugen	Oregon State University
Richard Heap	Salmon Advisory Subpanel- Oregon Sport

Dr. Dan Holland	Scientific and Statistical Committee- Ecosystem Based Management Subcommittee
Kate Kauer	The Nature Conservancy
Erin Kincaid	Oceana
Gway Kirchner	The Nature Conservancy
Terrie Klinger	Ecosystem Advisory Subpanel- University of Washington
Catherine Latanich	Fishery Leadership and Sustainability Forum
Phillip Levin	The Nature Conservancy/University of Washington
Arielle Levine	San Diego State University
Rich Lincoln	Pacific Fishery Management Council Member- Washington
Dorothy Lowman	Pacific Fishery Management Council Member- Oregon
Heather Ludemann	David and Lucile Packard Foundation
Gilly Lyons	The Pew Charitable Trusts
Nate Mantua	Southwest Fisheries Science Center- Landscape Ecology Team
Kristin Marshall	Northwest Fisheries Science Center
Steve Marx	The Pew Charitable Trust
Lynn Mattes	Groundfish Management Team- Oregon Department of Fish and Wildlife
Ali VZ Mayeda	District Representative – Congresswoman Suzanna Bonamici
Michelle McClure	Ecosystem Working Group- NOAA
Scott McMullen	Ecosystem Advisory Subpanel
Jeff Miles	Groundfish Advisory Subpanel- Fixed Gear
Ann Mooney	Oregon Climate Change Research Institute Program Manager
Corey Niles	Pacific Fishery Management Council Member/Ecosystem Working Group- Washington Department of Fish and Wildlife
Jim Olson	Salmon Advisory Subpanel- Washington Troll
Davia Palmeri	Oregon Department of Fish and Wildlife
Diane Pleschner-Steele	Coastal Pelagic Species Advisory Subpanel
Melissa Poe	Lead Social Scientist – Washington Sea Grant & NW Fisheries Science Center
Heather Reed	Groundfish Management Team- Washington Department of Fish and Wildlife
Charlotte Regula-White	Oregon Department of Fish and Wildlife
Corey Ridings	Ecosystem Advisory Subpanel- Ocean Conservancy
Cyreis Schmitt	Ecosystem Working Group/Highly Migratory Species Management Team/Coastal Pelagic Species Management Team- Oregon Department of Fish and Wildlife
Dr. Richard Scully	Ecosystem Working Group- Idaho Department of Fish and Game
James Seger	Pacific Fishery Management Council
Leila Sievanen	California Ocean Science Trust
Bruce Steele	California Current Acidification Network
Nate Stone	Fury Group, Inc.
Chuck Tracy	Pacific Fishery Management Council- Executive Director
Dr. Theresa Tsou	Washington Department of Fish and Wildlife
Dan Waldeck	Groundfish Advisory Subpanel- At-Sea Whiting

Lorna Wargo	Coastal Pelagic Species Management Team- WA Dept. Fish and Wildlife
Deb Wilson-Vandenberg	Ecosystem Working Group- California Department Fish and Wildlife

Workshop report prepared by Creative Resource Strategies, LLC

Summary of a Scenario Planning Process

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The Nature Conservancy

OREGON

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Introduction

Developing strategies to deal with an uncertain future is essential for natural resource management. The future is more than just a continuation of past trends as it exhibits unexpected shocks and non-linearities that are both unexpected and unpredictable (Shell 2008, NPS 2013, Meinert 2014). Regardless of the future situation that occurs, expected or unexpected, decisions need to be made to ensure the long-term sustainability of natural resources. Scenario planning is a means to develop effective strategies and actions for a range of potentially plausible futures (Rowland et al. 2014).

The Nature Conservancy has put together this document to aid the Pacific Fishery Management Council (Council) in moving forward with scenario planning in the Climate and Communities Initiative. The goal is to provide an overview of scenario planning, based on the broadly accepted guidance contained in *Using Scenarios to Explore Climate Change: A Handbook for Practitioners* by the National Parks Service (NPS 2013) combined with other resources. An example of the application of that guidance in also included in this report. It is important to note that the example is not a recommendation of a way forward with scenario planning on the West Coast, but a demonstration of successful scenario planning, which is very informative to the planning of the current initiative. The components of any process should be tailored to the needs of the group conducting the planning.

What is Scenario Planning?

Scenario planning is an iterative process used across a range of disciplines to plan for the future. It first became prominent as a military planning tool during World War II and has been used extensively in the business and financial sectors, most notably by the oil giant Royal Dutch Shell (Schoemaker 1995). In recent decades, scenario planning has been applied to natural resource management and programs exist within the US Fish and Wildlife Service (Rowland et al. 2014), and the National Park Service (NPS 2013). The process is well suited to fisheries and has already been used in several fishery applications (Badjeck et al. 2010, Davies et al. 2015, Schumann 2018b).

Planning for an uncertain future can be quite challenging. When thinking about the future, fishery drivers (i.e., the aspects that shape the fisheries landscapes) can be divided into two groups; things that are known with some amount of certainty (e.g., death and taxes) and things that are very uncertain (e.g., climate change, politics, the economy) (Schoemaker 1995, Meinert 2014). Scenario planning presents a structured process to evaluate fisheries through the lens of those drivers, e.g. climate change, and explore our underlying assumptions, ideas and perceptions as well as the range of uncertainty concerning the information we have about the future (Meinert 2014).

Scenario planning is a process for explicitly acknowledging and working with that uncertainty (Shell 2008). It does not try and predict the future, but simply examines the range of potential futures to determine effective ways to make decisions despite uncertainty. By working through the scenarios, participants are forced to identify and critically examine their own assumptions about the future and analyze the main factors driving potential outcomes, their connections and feedback loops (Rowland et al. 2014). Each scenario represents an narrative about the future that is plausible. It is not a forecast, but simply a visualization of one possible future. The process reduces two of the major problems when

planning: tunnel vision – a view of the future that's too narrow - and over confidence – belief that a single envisioned future is the most likely (Schoemaker 1995).

Scenario planning is well suited to situations in which the level of uncertainty around key drivers of future conditions is larger in scale than the one's ability to adjust or predict. Scenario planning is a particularly useful tool when considering situations where significant and dramatic changes have occurred in the past and are likely to occur again, and when such changes can have serious consequences on the resource and livelihoods. It can also help when effective long-term strategic planning is difficult due to limited planning resources and/or multi-institution governance complexity. Additionally, scenario planning can provide a collaborative context for airing and reconciling divergent views on the best way forward to achieve a common purpose (Schoemaker 1995).

Guiding principles

When developing scenarios there are a few guiding principles:

- Utilize a **time horizon** that is long enough that it considers the large-scale uncertainties that will shape the future. It should be of sufficient length to move beyond the day-to-day operational decisions, but short enough that it is still relevant and actionable.
- A popular term in the scenario planning process is "**Outside-in thinking**". In general, the participants should first consider how forces outside the Council (e.g. climate change, politics, economy, society) will impact the resource and the management process and then how the Council will navigate those changes.
- Always include **a diverse group of stakeholders** with multiple perspectives. The wider the array of views, attitudes, perspectives and experiences of the participants, the more fully the scenarios will be informed.
- As with all planning processes, establish **clear goals** to ensure everyone is striving for the same end, such as, "management actions to take in the face of climate change."
- Scenario planning is a process that should be **tailored to suit the needs** of the group conducting the planning. Within the framework, there is no single correct way to do things; implement it in a way that achieves the goals (NPS 2013).

Guidance for Scenario Planning

In general, the amount of time needed to conduct scenario planning can vary greatly. Ideally, the process would take no more than one year to complete. It involves a core team of individuals to lead the process, and participants (the number of participants should be tailored to the specific needs) to develop, shape and examine the scenarios over the course of one to three workshops.

There are a number of standard steps in the scenario planning process. Here we outline the five step procedure followed by the National Park Service (NPS 2013):

1. Orientation,
2. Exploration,

3. Synthesis,
4. Application, and
5. Monitoring.

The outline provides a general summary of the National Parks Service approach, but also includes information from other resources to provide a broad overview.

1. Orientation

Orientation is about getting the framework, the information and the people up and running. One of the first steps for the Council, were you to follow this process, is to bring on an experienced scenario planning facilitator.

A core team should be assembled; a small group of people that will lead all phases of the process. Core team responsibilities include inviting participants, setting the schedule, conducting interviews, organizing and facilitating workshops, and drafting scenarios and reports. The core team begins by developing the orientation materials such as defining critical challenges, key deliverables and the audience for the work.

The group should develop a clear goal such as, 'Developing an implementable strategy for managing fisheries in the face of climate change' and a time horizon. The time horizon represents the number of years into the future the process will explore.

As part of orientation, the core team plans a series of workshops that will be executed in future steps (i.e., step #3 Synthesis and step #4 Application). This includes the type and number of workshops, the identification of steering committees (if needed) to help with specific workshop planning, dates and locations, goals and objectives of workshops, facilitators, presenters, note takers, and participants from a range of backgrounds.

During this phase, the core team conducts one-on-one interviews with fishery interests who will be the participants in the workshops (i.e., commercial and recreational fishers, tribes, processors, supply chain experts, tourism staff, fishery related businesses, economists, local politicians, port authority, lawyers, natural and social scientists, town, state and federal managers and non-governmental organizations). The interviews are conducted with broad, open ended questions (e.g. What are the largest uncertainties that could impact fishing and fisheries management over the time-horizon?). The goal is to obtain background material from a range of perspectives on some of the major factors (physical, social, political, technological, or economic) that cause uncertainty in fisheries and to get a sense of the variation in assumptions and beliefs that are held across the industry. The interview results may help to reshape the initial goal, identify critical challenges, and hone the time-horizon.

2. Exploration

During the exploration phase the core team with input from the participants, additional background material, and literature review, identifies major factors shaping the future and their degree of uncertainty.

In parallel, the core team works with climate and fisheries experts to put together climate change projections for the physical and biological variables on the West Coast. This could include using the IPCC carbon dioxide emission scenarios and global earth system models to project factors such as changes in water temperature, storm frequency and sea level rise. Down-scaled regional climate models and species distribution models can also be used to get a sense of the factors driving change, the range of physical changes that could occur and the uncertainty associated with the changes.

The results of the exploration phase should be a list of factors that drive the future from a range of different disciplines and perspectives. A pragmatic approach is needed to ensure important factors are included, possibly in broad terms, but the list is not so long as to be impractical.

Communications by the core team can help ensure stakeholders are informed of the process and help bring everyone up to speed so that the workshops in steps #3 and #4 can move efficiently.

3. Synthesis

The synthesis phase involves creating different scenarios based on the factors identified in phase 2. A workshop format is recommended to engage participants in discussion and dialogue.

The first step is to review the list of factors as a group, combining or eliminating as many as possible and potentially adding any missing ones. Participants then sort the factors into two groups: 1) Factors that are considered reasonably well known and/or likely to follow their current patterns into the future (e.g. population growth, age of fishing captains), and 2) Factors that are considered largely unknown (e.g. frequency of oceanographic events, seafood market dynamics). When selecting factors, there are no single correct answers and the process is a product of the particular group of people in the room. That is one of the reasons it is so important to have a diversity of people and opinions at the workshop.

The second step is developing the critical uncertainties, which form the basis for building the scenarios. This is done by ranking the unknown factors, or groups of factors, to determine the top two to five. It may be that a bundle of related factors becomes one of the critical uncertainties. It is important that the number of critical uncertainties is limited, that they are significantly different, and that they could impact the future within the specified time horizon.

Finally, the scenarios are built. There are a range of methods for building scenarios, we review two methods:

a) Matrix method

In the matrix method, small break out groups cross two of the critical uncertainties. It is best to select critical uncertainties from two different disciplines (e.g. an economic factor and an environmental factor as opposed to two environmental factors). As each critical uncertainty has two end members, crossing two critical uncertainties perpendicularly creates four quadrants and thus four potential scenarios. The break out group then reviews each quadrant, first determining if a scenario based on that quadrant is plausible (e.g. can sea level rise be maximum and port infrastructure be unaffected?) and then determining if a useful, compelling narrative could be developed. The goal is to find plausible scenarios that challenge participants, forcing

them to examine the main drivers in the system, the underlying causal relationships, considering the range of possible futures while focusing on the challenges that fisheries management might face. At this initial stage, the small groups create short bulleted lists about how the future might unfold in each of the different quadrants and then mix and match the different critical uncertainties, creating new matrices to develop abridged story lines for each quadrant. After working through several different crosses with different critical uncertainties, the small group should select their top two to four plausible scenarios that express the range of potential challenges in fisheries and fishery management in the face of climate change.

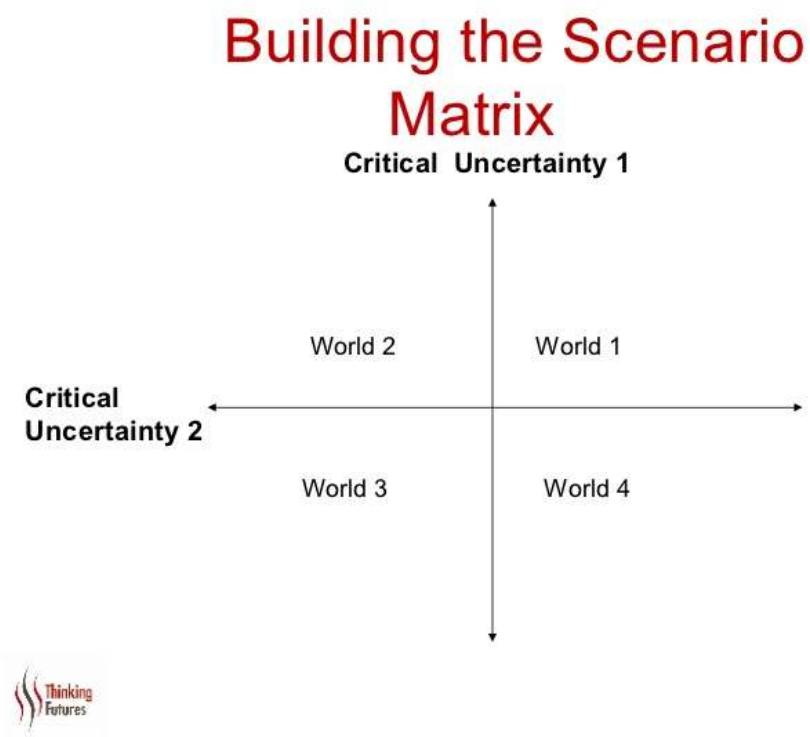

Figure 1. Schematic of a scenario matrix (from (Conway 2007)).

b) Incremental approach

The incremental approach begins with the same two to five critical uncertainties established by the participants. The critical uncertainties are written down on separate cards with one side of the card indicating one extreme value or lowest level of change for the critical uncertainty and the other side, the maximum level of change. In break out groups, the cards are laid down such that each critical uncertainty is at the lowest level of change. The small group determines if that combination of critical uncertainties is plausible and then puts together a bulleted narrative of what might occur in the future given those realities. The small group then turns over two or more cards and works through an abbreviated story line based on the new value of the critical uncertainty. The goal is the same as in the matrix method above to determine the major factors shaping the future, the different possible realities they could take, and how they could impact

fisheries. Again, the small group works through several different iterations and eventually selects the top two to four scenarios.

In both methods it is important to explore and document first order impacts for each scenario (e.g. if the warm blob persists for ten years then…). While scenarios that are implausible should be removed, unlikely scenarios should not necessarily be eliminated. Examination of low probability, unexpected scenarios can often reveal major insights.

After selecting the top scenarios in each small group, the large group reconvenes, works through the scenarios together to ensure they are internally consistent, have a broad perspective and enable the creation of real actions or strategies. The group combines and eliminates some and then selects the overall top three to five scenarios. **The goal is not to select the correct future, or to predict the most likely future, but to select scenarios representing futures that are relevant, challenging, divergent, and cover the concerns facing fisheries management.** Finally, working with the core team, the participants fully flesh out the story in each scenario, working through the narrative development, the causal chain of events, the interconnections and outcomes for the different aspects (e.g. biological, economic). Creating a story around each scenario is often considered crucial as it one of the main ways humans understand and connect with abstract concepts such as future uncertainty.

4. Application

During the application phase, participants work through the scenario narratives from phase 3 to develop actions and strategies to ensure successful fisheries given the manner in which the scenarios unfold. Often in small groups, in a workshop setting (one or more, depending on the needs of the group), the participants work through the scenario narratives attempting to understand second and third order impacts, how the scenarios would impact specific areas and what the scenario would imply for specific stakeholders.

During this exploration, the participants develop draft actions and evaluate their implications. Questions such as, “If we knew this was the actual future, what actions would we take now? Are there actions we should stop taking? What is needed to meet our objectives under this set of conditions?” can help shape the process. Participants can trial run different ideas and strategies and work through the thought experiment of how they might play out under the different scenarios. The participants explore whether different ideas will work or not and determine the conditions under which certain concept will be effective. The goal is to develop ideas for what actions the stakeholders and the Council could or should take to be successful under the future scenario.

One of the key components of scenario planning is that the process is not trying to predict the actual future and plan for that single outcome. It is not trying to build a single consensus. The goal is to develop a range of scenarios that specify a broad array of potential futures forcing the participants to plan for all of them. **The actions developed across the full set of scenarios can then be evaluated to determine what strategies could work across a broad array of potential futures and thus be prepared regardless of which future actually happens.**

Working as a large group, the participants and core team review the actions and strategies developed for the different scenarios. The group is looking for patterns or suites of actions that cut across scenarios. This can include actions to take and actions to stop taking. It is also important to determine if the recommended actions diverge widely across the different scenarios indicating that different course of action are needed for the different realizations of the future. Different actions for different futures suggest an adaptive strategy is needed. Based on the potential actions, the participants can determine if there are certain actions that make sense across all scenarios (e.g. maintain healthy spawning stock biomass) or if there are sets of actions that are useful within certain reoccurring situations. The participants must then determine if the recommended actions represent gaps in the current strategy and if additional resources/data would be needed to execute them.

Monitoring

Monitoring is essential to know what actions to take when to maintain natural marine resources. Within the scenario planning process, it is important to determine what indicators can be used to determine if certain scenarios are becoming a reality, if there are bifurcation points and how the critical uncertainties are tracking. There is already a robust data collection program for fisheries on the West Coast. The program covers a wide range of indicators from physical and biological data to aspects of social and economic status. Many of the indicators are provided to managers by the NOAA IEA team in various formats, including the Annual Ecosystem Report given the PFMC. It is likely that most of the raw data, particularly for the physical and biological factors, are already collected, but may need to be processed in additional ways to track changes. Within the scenario planning process, the group should have a conversation about the desired indicators, current data streams and their ability to track the needed indicators as well as the allocation of time and resources for collecting and processing data.

5. Outputs

Scenario planning should have four products:

1) A series of bulleted scenario narratives
2) A list of actions to be taken to meet Council objectives within each scenario.
3) A list of strategy/action that cut across all scenarios that are the recommendations from the scenario planning process, and
4) A monitoring plan.

The core team is responsible for compiling all the information and producing the final report. The bulleted scenarios should be turned into written stories to ensure that they are accessible to those outside the workshops and so they can promote critical and creative strategic planning across the Council. The recommended actions or strategies will largely be derived from the workshop discussion surrounding actions developed for each individual scenario. Additional discussion with participants after the workshop as well as discussion with other stakeholders can also be used to develop additional strategies in the future.

The process can be completed in three to twelve months if the core team has dedicated time for the exercise. It may be possible to complete most of the work in one workshop, but two or three workshops

are frequently seen. It is best if the same participants are part of all phases of the process and it is highly recommended to hire a facilitator with experience in scenario planning.

A Scenario Planning Example: Rhode Island Commercial Fisheries

A good example of using this process to develop scenarios and responses in fisheries can be found in Rhode Island (Schumann 2018b). It is important to note that this is not a recommendation to follow this exact process. Rather, it is a demonstrative example of the successful use of scenario planning in fisheries.

In 2015, 12 Rhode Island fishermen were awarded a NOAA Saltonstall Kennedy grant to develop collective thinking on future environmental change, known as the Resilient Fisheries RI Project. They developed a Project Oversight Team and hired a Project Coordinator. They contracted with the Future Strategy Group to facilitate scenario development and undertook a process to develop scenarios that evaluated four different climate scenarios, combined with four difference socio-political scenarios (Schumann 2017):

- A period of high climate variability ("Global Weirding") and a "Do It Yourself" governance structure;
- A period of global cooling and increased eutrophication (greater anoxic events and acidification) and period of new technological innovation (i.e., artificial intelligence, micromanufacturing, and robotics) with a growing U.S. economy;
- An "Anthropogenic Warming" period, with increased temperatures, lower salinity and dissolved oxygen levels, and increasing ocean acidification, combined with a sluggish economy and tough protectionism and government programs; and
- A "Natural Warming" period with the same results to the environment as the previous scenario, but the drivers are natural, rather than human caused. This is combined with a new economy based on cheap renewable energy, creating profound economic uncertainty globally.

These scenarios were developed and evaluated through a multi-phase process that consisted of one-on-one interviews with fishery participants, and a series of facilitated workshops to determine the critical uncertainties that would form the basis of the scenarios and develop goals, strategies, and opportunities for Rhode Island's commercial fisheries in a changing climate.

During the first phase, the project coordinator conducted one-on-one interviews with fishery participants. The interviews were developed to solicit an understanding of how the environment is changing and how fishery participants are adapting to these changes, and to understand barriers that limit fishery participants' adaptive capacity and resilience. Discussions were not limited to environmental changes, rather they were open to all factors that affect fisheries.

The information collected in the interviews formed the basis for a series of workshops in the second phase that evaluated several topics that were identified as areas of uncertainty for fisheries in the future, including: ecosystem-based fisheries management and warming waters, ocean acidification, ecological changes and water chemistry in Narragansett Bay, changes in the seaweed community, squid

in a variable climate, socio-ecological community vulnerability, the expansion of black sea bass, the pros and cons of diversified versus specialized business portfolios, and models for combating the low level of new entry into Rhode Island's fishing industry. Political climate and climate change uncertainty were identified as the critical uncertainties and formed the four scenarios that would be evaluated in the next phase.

In the final interactive phase, a full day facilitated workshop was held with the focus on strategies that would achieve a thriving fishing industry in 2025-2030, under four distinct scenarios developed from the critical uncertainties identified above. Strategies that held promise in multiple scenarios were identified as the most winning strategies to attain future goals. This information was compiled in the *Rhode Island Commercial Fisheries Blueprint for Resilience* (Schumann 2018b).

This process was based on that developed by the National Parks Service (described previously;(NPS 2013)), and follows the five-step procedure of orientation, exploration, synthesis, application, and monitoring. The results of this process include a well-constructed vision for the future, an exploration of the challenges fishermen face (e.g., mounting regulatory strain, regulatory discards, time lags in data, regulatory fragmentation, business specialization, withering of the waterfront, rising business expenses, market stagnation and volatility, public apathy, shortened planning horizons, graying of the fleet, individual isolation, environmental variability and change, habitat degradation, and competing ocean uses) and an identification of future opportunities (e.g., Rhode Island's local foods commitment, collaborative marketing, new attitudes in management, emerging species, and new ecosystem models for managing fisheries). Through the workshops and planning exercised, fishermen identified core strategies and goals that can inform their own business practices or future fishery management actions.

The group developed their own "how-to" guide that could be very informative to the work currently being undertaken by the Council in the Climate and Communities Initiative (Schumann 2018a).

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ECOSYSTEM WORKGROUP REPORT ON THE CLIMATE & COMMUNITIES INITIATIVE

Contents

1 Introduction

The Council discussed the Climate and Communities Initiative at its September and November 2018 meetings. In September, the Council directed the Ecosystem Workgroup (EWG) to meet with the Management/Technical Teams over the winter to assess existing management measures in each fishery management plan (FMP) that could be used to help our fisheries respond to climate variability and change. The Council also appointed an Ad Hoc Climate Scenarios Investigation Committee, which met on October 23, 2018, to refine direction on the initiative. At its November meeting, the Council provided direction on the initiative for the November 2018 through March 2019 period:

- The EWG should hold work sessions with the Management/Technical Teams to both assess existing management measures in FMPs, and to discuss scenario planning;
- The EWG should hold a webinar with a description of proposed process and products to expose Council advisory bodies and the public to the scenario planning process;
- The EWG's March 2019 report to the Council should include 5-10 potential scenario planning topics for Council consideration, comment, and selection.

The EWG met with the Salmon Technical Team (STT) via webinar on November 28, 2018, to discuss Salmon FMP management measures that could aid in buffering salmon fisheries against the effects of climate change. We thank the STT for their creativity and willingness to brainstorm on this project. Our discussion with the STT raised many useful ideas in support of this initiative. The EWG also met with the Groundfish Management Team (GMT) on January 16 as part of our in-person meeting in Portland, OR. The GMT's engagement with us on these topics was also greatly appreciated.

On December 18, 2018, the EWG held an informational webinar with briefings for listeners on scenario planning for: North-central California coastal habitats (Sara Hutto of the Greater Farallones National Marine Sanctuary) and climate change effects on Atlantic Salmon and Atlantic Right Whale (Diane Borgaard and Dori Dick of the NMFS Office of Protected Resources). EWG Vice-Chair, Deb Wilson-Vandenberg, also reviewed the Tijuana National Estuarine Research Reserve's scenario planning process with Coastal Management Specialist, Dani Boudreau, for that project's applicability to our work.

We had planned to also hold a work session with the Highly Migratory Species Management Team (HMSMT) during our January 15-16 Portland meeting, but the HMSMT cancelled their meeting because of the partial government shutdown. The EWG will confer with them during their previously scheduled February 22, 2019, webinar. EWG Vice-Chair and California representative, Ms. Deb Wilson-Vandenberg, met with the Coastal Pelagic Species Management Team (CPSMT) informally by teleconference during their January 22-23 meeting.

The partial shutdown of the federal government in December and January occurred during a time when we had planned to pull together our work on this and other ecosystem agenda items. Our non-federal members are certain that group discussions and work would have been fuller had our two West Coast Region NMFS representatives been able to participate. We had also hoped for engagement and materials from NMFS science center staff (e.g., species climate vulnerability fact sheets). Although we do believe the Council can make progress with the information we provide here, and that we and others will provide supplemental reports and public testimony, we would like to highlight our view that more could have been accomplished if the shutdown had not happened or if it had ended sooner.

2 Existing Fishery Management Measures that May Mitigate for the Effects of Climate Change on Fish Stocks and Fisheries

As discussed above, the EWG was only able to meet with the STT and GMT before the February briefing book deadline. We plan to follow up with the HMSMT and CPSMT as those teams become available, and may be able to address those fisheries management processes and measures in a supplemental report for the March Council meeting.

Salmon Fishery Management Plan. For our November 28, 2018, meeting with the STT, we discussed:

- How can existing policies in the Salmon FMP address climate change impacts?

- What FMP tools or management measures would be most useful for adapting to climate induced changes in salmon fisheries? (Could broaden discussion to measures not currently available in the FMP or relevant statutes.)
- What are the most important climate drivers affecting West Coast salmon populations?
- If a climate scenario focuses on just one salmon species/stock, which one should it be?

The first three questions were intended to address our first assignment from the Council, that we look into existing management measures that might mitigate for the effects of climate change on fish stocks and fisheries. The fourth question builds on the first three questions and our discussion with the STT provided additional insight and information, which we address below, in Section 4 of this report.

The Salmon FMP and its implementing management processes and measures are explicitly designed for flexibility inseason, between years, and over longer periods. This flexibility is needed for managing populations that, even when abundant, are highly variable in year-class strength and distribution and run timing from year to year. Flexibility is even more needed to support fisheries that are challenged by widely migrating stocks that move through and are intercepted in Canadian and Alaskan waters, and by the need to target more abundant and hatchery-raised populations that commingle with natural populations in need of recovery.

While the Salmon FMP is nimble and the management process can address variability, that management flexibility depends on innovative prediction and monitoring science. The STT identified the abundance forecasting process as the most difficult part of the salmon assessment process. That forecasting process is becoming more difficult as the climate becomes more variable and the variability becomes less predictable, or less similar to past variability. For example, some populations are seeing changes in maturation rates in response to climate variability, and those changes in maturation rates and earlier-than-expected returns challenge the ability to estimate the abundance of mature fish in the ocean. Assessing ocean conditions is particularly challenging for salmon stocks both because of the large number of stocks with differing abundances, distributions, and behavior, and because there are few monitoring programs for ocean conditions.

Salmon are managed via a complex and swift science-to-management process, with the STT beginning their management year in January-February by reviewing the ocean fisheries reports from prior years, and developing a pre-season forecast for the current year by February. The STT looks at the ecosystem status report, available in early March, to understand what climate conditions might have been for salmon that first entered the ocean, as a factor influencing the adult abundance of fish 2-4 years later. For most salmon stocks, models that attempt to forecast abundance based on environmental variability do not perform as well as those based on sibling regression. The next step in the model improvement process may not be to look for the perfectly predictive environmental variable for any one stock, but to improve the quality of abundance forecasts with a better understanding of how less predictable climate variability is affecting stocks overall.

Over March and April each year, the STT brings abundance forecasts to the Council, gets estimates of catch and escapement, and helps the Council shape the fisheries for the upcoming year. Fisheries begin in May, and the Council reviews preliminary catch information in September.

Inseason fisheries monitoring is intensive, which allows for inseason quota adjustments and trading. The need for inseason salmon actions can sometimes be an early indication of unusual environmental conditions at sea. For example, 2015 landings reports for coho were much lower than had been expected and individual fish were smaller than usual, providing an early clue that ocean conditions were bad for colder water species.

The Salmon FMP's flexibility is both an asset and a challenge to scientists, managers, and the public. That flexibility depends heavily on a regular flow of data and other information into the management process, and depends on developing and maintaining a common understanding of what those data mean from year to year. As climate variability increases, and as we are faced with more frequent climate anomalies, that may challenge our understanding of the data and models used to support salmon fishery management.

Groundfish Fishery Management Plan. For our January 16, 2019, meeting with the GMT, the EWG asked the GMT similar questions to those we discussed with the STT. For the groundfish management process, we focused in on:

- What is your process for getting and using data for groundfish management? How does that fit within the larger biennial groundfish management process?
- Is there flexibility in the groundfish harvest control rules? What about the inseason management process?
- Are there points in the management process where climate information could be useful?
- What are the species or fisheries that most challenge flexibility in the management process?

Similar to the salmon fisheries, the groundfish fisheries are data-intensive, with data from different fisheries being reported and processed at different rates. Commercial fisheries data comes in relatively quickly, particularly for trawl individual fishing quota (IFQ) sectors. Fixed gear fisheries data is more limited, both in the quantity of data available and in the rate of speed at which the data moves into the management process. Coastwide movement towards an electronic fish ticket system should both increase the speed at which data moves from the docks to the management process and should make that data movement more uniform between states.

Recreational fisheries data is available on the Recreational Fisheries Information Network on a monthly basis with a one month lag. States have preliminary data on a weekly or monthly schedule, which although not considered "official," does give state fishery managers a sense of rates of recreational fisheries catches. There are a variety of logbook data collection programs for both recreational and commercial fisheries; however, compliance with logbook programs can be quite variable, which limits the quality of the data coming out of those programs.

Groundfish harvest specifications and management measures are developed and set on a biennial timeframe; the current management biennium is 2019-2020. Over 90 species are included in the Groundfish FMP, although stock assessment efforts are concentrated on 20-30 species. For the last 20 years, the Council's groundfish management has been notably shaped by the need to rebuild overfished groundfish stocks, particularly long-living and slow to mature rockfish species. Most of these species have been rebuilt over time, with the Council now facing the challenge of having to design a management system that allows our fisheries to benefit from the rebuilding years

without again pushing managed species to depletion. Efforts to minimize salmon bycatch in the groundfish fisheries continue, but groundfish fisheries are much less constrained than in past years by within-groundfish weak stock management.

A major challenge to fisheries management flexibility in the groundfish science-to-management process is the sheer number of species managed under the FMP, the majority of which are unassessed or infrequently assessed. Groundfish stocks that are regularly assessed may not receive a full assessment every two years, but may instead be subject to an assessment update. The ongoing need for more assessments and more data can be overwhelming. For stocks with less frequent assessments, our long-term quotas can be stable for a number of years and then jump dramatically (up or down) with new assessments. Many groundfish stocks have highly variable year class strength, which creates less predictable variability in overall recruitment and abundance. Time lags in stock assessments may also cause us to miss spatial distribution changes in our stocks, an increasing concern under variable climate conditions, and may artificially hold annual catch limits lower than conservation requires.

The groundfish regulations development and implementation process is fairly inflexible and generally does not allow for inseason changes to be made outside of Council meetings. Even seemingly small changes in regulations can take a long time to move through the Council process and then through the federal regulations process. With the states moving to electronic ticketing, more information will be coming into the management process at faster rates of speed, but the groundfish management structure is not designed with the flexibility of the salmon management structure. For nearshore stocks that have linked to state harvest guidelines, there is some inseason management flexibility to change management measures, but those also need to be planned for in advance and analyzed through the larger biennial management process.

Beyond the Council's groundfish management process, a major challenge to understanding the effects of climate on groundfish fisheries is trying to predict how fishermen who participate in non-groundfish fisheries may or may not drift into groundfish fisheries in different years or the reverse. For example, if the commercial Dungeness crab fishery is delayed due to a harmful algal bloom, will fishermen move to the groundfish fishery earlier in the year? Or, if recreational salmon fishing is poor, will there be a big shift to recreational groundfish fishing? West Coast fisheries are also indirectly affected by fluctuating participation in Alaska fisheries, where an unexpectedly poor fishing year for some Alaska species can drive fishermen southward to fish more intensively off the West Coast.

3.0 Scenario Planning Overview

In November, the Council requested that we propose ideas for scenario planning topics and process recommendations including a timeline and proposed meetings or workshops. In this report, we focus on topics. We will provide more detailed recommendations on process and timelines in a supplemental report.

The CSI report also provided general background on the purpose and desired outcomes for scenario planning. To paraphrase, scenario planning is a discussion tool that allows us to discuss and plan for future possible events, without assuming that we are perfectly predicting those events.

For this initiative, scenario planning would involve thinking creatively about how future climate variability and change might affect our managed species and fisheries and to look for opportunities to revise our management system so that we are better prepared for the future.

In thinking through topic ideas, the EWG found the five phases of scenario planning, as described in a National Park Service (NPS) handbook for that agency's processes, to be helpful:

Orientation: a "core group" articulates the purpose, desired outcomes, and scope of the project; decides who will participate in project activities, such as workshops; and develops a project schedule.

Exploration: the core group gathers background information to inform project participants, in particular the key critical driving forces and uncertainties underlying potential future states resulting from climate change.

Synthesis: Alternative scenarios are created through workshop exercises. Commonly, driving forces with associated uncertainty are transposed to help formulate alternative scenarios.

Application: Actions (management measures) and strategies can be tested against the scenarios to gauge effectiveness in the face of uncertainty about future conditions. This may be accomplished through a second workshop; alternatively, a single workshop can cover both the Synthesis and Application phases.

Monitoring: Project participants identify indicators effective in monitoring environmental change. This phase can be open ended by using ongoing monitoring to judge whether the world is tending toward any one of the alternative scenarios identified as part of the exercise.

The EWG also considered the information and experiences described by those who have conducted scenario planning exercises using the NPS model. Based on these discussions, the EWG has begun considering a simpler, more streamlined approach to achieving the goal of identifying strategies for improving the flexibility and responsiveness of Council management actions to near-term climate shift and long-term climate change. With time and resources, we believe we could take elements from the NPS handbook and tailor scenarios to fisheries management questions based on the topic or topics selected by the Council.

4.0 Scenario Planning Topics for Council Consideration

This section first lists out and provides brief summaries of the scenario planning topics the EWG drafted for deliberation by the Council, advisory bodies, and public. More detailed write ups follow in the appendix. These topics were informed by discussions but were not drafted in collaboration with the GMT or STT. The EWG's topic ideas are therefore not intended to replace any topic ideas offered by those groups independently. The EWG may modify or make more specific recommendations in a supplemental report to the Council, particularly if we are able to meet with the HMSMT or CPSMT before March.

Topic ideas center on possible changes to the abundance or availability of key fish and shellfish species. Changes in stock abundance and availability are what drive many fisheries management challenges. Climate change, ocean acidification, and phenomena like HABs and hypoxia will combine to influence new changes in abundance and availability in the California Current Ecosystem. Plausible changes to fish stocks and fisheries can be posited based on this general knowledge. We envision the topics focusing on those possible changes in abundance or availability and their consequences to fisheries more than on the causes of the changes themselves. For example, the focus of the whiting topic (Topic 4, below) would be on shifts in the stock and not on the degree of change in sea surface temperature or other factors that led to the shift.

Summary of Scenario Planning Topic Ideas (not listed in order of preference).

	Topic	Summary
1.	Snake River fall Chinook (Snake RFC) in the face of climate change	Snake RFC can make significant contributions to ocean fisheries off the coasts of Alaska, British Columbia and in the California Current north of Cape Falcon and to tribal fisheries in the Columbia River. What are the climate factors affecting Snake RFC production and what can be done to mitigate them?
2.	Sacramento Fall Chinook Salmon (SRFC): Changes in Abundance and Distribution	Scenarios would explore how stock distribution and freshwater and marine survival will change and how this could affect PFMC management, fisheries, and fishing communities.
3.	Northern coho	Coho were one of the first species to show the effects of the 2015 marine heat wave and place stress on Council fisheries and the management system. The scenarios in this topic would consider how coho populations would fare in the riverine and marine conditions that the warming California Current might bring.
4.	Changes in Whiting Abundance and distribution	Whiting is the most abundant and one of the more valuable of the federally managed West Coast stocks. The scenarios in this topic would explore the consequences of northward shifts in the stocks' distribution, changes in migration timing, shifts in bycatch stocks, etc. Shifts in distribution would help evaluate Council and international, transboundary management.
	Variations on 4: Changes in abundance and distribution of key target stocks (*no detailed write-up provided*)	The scenarios under these topics could be very similar to the whiting topic, but could focus on the management consequences of northward distribution shifts in sablefish, Pacific halibut, albacore tuna, or other key commercial and recreational target stocks.
5.	Rockfish	Rockfish have been the source of major conservation and management challenges. Key rockfish stocks have rebuilt or are rebuilding more quickly than anticipated when rebuilding plans began in 2000. Stock assessments have found them to be more productive than originally thought. At the same time, rockfish score as vulnerable to climate change in the California Current. The scenarios in this topic would explore the consequences of less productive recruitment and northward shifts in key rockfish stocks.

	Topic	Summary
6.	OR and WA benthic habitats and hypoxia	The benthic habitats off OR and WA are home to a diverse range of species, including halibut, lingcod, bottom dwelling groundfish, and Dungeness crab. These species are under increased exposure to seasonal hypoxic events. Hypoxic events lead to fish kills and loss of fishing grounds and displace fish populations to different areas as well as vertically in the water column. The scenarios in this topic would explore how fisheries could be impacted by increased hypoxia in combination with drivers such as the predicted northerly migration of some fish stocks, ocean acidification, increasing occurrence of HABs, etc.
7.	Shifts in the core distribution of key CPS stocks	CPS support lucrative commercial purse seine fisheries along the West Coast and are also highly valuable as live bait in other commercial and recreational fisheries. The scenarios in this topic would explore the southern-northern regional management issues the Council experienced in the 2000s. CPS abundance and population distributions fluctuate with changes in ocean conditions and prey abundance. Among other things, the scenarios would help explore how future ocean conditions may affect regional issues such as port infrastructure, area based effort controls, and other issues specific to northern and southern fishing communities.
8.	Regional mosaics	This topic would kick off scenario planning using broadly focused, regionally-based scenarios that combine "what-ifs" from multiple state and federal fisheries. With a broad-focus, the scenario planning discussions would be high-level and intended to lead to ideas for more narrowly tailored topics to be taken up at the next stage. The intent would be to provide participants with a panoramic look at plausible futures in their regions and to facilitate thinking about connections and combined effects between fisheries.

Appendix: Topic Descriptions

This appendix describes eight potential scenario topics for Council consideration. The first two topics, Snake River fall Chinook and Sacramento River fall Chinook are described in greater detail in order to give the Council and the public an idea of what a more fully fleshed out scenario topic might look like. Scenario topics are presented in random order. The EWG has no preferences for one scenario topic over others and welcomes ideas from other advisory bodies, the public, and the Council on alternate scenario topics.

1. Snake River fall Chinook (Snake RFC) in the face of climate change

Question or topic: What are the climate factors affecting Snake RFC production and what can be done to mitigate them?

Description: After completion of the four lower Snake River dams in 1975, Snake RFC numbers declined to less than 100 natural adult spawners in 1990. Since then, winter flow management at Hells Canyon Dam on the Snake River to prevent dewatering of redds, augmentation of summer flows with cold water from Dworshak Reservoir during the fall Chinook smolt migration, and a hatchery program to supplement natural spawning have rebuilt escapement numbers to near 60,000 annually from 2013 to 2015. Approximately one quarter of these were from natural area spawning. Since then, escapement has declined, and in 2018 escapement was near 16,000. Snake RFC can make significant contributions to ocean fisheries off the coasts of Alaska, British Columbia and in the California Current north of Cape Falcon. Snake RFC are also significant components of the Columbia River tribal and non-tribal commercial fisheries and to Columbia and Snake River recreational fisheries

Climate drivers: Fresh water: Temperature, Precipitation and snowpack. Marine: Temperature, ocean acidification (OA) and hypoxia.

Key factors: Freshwater: Access to most of the historical Snake RFC spawning habitat was blocked when hydropower dams were built in Hells Canyon of the Snake River beginning with Brownlee Dam in 1959. Since then, spawning has occurred in the Snake River below Hells Canyon Dam (completed 1967) and tributaries in Idaho and eastern Oregon and Washington. In years when flow is low and temperature is high, outmigrating smolts, which must pass through 8 reservoirs and dams before reaching the Columbia River estuary, suffer elevated mortality. The main factors are high temperature stress, disorientation in slow flowing reservoirs and predation by fish, both native and introduced, and birds.

Marine: When the ocean warms, the lipid-rich northern copepods that juvenile salmon and forage fish eat are replaced by lipid-poor southern copepods, leading to poor growth and survival. OA and hypoxic zones further reduce food availability due to reduction in usable habitat and reduction in crustacean forage.

If climate change results in more frequent and longer lasting warming events, then salmon survival in both freshwater and marine habitats will decline.

Goals: Increase Snake RFC survival where possible. Follow Fish Passage Center recommendations for flow management at Snake and Columbia river dams, reduce pinniped populations in areas where harbor seals have the most impact on smolts and where sea lions have the most impact on adult salmon. Continue creative hatchery management with yearling and sub-yearling smolt releases and geographic expansion of release sites. If it is shown that removal of the four lower Snake River Dams would be a major contributor to restoring healthy Snake RFC and all other Snake River anadromous fish stocks, as well as help rebuild the Southern Resident Orca population, then pursue that management option.

Affected groups: The north of Falcon, B.C. and Alaskan ocean salmon fleet and Columbia and Snake River fisheries. The most affected sector would likely be the Nez Perce, Umatilla, Warm Springs and Yakima tribes whose treaty fishing rights lie entirely within the freshwaters of the Columbia River system. Non-tribal commercial and recreational river fishers would also be affected. When nearly 60,000 adult Snake RFC escaped annually above Lower Granite Dam in 2013-2015, the state agencies and the Nez Perce tribe began discussions about how to best manage these fish for natural spawning and for harvest fisheries. If climate change prevents adequate escapement of Snake RFC above Lower Granite Dam, then these fisheries may not be possible or will be marginal and intermittent.

Snake RFC are part of a mixed stock Chinook fishery north of Cape Falcon, Oregon to Alaska. If this stock declines due to a warming ocean and the effects on the food web, the other components of the mixed stock Chinook fishery are likely to decline as well. Commercial and charter boat businesses will suffer and boat operators will likely switch to other species, such as albacore and groundfish.

Time frame: 15 to 20 years

Management tools: Fishery Regulation Assessment Model changes, aggressive management of piscivorous birds, marine mammals and freshwater piscivorous fish, improvement in water management of the four lower Snake River dams. Significant reductions in greenhouse gases is the only know solution to a warming climate and ocean acidification; however, eliminating excessive greenhouse gases and the accumulated carbon dioxide in the ocean will take many decades longer than the scope of the Chinook salmon scenario topic and is outside of the Council's purview.

Ecosystem impacts: When the largest Snake RFC escapement in recent memory occurred in 2013-2015, many bald eagles spent their late fall through mid-winter feeding on Snake RFC carcasses. Although not as obvious, many other Snake River species would have benefited from the addition of these nutrients brought back from the Pacific Ocean. If an abundance of Snake RFC spawned every fall, this would become the base of a broad food web that has been missing for several decades.

2. Sacramento River Fall Chinook Salmon (SRFC): Changes in Abundance and Distribution

Question or Topic: If climate scientists' observation of more and more warming that is happening at a faster and faster rate continues, how will this affect SRFC production in both the freshwater and marine components of their life cycle?

Description: The Sacramento River is the southernmost river to support indigenous Chinook salmon. The Sacramento River and its tributaries have been heavily modified over time by dam construction, flood control efforts, and water diversions for agriculture and domestic uses. Several hatcheries mitigate for the blockage to spawning and rearing habitats and thus SRFC are a mixture of hatchery and natural-area production. SRFC are the largest contributor to both the California and Oregon mixed stock Chinook fisheries.

Climate drivers: Warming temperature, prolonged droughts and decreased snowpack.

Key factors: Freshwater: Drought increases demand for agricultural and domestic water diversions while reducing stream flow for salmon spawning and rearing. Rising water temperature and reduced snowmelt causes mortality to pre-spawn adults and incubating eggs. Low, warm flows increases incidence of deadly Myxozoan parasites, increases susceptibility to predators, and decreases health of smolts. A large percent of hatchery smolts are transported to the estuary for release when flows are low and warm. This increases straying of returning adults which makes it difficult to obtain enough brood stock for hatcheries and decreases genetic purity on natural-area spawning grounds.

Marine: As the ocean warms, the zooplankton community becomes increasingly dominated by southern copepods and species of krill that have low caloric value for juvenile salmon and for the forage fish that are prey for older salmon. Salmon growth and survival decreases. Smaller and less abundant salmon reduce angler's catch, commercial fishers' income, escapement numbers and egg production per spawner. An increasing percent of Chinook return to freshwater to spawn at earlier ages, causing overforcasting of adult abundance for ocean fisheries and escapement.

Currently SRFC are rarely caught north of Cape Falcon. The marine distribution of SRFC may shift northward with a warming ocean. This could lead to a significant change in the mixed stock catch composition north of Falcon requiring changes to the harvest models.

Goals: Determine how and when the SRFC stock distribution will change and how this will affect fisheries and businesses. Determine how both freshwater and marine survival will change and how this will affect PFMC management relative to determining MSY and potential inability to rebuild the SFRC stock.

Time frame: 10 to 20 years

Management tools: Multi-agency fresh water management to shape seasonal flows from upstream reservoirs to provide adequate and sufficiently cool flows to meet the biological needs of several life stages of SRFC. Increased creativity to prevent disasters at storage reservoirs and hatcheries, and to increase smolt survival.

Ecosystem impacts: Salmon are important prey for marine mammals and various fish species as they grow from smolt to adult. Salmon are highly sought after by humans and if salmon were not available, humans would increase harvest on other marine species such as rock fish and tuna.

Primary Ports: All ports from Monterey Bay, CA to Newport, OR.

3. Northern Coho Scenario Planning

Northern coho stocks are an integral part of the OR and WA salmon fisheries. Coho stocks are generally managed by watershed, given that each river system has genetically distinct populations. As a result, northern coho are susceptible to stressors in freshwater conditions in their early life history and during spawning, and to marine conditions during their adult life history. In their early life history, coho are sensitive to stream temperature and low-flow events. In warmer conditions, juvenile coho will mature early, leading them to head to sea prematurely, causing much lower marine survival rates. Low flow events are an additional stressor that can lead to early outmigration of juveniles and increased mortality. Little is known about what drives marine survival rates for coho, especially on a stock by stock basis. A strong relationship between the abundance of northern copepods has been observed, and other key drivers are likely to be nearshore habitat, predation, and shifts in prey abundance. Marine heat waves have also been linked to salmon marine survival rates. Given the range of uncertainties facing salmon populations in the future it is important that managers are prepared early and give consideration to range of potential futures.

4. Changes in Whiting Abundance and Distribution

Whiting is the most abundant and one of the more valuable of the federally managed West Coast stocks. This topic would be relatively narrow in focus in that the main issues of interest would be specific to the shoreside, mothership, and catcher processor sectors and the Washington coastal treaty tribes. Whiting is particularly important for the ports of Newport, the Columbia River, and Westport, tribal fisheries in Neah Bay, and the at sea processing companies based out of Puget Sound. Northern shifts in whiting's distribution and migration would be the key variable to be explored. Changes in abundance or in the patterns of recruitment are other facets that could be varied in the scenario. Variation in the stock's movement, whether based on age, abundance, or environment is already an issue of importance to U.S.-Canada sharing of the stock, as well as access for the treaty tribes. Because of the U.S.-Canada treaty process, the Council is only indirectly involved with setting catch levels for the stock. However, the does Council play an advisory role in the process and has a formal representative on the treaty's Joint Management Committee as well as many stakeholders in common. Scenario planning could incorporate scenarios meant to explore bycatch management.

Bycatch has been the major focus for the Council as multiple species of rockfish, Chinook, and other species like sablefish and spiny dogfish have posed challenges in the last decade. Changes in the whiting stock, timing of the fishery, and changes in bycatch could all interact. Other potential connections in this topic include the pollock fisheries of the North Pacific, the other fishing strategies in the groundfish IFQ program, the Dungeness crab fishery, and more. Events in those fisheries can influence whiting fishery participants and businesses and vice versa. The whiting

sectors have also demonstrated strong self-management through co-ops. A scenario planning exercise could potentially benefit the co-ops, as well as direct regulatory tools used by the Council.

Lastly, the Management Strategy Evaluation for whiting includes the northern movement of the stock into Canadian waters as a key question of interest. Stock movement varies between years. The age distribution of the stock, large year classes, and environmental conditions are all possible factors for scenario planning. For whiting, scenario planning might also be best conducted through the treaty process or possibly in both arenas. If it were done through the Climate and Communities Initiative, it would provide more focus on West Coast fishery participants, processors, and communities.

5. Rockfish Conservation and Management

Rockfish have been the source of many challenges for the Council, fishing communities, and fisheries scientists. Species like canary rockfish, yelloweye rockfish, and cowcod are long-lived, late maturing, and difficult to monitor because they live in habitats that are difficult and costly to survey. Many efforts have gone into rebuilding rockfish since the early 2000s. All but two species have successfully rebuilt and the remaining two are scheduled to rebuild much faster than expected. The era of rockfish rebuilding was accompanied by notable changes in the understanding of rockfish productivity, with stock assessment results finding them to be more productive than previously thought. At the same time, rockfish rank as some of the more vulnerable species to climate change in the California Current. This topic would explore scenarios where rockfish experience lower productivity because of less favorable conditions in the ecosystem. The scenarios would also be designed to explore the potential consequences of northward distribution shifts of key stocks.

6. OR and WA benthic habitats

The benthic habitats off OR and WA are home to a diverse range of fisheries, including halibut, lingcod, bottom dwelling groundfish and Dungeness crab. These fisheries are an integral part of the region's fishing portfolios for both commercial and recreational fisheries. In recent years, these fisheries have been coming under increasing threats due to the increasing severity and duration of seasonal hypoxia events. During the 2006 hypoxia event, mass mortality of immobile benthic fauna and an exodus of mobile fauna was recorded off the OR coast and recent events led to the temporary shutdown of some tribal Dungeness crab fisheries.

Hypoxic events have the potential to impact fisheries dependent upon benthic habitat directly through fish kills and the effective seasonal loss of large areas of fish habitat, and indirectly through the vertical or horizontal displacement of impacted mobile species. The displacement of benthic species will have direct impacts on them in terms of energetic expenses and less-than favorable habitat and impacts on the broader ecosystem through increased competition for suitable habitat and potential food web disruptions. How this will affect fisheries in the region is uncertain and this uncertainty will compounded by drivers such as the predicted northerly migration of some fish stocks, ocean acidification, increasing occurrence of HABs, etc.

7. Shifts in the core distribution of some CPS

Coastal pelagic species (CPS) are schooling species that have supported lucrative commercial purse seine fisheries along the West Coast and are used as live bait in valuable recreational fisheries for HMS and groundfish. Their abundance is driven largely by variability in environmental conditions and subsequent abundance of their planktonic prey. The commercial fisheries for these stocks are limited entry south of Pt Arena, CA, and a mixture of limited entry and open access north of this point. In California, CPS fishermen are generally dependent on almost year-round availability of a portfolio of species; however, fishermen that fish for CPS off of Oregon and Washington often also fish for non-CPS species or move locations. These fisheries are also dependent on sufficient shoreside port infrastructure to rapidly process a fresh, high quality product. Recent changes in environmental conditions affecting the abundance and distribution of CPS species along the coast has challenged recreational and commercial components of the fishery by bringing more southerly distributed species north that may only be incidentally harvested, or because FMP species become unavailable by moving north to Canada following preferred water conditions. How would significant changes in core and also tail CPS distribution affect those fisheries and fishing communities?

8. Regional mosaics

This topic would kick off the Council's scenario planning activities using broadly focused, regionally-based scenarios. The scenarios would combine "what-ifs" from multiple state and federal fisheries to facilitate thinking about the combined effects of potential changes. Many fishery participants, seafood businesses, and local economies depend on revenues from more than one fishery. While the connections are generally known, they are rarely discussed directly at the Council.

We would envision having 2-4 scenarios per region that would vary changes in the abundance or availability (via distribution shifts, changes in migration, HABs, etc.) of key target fish and shellfish species as well as bycatch. For example, a northern scenario would likely center on Dungeness crab and would include albacore, salmon troll, groundfish, and more. The scenarios could be crafted with natural groups in mind, like small scale fishermen making their living with "three-legged stool" type portfolios (e.g. crab, salmon troll, and rockfish).

The crafting of the scenarios would be central to the effort. One purpose would be to take the best available scientific thinking of what might occur while keeping within the the spirit of the scenarios being postulated and plausibilities, not forecasts. Regional scenarios could be discussed at the same meeting to facilitate thinking across regions, or separately to allow more attention paid to each.

By taking a broad focus, the discussions of the scenarios would need to be kept high-level. For instance, we would describe the purpose as involving "issue spotting" than detailed examination of particular management tools. One key outcome of the discussions would include ideas for more narrowly tailored scenario topics to be taken up at the next stage. Participants will benefit from having been presented a panoramic view of possible future conditions in California Current fisheries.

New England Fishery Management Council
50 W ATER STREET | NEW BURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
John F. Quinn, J.D., Ph.D., *Chairman* | Thomas A. Nies, *Executive Director*

COUNCIL SOLICITING CONTRACT WORK
Preparation of Discussion Document
Re: Offshore Spawning of Atlantic Herring
March 27, 2019

Project Description

The New England Fishery Management Council (NEFMC) requires the services of an independent contractor to prepare a Discussion Document that summarizes all scientific research and other relevant information about offshore spawning of Atlantic herring, *Clupea harengus*. The document should include a summary of all relevant information available about offshore spawning locations, seasons, patterns, and trends, including identification of any potential impacts on offshore spawning of Atlantic herring. The Council intends to use this Discussion Document to support future deliberations about potential management measures that may be considered to minimize impacts on spawning of Atlantic herring on Georges Bank and Nantucket Shoals. This is a short-term, temporary contractor role, commencing on or about May 1, 2019 and ending when the Council reviews the Discussion Document (tentatively September 2019). It is anticipated that the contractor will research and prepare the Discussion Document and then work with Council staff to present the document to the Herring Plan Development Team (PDT) and Council. The information also will be shared with the Atlantic States Marine Fisheries Commission (ASMFC).

Project Background

The Council is working on a number of herring work priorities in 2019, including preparation of a Discussion Document that reviews and summarizes all scientific research and other relevant information available on spawning of offshore Atlantic herring. This Discussion Document will be the first step to summarize all relevant scientific information available. It will be presented to the Herring PDT and Herring Oversight Committee of the Council. The full Council then will decide the appropriate next steps for this topic.

The Discussion Document, at a minimum, should contain the following updated information:

- Results from recent stock assessments prepared by the Northeast Fisheries Science Center (NEFSC) and other indicators of spawning trends and activity;
- Review of historical and current research collected on spawning of Atlantic herring;
- Description of potential impacts of fishing on spawning of Atlantic herring, which may include a summary of data from observers and other sources (i.e. portside sampling);
- Review of measures in place in other fisheries for spawning protections of herring;
- Summary of other sources of mortality and risks for successful spawning of Atlantic herring; and
- Recent management actions by the New England and Mid-Atlantic Fishery Management Councils and ASMFC that may have impacts on spawning of Georges Bank Atlantic herring.

The successful candidate will present a draft of the Discussion Document to the Herring PDT for review and input. Subsequent to that meeting, the contractor will work with staff to finalize the document for Council consideration, which likely will include a presentation to the Herring Oversight Committee in September 2019. Following the meeting, some additional time likely will be needed to finalize the discussion document.

Statement of Work

The primary role of this contract is to prepare a Discussion Document that summarizes all scientific research and other relevant information available about offshore spawning of Atlantic herring, *Clupea harengus*. Under the overall direction of the NEFMC Herring Plan Coordinator, the contractor will research information to summarize in the Discussion Document, be the primary author of the Discussion Document, and present the Discussion Document to several different audiences. The contractor will be expected to operate independently, with little administrative support. A key part of the contractor's assignment will be to take full responsibility of the Discussion Document, including researching updated information and writing clear summaries of relevant information to support Council deliberations on this topic. The successful candidate will present this document to the Herring PDT, as well as the Herring Oversight Committee of the New England Fishery Management Council.

Necessary office space and equipment will be provided by the contractor; approved travel expenses will be reimbursed by the Council.

Desired Experience and Demonstrated Skills

1. General understanding of fishery management programs at the state, interstate, and national levels.
2. Familiarity with the use of scientific information in the fishery management process.
3. Awareness of relevant scientific journals and other potential sources of information. Ability to research and compile fisheries management policies and scientific research with minimal supervision.
4. Experience interacting with fisheries managers, scientists, and stakeholders.
5. Strong writing and speaking skills. Demonstrated ability to summarize complex policies and procedures, as well as scientific research, in clear, easily read documents or through concise verbal discussions.
6. Advance degree in a fisheries policy or technical field preferred.
7. Ability to develop fishery maps with minimal supervision (i.e. recreate historical maps of known offshore Atlantic herring spawning locations).
8. Demonstrated ability to summarize conflicting information in an objective manner.
9. Candidates employed by advocacy organizations or by organizations that are parties in fishery lawsuits related to this issue will not be considered.
10. The successful candidate will not have a conflict of interest, defined as any financial or non-financial interest that conflicts with the actions or judgments of an individual because it could:

a. Impair the individual's objectivity;
b. Create an unfair competitive advantage for any person or organization; or
c. Create the appearance of either item listed above.

Expected Responsibilities and Deliverables

The following list illustrates the activities expected from the contractor. This list is not all-inclusive. A detailed list of deliverables will be negotiated.

1. Serve as primary author of Discussion Document under supervision of Council staff.
    a. Summarize the status of Atlantic herring, including historical and updated research about spawning activity.
    b. To the extent information is available, provide maps showing historical and current spawning locations and herring egg beds.
    c. Summarize all fishery data (direct and incidental) that could have relevant information about the location, season, condition, or trends in Atlantic herring spawning activity (i.e. at-sea observations of spawning activity, portside sampling of herring landings, mapping of historical and current data on spawning of Atlantic herring, etc.).

2. Present Discussion Document
    a. Review draft with Herring PDT and incorporate input during summer 2019.
    b. Present to Herring Oversight Committee, likely in September 2019.
    c. Finalize Discussion Document during October 2019.

Application Submission Contact

Interested professionals are encouraged to submit a letter of interest, current resume or CV, examples of similar work completed for other organizations or publications, and budget with expected expenses. In addition, applicants should describe the approach that would be used to meet the requirements of this project, including deliverables. Travel expenses need not be included as approved travel will be reimbursed by the Council. Letters of interest and supporting materials should be received **no later than April 22, 2019** and addressed to Thomas Nies, NEFMC, 50 Water Street, Mill 2, Newburyport, MA 01950 or submitted by e-mail to tnies@nefmc.org. Questions concerning this proposal should be directed to the same address.

This work will be funded under New England Fishery Management Council Award #NA10NMF4410007. Compliance with the Magnuson-Stevens Fishery Conservation and Management Act (P.L.401-208 as amended) and the Council's standard contract terms and conditions will be expected.

NEFMC takes affirmative action toward ensuring equal opportunities; the Council encourages women-owned businesses, protected veterans, and individuals with disabilities to submit letters of interest and other requested materials for consideration under this announcement.

Disclaimer

1. All costs associated with the preparation and presentation of the proposal will be borne by consultants submitting letters of interest.
2. Materials submitted will not be returned.

3. Respondents must disclose any relevant conflicts of interest and will be expected to comply with all federal grant contracting requirements.
4. The Council reserves the right to: accept or reject any or all letters of interest received; negotiate with all qualified potential candidates; cancel or modify the RFP in part or in its entirety; and/or change the application guidelines when it is in its best interests.

New England Fishery Management Council

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

February 25, 2019

Mr. Michael Pentony
Regional Administrator
NMFS/GARFO
55 Great Republic Drive
Gloucester, MA 01930

Dear Mike,

The Mid-Atlantic and New England Fishery Management Councils request involvement in the Endangered Species Act (ESA) Section 7 consultation for the North Atlantic Right Whale.

National Marine Fisheries Service Policy Directive 01-117 describes the integration of ESA Section 7 with Magnuson-Stevens Act Provisions. Ongoing discussions by the Atlantic Large Whale Take Reduction Team (ALWTRT) will consider measures that could affect fixed gear fisheries managed by the two Councils. While we are members of the TRT, we request that we also be involved in the Section 7 process as authorized by the policy directive. Specific tasks that we are interested in include:

- Identifying feasible alternatives
- Providing Council views on "best scientific information available"
- Reviewing the draft Biological Opinion, including a review of draft Reasonable and Prudent Alternatives (RPAs) or Reasonable and Prudent Measures (RPMs)

Should you grant this request, please work with our Executive Directors to define the level of coordination and identify points of contact. We look forward to your reply.

Sincerely,

Mr. Michael Luisi
Chairman, MAFMC

Dr. John Quinn
Chairman, NEFMC

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

APR - 1 2019

Mr. Michael Luisi, Chairman
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, DE 19901

Dr. John Quinn, Chairman
New England Fishery Management Council
50 Water Street, Mill 2
Newburyport, MA 01950

Dear Mr. Luisi and Dr. Quinn:

Thank you for your letter dated February 25, 2019, regarding the Endangered Species Act (ESA) Section 7 consultation on the continued operation of the fisheries regulated under eight Fishery Management Plans and two Interstate Fishery Management Plans. These include American lobster and Jonah crab, Atlantic bluefish, Atlantic deep-sea red crab, mackerel/squid/butterfish, monkfish, Northeast multispecies, Northeast skates, spiny dogfish, and summer flounder/scup/black sea bass.

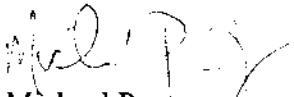
We agree that both the New England and Mid-Atlantic Fishery Management Councils should be engaged in this process and will continue to work with you throughout the consultation process. My staff will present an update on the Atlantic Large Whale Take Reduction Team's upcoming meeting and the consultation process at the April New England Council meeting. At the June meetings for both Councils, my staff will present the outcome of the April 2019 Take Reduction Team meeting and expected next steps. As we continue to work on the consultation, we will coordinate with you to establish an agreed timeline for your review of the draft Biological Opinion. If you agree, we can discuss the timeline at the upcoming Northeast Regional Coordinating Council meeting in May.

Sarah Heil, Assistant Regional Administrator for Sustainable Fisheries, will serve as the point of contact for fishery management measures and actions. Mike Asaro, Acting Assistant Regional Administrator for Protected Resources, will be the point of contact for information on the

Atlantic Large Whale Take Reduction Team and Section 7 consultation. Sarah can be reached at Sarah.Heil@noaa.gov or (978) 281-9257. Mike can be reached at Michael.Asaro@noaa.gov or (978) 282-8469.

We welcome your input on these issues and appreciate your continued engagement.

Sincerely,



Michael Pentony
Regional Administrator

NATIONAL MARINE FISHERIES SERVICE POLICY 01-117 Effective on: January 19, 2015
To be reviewed on: October 1, 2023
Fisheries Management
Integration of Endangered Species Act Section 7 with Magnuson-Stevens Act Processes
NOTICE: This publication is available at: https://www.fisheries.noaa.gov/national/laws-and-policies/policy-directive-system
Author name: Marian Macpherson **Office:** Sustainable Fisheries **Certified by:** Alan Risenhoover **Office:** Sustainable Fisheries **Type of Issuance:** Renewal, September 2018
SUMMARY OF REVISIONS: Renewed in September 2018. This initial directive was put into effect on January 19, 2015.

I. Introduction

The Endangered Species Act (ESA), in Section 7(a)(2), requires federal agencies ("action agencies") to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of threatened or endangered species or adversely modify or destroy such species critical habitat in consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service (NMFS) ("consulting agencies"), depending on the species or habitat affected. The consulting agencies' determinations of whether a proposed action is likely to result in jeopardy or adverse modification is reached through the section 7 consultation process set forth at 50 CFR Part 402. Informal consultation is an optional process in which the action agency and the consulting agency consider the effects to ESA listed species from a proposed action, and it concludes if the relevant consulting agency or agencies concur with an agency's determination that its planned action may affect, but is not likely to adversely affect listed species or their critical habitat. Formal consultation is required if one or both consulting agencies do not concur with the action agency's determination or if the action agency determines that its action may affect listed species or their critical habitat.

Formal consultation may be initiated when the action agency provides a written request with sufficient information about the proposed action and its effects on listed species and designated critical habitat. Formal consultation concludes with the consulting agency's issuance of a biological opinion (BO), which contains the consulting agency's conclusion as to whether the action is likely to jeopardize listed species or destroy or adversely modify critical habitat. If the BO concludes

that the proposed action is likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of critical habitat, the consulting agency proposes "Reasonable and Prudent Alternatives" (RPAs) that would allow the action to proceed with modifications to avoid jeopardy or adverse modification. In this case, the action agency should either modify the proposed action to bring it into compliance with the ESA, or not take the action. The consulting agency and action agency should work together to avoid jeopardy conclusions and, when this is not possible, work together to develop RPAs. The BO also includes an "incidental take statement" (ITS) that specifies the number of individuals, or extent of a population, of a listed species that will be "taken" – defined broadly under the ESA to include harm and harassment as well as killing, hunting and capture – incidental to the planned action, and exempts that take from the ESA section 9 prohibitions on take. An action agency must reinitiate the consultation process if the specified amount or level of take is exceeded.

This policy was developed in response to a 2012 Council Coordinating Committee (CCC) request for better integration of Councils into the NMFS's ESA section 7 consultation process.

II. Objective

This policy directive implements recommendations from the CCC and the Marine Fisheries Advisory Committee (MAFAC) for better integrating Councils into the ESA section 7process. It is NMFS's policy that integration of Councils' fisheries management planning processes with the ESA section 7 process, along with enhanced coordination and collaboration, will result in more efficient development of regulations and policies that accomplish the goals of the ESA, National Environmental Policy Act (NEPA), and the Magnuson-Stevens Act (MSA).

III. Authorities and Responsibilities

This policy directive establishes the following authorities and responsibilities. This policy applies to ESA section 7 consultations that are conducted on fishery management activities that: (1) are governed by fishery management plans developed by the Councils pursuant to the MSA; and (2) may affect endangered or threatened species or designated critical habitat under NMFS' jurisdiction.

This policy does not apply to fisheries managed solely by the Secretary. It does not pertain to consultations on species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service. It does not apply in the case of consultations conducted on activities taken by other action agencies.

There are generally three opportunities for collaboration with the Councils when section 7 of the ESA applies. The first occurs when a Council is in the process of developing a new or modified management measure and NMFS determines that the action may affect endangered or threatened species or designated critical habitat. The

second opportunity is during formal or informal consultation between the unit of NMFS functioning as the action agency (Sustainable Fisheries (SF)), and the unit of NMFS functioning as the consulting agency (generally Protected Resources (PR)), once a proposed action has been identified. Another opportunity occurs when a change external to the Council process triggers the need for initiation, or reinitiation, of consultation on the fishery action. For example, reinitiation is triggered by a change in species listings, a designation or revision of critical habitat, an exceedance of the amount or level of incidental take specified in an ITS, or if new scientific information becomes available that may affect the findings of an existing BO. NMFS has determined that this policy is applicable to all three situations. NMFS and the Councils are encouraged to use this policy and guidance to foster broad cooperation and communication pertaining to our joint stewardship and management responsibilities.

IV. Measuring Effectiveness

a. Recognition of the Unique Roles of Councils

The MSA establishes the basis for Federal management of United States fisheries and vests primary management responsibility with the Secretary of Commerce. The Secretary has delegated this responsibility to the NMFS. The MSA management system is unique insofar as Congress has established eight regional fishery management councils and given them special responsibilities for recommending fishery management plans (FMPs) and amendments and regulations. FMPs and regulations must comply with all applicable law including the ESA.

Composed of Federal, state, and territorial fishery management officials, participants in commercial and recreational fisheries, and other individuals with experience or training in fishery conservation and management, the Councils' primary responsibility is to develop and recommend fishery management measures and actions for any fishery under their jurisdiction that requires conservation and management. Specifically, MSA section 302(h)(1) requires Councils to prepare and submit FMPs to NMFS for fisheries in need of conservation and management. Section 303(c) of the MSA requires Councils to submit to NMFS proposed regulations that the Councils deem necessary and appropriate to implement the FMP. The MSA mandates an open, public process for the development of fishery management measures and actions through the fisheries management council system. For MSA fishery management actions, NMFS's authority to modify Council-recommended fishery management plans and plan amendments is restricted: NMFS may approve, disapprove, or partially approve a proposed FMP or FMP amendment recommended by the Council, and the sole basis for disapproval of any such recommendation is that it is not consistent with applicable law, including NEPA, the MSA and its national standards, or the ESA. NMFS may not modify regulations in a way that is inconsistent with an underlying

FMP or amendment.

In recognition of this unique relationship between NMFS and the Councils, in 2013, NMFS issued a Policy Directive on "National Environmental Policy Act Compliance for Council- Initiated Fishery Management Actions under the Magnuson-Stevens Act," that pertains to roles and responsibilities for NEPA compliance. That policy promotes early cooperation and partnership. Recognizing that each Region/Council pair frequently works as a team to achieve the fishery management mission with available resources, the policy fosters continued cooperation and joint prioritization between NMFS and the fisheries management councils.

While recognizing that Councils are not Federal action agencies for the purposes of NEPA, the policy also acknowledges that the Councils are indispensable elements in the MSA statutory scheme and as such, are an integral part of the Department of Commerce team. Given the unique relationship between NMFS and the Councils, either NMFS or Council staff may draft the NEPA document as long as NMFS participates early, provides information or advice as needed, conducts appropriate outreach with other agencies and constituents, and independently evaluates each NEPA document's adequacy prior to using it in some fashion to satisfy its NEPA responsibilities.

Similarly, the Councils play a critical role in supporting NMFS's ability to comply with the ESA. For example, in order to initiate the consultation, the Action Agency must submit a written request to the Consulting Agency that includes a description of the action and potential effects on listed species and critical habitats along with a determination of effect. (50 CFR 402.14(c)). This means consultation cannot begin until the Council can sufficiently describe the proposed action. Additionally, the Action Agency often relies on the analysis of protected species/critical habitats in the NEPA document, which may be prepared by the Council, to support its determinations on effect to ESA-listed species and/or critical habitat. Another example of the Council's critical role in supporting NMFS ability to comply with the ESA occurs during the formal consultation process when a BO concludes that a proposed fishery action *is* likely to jeopardize the continued existence of an ESA-listed species or result in destruction or adverse modification of critical habitat. Alternatives must be developed in these circumstances and, as a result, the Consulting Agency and Action Agency must work together to develop RPAs that will remove jeopardy or adverse modification to the species and/or critical habitat and, therefore, allow the action to proceed. RPAs must:

- Be consistent with the intended purpose of the action;
- Be consistent with the scope of the Federal agency's legal authority;
- Be economically and technologically feasible for the agency to implement;
- Not jeopardize the continued existence of listed species or result in

adverse modification of critical habitat

When RPAs are provided, NMFS should either modify the proposed action in order to comply with the ESA or not take the action. However, since NMFS cannot modify council- recommended FMPs or amendments, it is imperative that NMFS work closely with the Councils to accommodate ESA requirements.

b. Fostering Council Involvement

NMFS recognizes that any policy to align Council processes with the ESA section 7 process should be flexible, and should allow for NMFS and a Council to scale Council involvement appropriately depending on the facts and circumstances of the action under review. NMFS offers the following guidelines for enhancing coordination and collaboration among SF, PR, and Councils throughout the ESA section 7 consultation processes:

1. Existing Arrangements

This policy recognizes that some region/council pairs have existing working relationships pertaining to ESA compliance for MSA fishery management actions. This policy does not supersede those agreements. Rather, it offers an additional opportunity for further coordination if the Council requests a more specific role. There is no need to prepare an additional agreement where both NMFS and the Council are satisfied with current arrangements.

2. Early Coordination and Cooperation

This policy fully supports the MAFAC report's conclusion that early collaboration can reduce the likelihood that the preferred alternative will result in jeopardy or destruction or adverse modification. This policy stresses and calls for early involvement between PR, SF and the Councils prior to initiation of consultation. Specifically, early involvement from PR through technical assistance and/or assignments of liaisons is encouraged.

In addition, engaging Consulting Agency staff in reviewing and providing appropriate information for sections of NEPA documents can provide greater certainty that the documents will address effects of the action on ESA-listed species, provide a means for the public to understand the effects through the NEPA public review process, and ensure that the Council has adequate information to make its recommendations.

3. "ESA/MSA Integration Agreements"

NMFS regional offices and Councils may choose to develop written

agreements providing for specific types of Council participation in the ESA section 7 process, i.e., "ESA/MSA Integration Agreements." As stated above, Council involvement will be most effective if based on early and continuous communication and cooperation with the Action Agency and the Consulting Agency. This policy recognizes that there may be cases where the Action Agency and/or Consulting Agency may seek input from a Council during consultation. Additionally, there may be cases when the Regional Administrator (RA) for a NMFS regional office decides to share a draft BO with the Council. According to the ESA regulations, the Action Agency may request a copy of the draft BO for the purpose of reviewing RPAs, and the Consulting Agency shall provide it. (50 CFR 402.14(g)(5). The Consultation Handbook[11] indicates that, if the action agency supports participation by a party who may not fit the definition of "applicant," the consulting agency should try to work with that party, although the procedural opportunities afforded to "applicants" would not apply to that party (Consultation Handbook, p. 2-12).

Any ESA/MSA Integration Agreement should provide for early and continuous cooperation and communication between Consulting Agency, Action Agency, and the Councils and may allow for sharing of draft BOs only in accordance with the criteria provided below.

a. On an Action-Specific Basis

NMFS may request input and participation from Councils during technical assistance and/or consultation phases of ESA section 7 consultation. A Council, through either the Chair or the Executive Director, may also request involvement in an ESA section 7 process by transmitting a letter to the appropriate RA.

When NMFS either requests Council involvement or agrees to a Council's request for involvement, the agreement may allow the Council to advise the Action Agency throughout the ESA section 7 process as appropriate. Such involvement may include assisting NMFS with any or all of the tasks described in the section 7 consultation regulations including: describing the proposed action for purposes of initiating consultation; identifying feasible alternatives; providing Council views as to the "best scientific information available" on fisheries management practices and potential effects of the proposed action on listed or proposed listings of species and designated or proposed designations of critical habitat; preparing draft biological assessments, biological evaluations, and other ESA section 7 consultation initiation documents;

[1] U.S. Fish and Wildlife Service and NMFS, "Endangered Species Act Consultation Handbook: Procedures for Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act," March 1998 (hereinafter, "Consultation Handbook.")

and preparing or reviewing additional information requested by the Action Agency or the Consulting Agency during consultation.

If a Council requests an opportunity to review a draft BO during a formal ESA section 7 consultation, the RA may decide to provide an opportunity for Councils to review a draft BO, including reviewing draft RPAs in the case of a jeopardy BO, or draft Reasonable and Prudent Measures (RPMs) to be included in an ITS.

These opportunities for enhanced coordination and communication among Councils, the Action Agency, and the Consulting Agency with regard to ESA section 7 do not require designations of Councils as particular special parties described under the ESA regulations nor do they affect NMFS's authorities pursuant to MSA or NEPA.

NMFS's requests to Councils should specify the level of Council involvement sought by NMFS in the technical assistance, pre-consultation, informal consultation, formal consultation, and/or other process; the designated points of contact at NMFS for coordination purposes; and any other relevant information that will better integrate the ESA consultation process with the Council process and assist NMFS with its responsibilities under the ESA.

In response to Council requests, NMFS will respond in writing to the Council, describing the level of coordination between the Council and NMFS deemed appropriate for the consultation, identifying points of contact at NMFS, and providing any other relevant information that will assist NMFS and the Council in their coordination efforts. It is expected that NMFS generally will grant a Council's request for involvement in an ESA section 7 process. However, NMFS may deny the request in circumstances that include NMFS' determination that the Council's requested level of involvement would violate federal law or the order of a court in ongoing litigation or when existing deadlines do not provide sufficient time for the level of involvement requested.

b. On a Region/Council Basis

In addition to the steps outlined above pertaining to Council involvement in an individual ESA section 7 consultation process, when requested by a Council, NMFS regions and the requesting Council may develop a generally-applicable, written working agreement (either within the context of, or modifications to, their Regional Operating Agreements, or through another form of formal written documentation such as a Memorandum of Understanding (MOU), outlining roles, responsibilities, and expectations for each Region and Council pair during ESA section 7 consultation process. Such an agreement should be clearly titled as the

"ESA/MSA Integration Process," should clarify the circumstances covered by the agreement, and should state that NMFS retains discretion to conduct any individual ESA section 7 consultation differently from the process spelled out in such an agreement. Such a written agreement may be signed by NMFS, and the relevant Council, as appropriate.

c. Criteria

In developing a written agreement on either an action-specific or a generalized basis, the regions and Councils should comply with the guidance set forth below.

i. Roles of NMFS Offices.

The ESA section 7 regulations specify roles for Action Agencies and Consulting Agencies. To implement this policy, each region must identify which office is acting in which of these roles and the offices must fulfill the roles set forth in the regulations. In most instances, this means that the Action Agency communicates directly with the Council for the purposes of developing initiation documents, collecting scientific information regarding the fishery and interactions with ESA species and critical habitat, and developing alternatives to minimize interactions resulting in take of species.

The Consulting Agency should communicate with the Action Agency, and Councils if appropriate, early and often regarding affected species and critical habitat and fisheries and scientific information needed for the consultation. This can be achieved by making presentations at Council meetings, participating on interdisciplinary teams with the Action Agency and Councils, and providing other forms of early communication and technical assistance. The Action Agency should maintain its role as liaison throughout the section 7 process. During formal consultation, the Action Agency must facilitate direct communication with the Council; determine how to address the Council's concerns on its (the Action Agency's) record, and then communicate issues to the Consulting Agency, which may be the same or different from those communicated by the Council. The Consulting Agency must maintain a record that supports the manner in which it addresses comments submitted by the Action Agency and other decisions during consultation.

ii. Record Considerations when sharing draft BOs.

If the RA determines that a draft BO should be shared with a

Council, it is likely that the Council will provide comments. While the section 7 regulations specify that the purpose of sharing a draft BO is for analyzing RPAs, it will not be possible to limit the comments that are submitted to specific topics such as RPAs. It is not necessary for NMFS to develop a separate "comment and response" document addressing Council comments on a draft BO. However, both the Action Agency and Consulting Agency should make sure that their records appropriately consider and address any comments received. For the Action Agency, it may be appropriate to respond to Council input orally during a Council-meeting, or in writing in any relevant follow-up report.

The Consulting Agency would not be required to respond to each individual comment. However, the final BO should describe any additional considerations that affect the analysis, provide the rationale supporting the final decision, and include any modifications to the document that are appropriate in light of relevant information.

iii. Information Quality Act (IQA) Compliance for Release of Draft Biological Opinions to Councils.

Pursuant to the IQA (P.L. 106-554 § 515), NOAA has guidelines regarding the quality, objectivity, utility, and integrity of information that it disseminates. Dissemination means agency initiated or sponsored distribution of information to the public. Dissemination does not include distribution limited to: government employees or agency contractors or grantees; intra- or inter-agency use or sharing of government information; or responses to requests for agency records under the Freedom of Information Act, the Privacy Act, the Federal Advisory Committee Act or other similar law. This definition also does not include distribution limited to: correspondence with individuals or persons, press releases, archival records, public filings, subpoenas or adjudicative processes. ESA section 7 consultation documents that are posted on a public internet website or Public Consultation Tracking System are publicly disseminated.

Release of draft BOs to Councils would constitute dissemination to the public. Therefore, pre- dissemination review and certification including review by NOAA General Counsel and the RA must be completed prior to release. NOAA Information Quality Guidelines are posted on the NOAA Office of the Chief Information Officer Webpage.
http://www.cio.noaa.gov/services_programs/info_quality.html

During formal consultation, NMFS may agree to release preliminary drafts of RPAs or RPMs prior to release of the entire draft opinion if otherwise consistent with this policy. However, during formal consultation no other individual components of a BO may be released to the Council out of context of the entire cleared draft.[2] For example, NMFS will not release a draft effects analysis as a stand-alone document.

iv. Staff, Budget, and Timing Considerations.

In developing these regional agreements, NMFS and the Councils should carefully weigh the costs and benefits of sharing draft BOs that have been cleared in accordance with section IV.B.3.c.iii of this policy. This choice can have workload, budgetary and timing implications. Specific timing considerations are as follows.

To initiate formal consultation, the Action Agency must submit a written request that includes a description of the action and potential effects on ESA-listed species along with a determination of effect for each species and its critical habitat, if present. (50 CFR 402.14(c)). This means the request for consultation cannot begin until the Council can sufficiently describe and therefore, provide the proposed action to the Action Agency. Consultation also cannot begin until the Consulting Agency has received all requested information from the Action Agency. Once all requested information has been received by the Consulting Agency, the ESA requires that the formal consultation be concluded within 90 days (unless mutual agreement between the Consulting Agency and the Action Agency to extend) (ESA section 7(b)(1)(A)), and that a BO documenting the Consulting Agency's opinion about how the action affects the listed species must be provided within 45 days (unless extended) of the conclusion of the consultation (50 CFR 402.14(e)). While the default total time established by the statute and regulations between initiation of consultation and completion of the final BO is 135 days, the Consulting Agency sometimes exceeds this time period due to mutually-agreed extensions.[3]

[2] This statement does not preclude frontloading activities or the sharing of information between NMFS and council staff to describe the proposed actions. The proposed action should be sufficiently described prior to initiation of the formal consultation clock.

[3] According to the Consultation Handbook, "initiation of consultation" for purposes of starting the 90-day time period on formal consultation occurs when the consulting agency determines the information submitted is complete. Consultation Handbook, section 4.4, pp. 4-5 - 4-8.

With respect to timing, the proposed process of having the Council review a draft BO, that has been cleared in accordance with section IV.B.3.c.iii of this policy, would likely prevent the Consulting Agency from completing the consultation and finalizing the BO within 135 days. Thus, the Action Agency and the Consulting Agency should mutually consider whether there is a need to extend the deadline to accommodate Council review. Factoring in the time required for review, clearance, and publication of Council meeting agendas in the Federal Register, a Council would need several weeks advance time in order to place on its agenda review of a draft BO, which has been cleared in accordance with section IV.B.3.c.iii of this policy. The process of Council review could also affect the timing of completion of associated NEPA documents and/or Council actions relying on the outcome of the BO.

Before agreeing to release of a draft BO that has been cleared in accordance with section IV.B.3.c.iii of this policy, the Action Agency and the Consulting Agency must consider and document whether there is a need for an extension of the 135 day period to provide sufficient time for Council review.

v. Freedom of Information Act Considerations

Sharing a draft BO, which has been cleared in accordance with section IV.B.3.c.iii of this policy, with Councils and the public, affects the document's status. Once shared, NMFS no longer considers it an intra-agency memorandum exempt from the disclosure requirements of the Freedom of Information Act (5 USC §552(b)(5)). Because Councils are public bodies, documents shared with them are considered public.

V. References

This policy directive is supported by the glossary of terms listed in Attachment 1.

Signed  9/27/2018

Chris Oliver Date

Assistant Administrator for Fisheries

Attachment 1

Glossary of Terms

Action Agency – For fishery management actions, the "action agency" is NMFS's Office of Sustainable Fisheries or regional Sustainable Fisheries Division.

Consulting Agency - For most marine/anadromous species, the "consulting agency" is NMFS's Office of Protected Resources or regional Protected Resources Division. However, in some cases, program offices within Sustainable Fisheries may conduct ESA consultations, depending on the species involved (e.g., salmon fisheries in the West Coast Region). This document uses the term "consulting agency" to refer to the office within NMFS that is acting as the consulting agency.

Section 7 Consultation – There are generally two types of consultation: informal and formal. An "informal" consultation includes all discussions and correspondence between an action agency and consulting agency to assist in determining the effects of an action or when the action agency determines that a proposed action may affect, but is not likely to adversely affect, ESA-listed species or critical habitat. A "formal" consultation is required when a proposed action may affect listed species and/or adversely modify or destroy critical habitat.

Biological Opinion – As part of a formal consultation, the consulting agency prepares a BO. This document states the consulting agency's opinion on whether the proposed action is likely to jeopardize a listed species or destroy or adversely modify a listed species' critical habitat. (50 CFR 402.14(h)).

Biological Assessment – A Biological Assessment (BA) is a document developed by the action agency to evaluate the potential effects of a proposed action on listed species and critical habitat. (See 50 CFR 402.12.) It can be used to support the action agency's determination(s) during an informal consultation or can be used to initiate formal consultation. BAs are only required for major construction projects.

Biological Evaluation - A generic term used to document analyses and Section 7 determinations when a BA is not required. Biological Evaluations often consist of NEPA documents (Environmental Assessments/Environmental Impact Statements) and other supporting documents. This document accompanies the request for consultation for FMP related actions.

Jeopardy – Under the ESA, jeopardy occurs when an action is reasonably expected, directly or indirectly, to diminish a species' numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild is appreciably reduced. (See 50 CFR 402.02)

Incidental Take Statement – BOs that contain a "no jeopardy" determination include Incidental Take Statements (ITS). The ITS includes a description of the expected amount or extent of take of ESA listed species resulting from the proposed action. The ITS also includes reasonable and prudent measures (RPMs) and terms and conditions that must be carried out by the action agency in order to be exempt from take prohibitions in the ESA.

2018 FALL NRCC MEETING SUMMARY (NOVEMBER 14-15)

Portland Regency Hotel – 20 Milk Street, Portland, ME

Attendees

Atlantic States Marine Fisheries Commission (ASMFC)
Bob Beal, Executive Director
Toni Kerns, Interstate Fishery Management Program Director (Day 2)

Mid-Atlantic Fishery Management Council (MAFMC)
G. Warren Elliott, Vice-Chairman
Dr. Chris Moore, Executive Director
Brandon Muffley, Staff

New England Fishery Management Council (NEFMC)
Dr. John Quinn, Chairman
Terry Stockwell, Vice-chairman
Chris Kellogg, Deputy Director
Dr. Jason McNamee, Chair, SSC

NOAA Fisheries Northeast Fisheries Science Center (NEFSC)
Dr. Jon Hare, Science and Research Director
Dr. Jim Weinberg, Stock Assessment Workshop (SAW) Chairman
Dr. Michael Simpkins, Chief, Resource Evaluation and Assessment Division
Dr. Russ Brown, Chief, Population Dynamics Branch

NOAA Fisheries Greater Atlantic Regional Fisheries Office (GARFO)
Mike Pentony, Regional Administrator
Moira Kelly, performing the duties of the Acting Assistant Regional Administrator for Sustainable Fisheries
Emily Gilbert, Sustainable Fisheries Division (NRCC staff support)
Kyle Molton, Sustainable Fisheries Division (NRCC staff support)

Guest Presenters
Dr. Dan Linden, APSD (Day 2)

Public Attendees
Drew Minkiewicz (Day 1)
Chris Weiner (Day 1)

Note: NRCC decisions and action items that resulted from this meeting are in bold for ease of reference.

– Day 1 –

1. NRCC Charter

The NRCC reviewed the draft of the NRCC charter. The group requested and agreed upon a few adjustments to the draft and ultimately approved the charter. The group agreed that rotating chairs will also be responsible for hosting the meetings. Formal members of the ASMFC will be the chairs for 2019 and GARFO support staff will reach out to coordinate meeting logistics in the coming months. The charter is a living document and adjustments will be included in future appendices. The NRCC agreed to host this document on the NEFMC's website. GARFO support staff will make the agreed upon adjustments to the charter and Mr. Mike Pentony will have all formal members sign the document during the next round of Commission and Council meetings (**Action Item #1**).

2. Long-term Stock Assessment Schedule Discussion

Approval of the Stock Assessment Scheduling Process

Dr. Mike Simpkins reviewed the latest updates to the stock assessment scheduling process document. NRCC members had already been updated on this information prior to the NRCC meeting. The following is a summary of the clarifications discussed at the meeting:

- The NRCC agreed that although the ability to utilize external reviews through a management track is not explicitly spelled out in the document, it is something that can be considered on a case-by-case basis.
- When Assessment Oversight Panel (AOP) meetings are being scheduled, the NEFSC will ensure that GARFO, the Councils, and the Commission staff are informed early on so they can participate. Their attendance is not a requirement.
- Dr. Jason McNamee requested that the SSC chairs have an orientation over the AOP process so they understand their roles prior to the implementation of this new process.
- The working group that came up with the initial strawman schedules for the research and management track will be disbanded; future scheduling will be accomplished by the NRCC.
- The NEFSC is working on creating automated data updates, where possible. Until these are automated, data updates must be requested and scheduled by the NRCC.

Following the presentation and discussion, **the NRCC approved the assessment process document by consensus**.

Approval of the Management Track Schedule

The NRCC reviewed and discussed the drafted management track schedule. Peer review levels will be determined later once assessment leads begin to develop initial assessment plans. There were a few adjustments to the drafted schedule, summarized below:

- The herring management track was moved from 2022 to 2020 and switched to a 2-year cycle (i.e., 2021-2022).
- To accommodate the adjustment in the herring cycle, the ocean pout, white hake, and wolfish management tracks were switched to a 3-year cycle beginning in 2021.
- Mr. Bob Beal noted that the ASMFC-only stocks are not getting assessed as much, noting that most are on a 5-year schedule. After discussion, the NRCC agreed that if/as capacity increases in the future, first consideration would be given to ASMFC assessments (**Action Item #2**).
- Some of the adjustments made to the specification cycles will require adjustments to the regulations. Eventually management actions for affected FMPs will need to be initiated to adjust the current allowable specification cycles (**Action Item #3**).
- Chub mackerel will need a data update or exploration of data for 2020 and will eventually need to be on the management track cycle. It was included as a placeholder with dates to be determined in the future.
- For blueline tilefish, Dr. Chris Moore mentioned that the NEFSC will likely need to help a bit even though most of the work will be coming out of the SEFSC. Coordination between SERO, SEFSC, MAFMC, SAFMC, GARFO, and NEFSC will be needed in the future.

Approval of the Research Track Schedule

The NRCC reviewed and discussed the drafted 5-year research track schedule. The NRCC discussed the need to consider how out-year schedules should be developed (i.e., Year 6 and beyond). The NRCC decided that each year it will develop a Year 6 list, will firm up the Year 3 list (Years 1 and 2 will be considered final), and will consider Years 4 and 5 to have some level of flexibility for adjustments.

There were a few adjustments to the drafted schedule, summarized below:

- The Spring 2020 research topic was refined to include red and silver hake stock structure, rather than just red hake.
- The NRCC agreed that haddock is a priority for a research track assessment, so that was moved to Spring 2021. The winter flounder stocks that were scheduled for that time were moved to Year 6 consideration.
- American plaice and dogfish research track assessments were moved from Fall 2021 to Spring 2022.
- The butterfish and longfin squid research track assessments were moved from Spring 2022 to Fall 2021.
- Windowpane flounder was removed from the Spring 2024 research list and included as a potential consideration for Year 6.

- In the place of windowpane, a scallop research track assessment was included for Spring 2024.
- The current list of Year 6 topics includes monkfish, winter flounders, windowpane flounders, Jonah crab, chub mackerel, blueline tilefish, scup, and herring. The NRCC agreed that the NEFSC's assessment branch should review this list and provide input (**Agenda Item #4**).

By consensus, the NRCC approved the current research track assessment schedule. The research assessments for 2020-2022 will not be adjusted. The 2023 schedule will be finalized over the next one or two NRCC meetings, and the 2024 schedule will be finalized in the next 3 to 4 NRCC meetings.

3. Update on Operational Stock Assessments for Scup, Black Sea Bass, and Bluefish

Dr. Russ Brown reviewed the current schedule for the operational stock assessments for scup, black sea bass, and bluefish. There is an AOP meeting tentatively scheduled for January 22, 2019. The agenda will be available the week before the meeting. The peer review is currently scheduled for April 2019, with final results available the first week of May. Dr. Simpkins suggested adopting some of the new assessment process in this assessment (i.e., invite GARFO and Commission and Council staff to AOP meeting). **The NRCC agreed.**

The NRCC had a longer discussion about the utility of having these assessments in April 2019, rather than later in the year, particularly for black sea bass. There was concern from the ASMFC and MAFMC regarding how to incorporate 2018 catch and landings information. Dr. Moore and Mr. Beal requested that the assessment be moved to June 2019 to incorporate that data. The NEFSC noted that if the assessment were moved to later in the year, the peer review would likely occur in August or September, rather than June. Mr. Pentony pointed out that this would mean final action for black sea bass specifications would occur in October at the earliest, which would mean that the black sea bass fishery would operate under no specifications at the January 1 start of the 2020 fishing year. In the case that the assessment remains on its current April schedule and does not include 2018 data, Dr. Moore asked if the NEFSC could provide an assessment or data update later in the year to inform management. Dr. Simpkins noted that the NEFSC does not want to do an assessment update, but that a data update would be possible. However, a data update would not include updated projections. The NRCC agreed that at the MAFMC's December meeting there will be a discussion clarifying milestones and when they would occur based on the current April 2019 schedule versus a later schedule. The NEFSC and GARFO will work on refining this schedule (**Action Item #5**). The NRCC scheduled an intercessional call for December 17 to discuss whatever recommendation comes out of the ASMFC and MAFMC's joint December meeting.

UPDATE: Following the NRCC meeting, the ASMFC, MAFMC, GARFO, and NEFSC resolved the timing of these assessments. All parties agreed to push back the operational assessment to early July 2019 (rather than April) in order to incorporate 2018 data. The peer review would occur in late July, with final reports available in mid- to late August. Because this information will not be available to get specifications in place at the start of the 2020 fishing year, we will come up with a plan to set interim measures for the start of the year (i.e.

2020). Following final results of the operational assessment, the SSC will meet in September 2019 to make acceptable biological catch (ABC) recommendations for the 2020-2021 fishing years. The Council and Board will meet (jointly or separately - TBD) in October 2019 to make final recommendations for 2020-2021 and GARFO will work to implement those measures as quickly as possible. All parties will continue to work on fine-tuning those timelines, but have a joint plan moving forward. Based on these discussions, the intercession call on December 17 was cancelled.

4. Workshop on Changing Climate Conditions and Science on the East Coast (NEFSC-SEFSC)

Dr. John Hare provided a status update on the workshop being developed by the NEFSC and the Southeast Fisheries Science Center. The purpose of the workshop is to improve climate science coordination across the eastern U.S. coast. This is a step towards more coastwide interactions. Dr. Hare was interested to know if other NRCC organizations would want to attend and if so, at what level of participation. **The NRCC generally agreed they would be interested in sending staff to observe.** This workshop is focused on science. Future workshops can address management issues.

– Day 2 –

5. Update on NEFSC-GARFO Coordination to Reconcile and Explain Differences in Discard and Landing Estimates

Dr. Dan Linden provided an update on the Data Matching and Identification System (DMIS) documentation and ongoing comparisons with Area Allocation (AA) tables. DMIS is used for quota monitoring and the AA tables are used in stock assessments. DMIS is a process used to integrate all fishery dependent data from a single commercial fishing trip. It is a general process and has recently been revised to apply to all FMPs. APSD has drafted DMIS documentation and the NEFSC has already provided comments. Dr. Linden provided the NRCC with the drafted documentation and noted that if the NRCC would like to comment, it would be helpful to submit comments by January or February 2019. Dr. Linden also mentioned that NESFC and GARFO are committed to coordinating to the extent possible in reconciling differences in discard and landings estimates that are developed through DMIS and the AA tables. These systems were developed to achieve different objectives, so it will not always be possible to have identical estimates. GARFO and NEFSC will have a workshop in the future to continue discussions and build consensus for continued Fishery Dependent Data Initiative (FDDI) project development.

The NRCC had a brief discussion about interest in attending the workshop. Mr. Pentony suggested that there be an internal workshop first, followed by a larger discussion with external partners. APSD will discuss this suggestion. There will be a follow-up on the status of this workshop at the next NRCC (**Action Item #6**).

6. Coordination of Atlantic Herring Management in the EEZ

The NRCC discussed the ASMFC's recent decision to consider development of herring spawning protection in the offshore area of Georges Bank, which is solely in Federal waters. It was noted that this request must go to the NEFMC and be considered against its other priorities for 2019. Mr. Pentony clarified that GARFO only has the ability to develop complimentary regulations under Secretarial action when the fishery is not currently management in Federal waters by a Council. Mr. Pentony offered support to the Board and Council to work collaboratively. The NEFMC will discuss 2019 priorities at its December 2018 meeting. Mr. Beal recognized that more research into the issue of spawning protection must happen before action can be taken.

7. Priorities Discussions

The NEFSC, MAFMC, NEFMC, ASMFC, and GARFO presented their list of priorities to-date for 2019. Mr. Pentony noted that the approved assessment process requires adjustments to a number of specification cycles, which will need to be addressed through future actions.

The NRCC had a long conversation about wind energy. There was general concern over the Bureau of Ocean Energy Management's (BOEM) process for approving offshore wind projects and the level of NMFS's support for such projects. Mr. Pentony discussed our requirements under NEPA to review these wind projects, often on an extremely tight timeline. Dr. Hare noted the difficulty of determining the cumulative impacts of wind energy projects, particularly on fisheries resources. Dr. Hare also noted that when these wind projects are developed, there will be an impact on our surveys and assessments because research vessels will no longer be able to access those areas. Recognizing that wind energy is something that will continue to be an important issue, the NRCC agreed to have regular updates at future meetings. GARFO will coordinate with relevant staff to provide a formal presentation and discussion on wind energy at the next NRCC meeting (**Action Item #7**).

8. Update on Northeast Trawl Advisory Panel

Mr. Terry Stockwell discussed general updates from the Northeast Trawl Advisory Panel (NTAP). The working group of the NTAP will meet next week. The purpose of this working group meeting is to: 1) Review the status of the wingspread performance analyses and gear performance (door) evaluations; 2) discuss the twin trawl survey design and door testing with considerations given to species of interest, timing, experimental design and analyses; and 3) discuss other business and next steps for the NTAP. There will be a full NTAP meeting in December to review the work of the working group. Mr. Stockwell noted that many working group members were concerned about the most recent *R/V Bigelow* breakdown and the NEFSC's decision to cut down to four surveys. Dr. Hare emphasized that maintenance of the *R/V Bigelow* is a top priority.

Mr. Stockwell also noted that the Councils and Commission should reevaluate NTAP membership. Some of the current members have not attended a meeting and it would be beneficial to have active membership.

9. Other Business

New Assessment Process Outreach
The NEFSC will consider the outreach approach for the new assessment process (**Action Item #8**). The Councils and Commission will report out on the new assessment process and long-term schedules at their next meetings. The SSCs will also discuss at future meetings. The NEFSC will post a short web story announcing that the NRCC approved this stock assessment process.

Next Meetings
The NRCC scheduled an intercessional call from 1-2pm on December 17, 2018, which was later cancelled.
The Spring 2019 NRCC meeting is scheduled for May 29-30th. ASMFC is chairing and hosting.

NORTHEAST REGION COORDINATING COUNCIL CHARTER

New England Fishery Management Council

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

The Northeast Region Coordinating Council Charter

Background

Formed in 2001, the Northeast Region Coordinating Council (NRCC) consists of members from the Atlantic States Marine Fisheries Commission (ASMFC), Greater Atlantic Regional Fisheries Office (GARFO), Mid-Atlantic Fishery Management Council (MAFMC), New England Fishery Management Council (NEFMC), and Northeast Fisheries Science Center (NEFSC).

Mission

To prioritize, communicate, and coordinate fisheries scientific and management resources through in-person meetings that include Federal, state, Council, and Commission managers and scientists of the Greater Atlantic region of the United States.

Roles and Responsibilities

Formal Members

The following are the decision-making, voting members of the NRCC representing the five partner organizations:

- ASMFC Chair
- ASMFC Vice-Chair
- ASMFC Executive Director
- MAFMC Chair
- MAFMC Vice-Chair
- MAFMC Executive Director
- NEFMC Chair
- NEFMC Vice-Chair
- NEFMC Executive Director
- NMFS Greater Atlantic Regional Administrator
- NMFS Northeast Fisheries Science and Research Director

NRCC Deputies

NRCC Deputies are non-voting, standing members from each member organization with the following titles:

- Assistant Regional Administrator (ARA) for Sustainable Fisheries, GARFO
- Interstate Fishery Management Program Director, ASMFC
- Deputy Director (or designee), NEFMC
- Deputy Director (or designee), MAFMC
- Chief, Resource Evaluation and Assessment Division, NEFSC

These designated deputies form an oversight panel that reviews and approves the membership of research track stock assessment working groups, as well as confirm the selection of external experts nominated to serve on management track or research track peer review panels.

Ex-Officio Members

Ex-officio members may attend and participate in NRCC meetings to provide organizational support and expertise. Ex-officio members include:

- MAFMC Scientific and Statistical Committee (SSC) Chair
- NEFMC SSC Chair
- Fisheries Science Program Director, ASMFC
- ARA for Analysis and Program Support, GARFO
- Stock Assessment Workshop Chair, NEFSC
- NOAA General Counsel, Northeast Section

Support Staff

Two support staff, appointed by the GARFO Regional Administrator, attend every NRCC meeting to assist with meeting logistics. Support staff solicit members for agenda items in advance of the meetings, take notes and record action items during meetings, and are responsible for drafting and distributing meeting summaries following NRCC meetings. Support staff will provide drafts of meeting summaries to all parties for review prior to finalization. Support staff are also responsible for organizing and providing support for any intercessional meetings or conference calls deemed necessary by the NRCC.

Invited Participants

Other technical staff may attend, as necessary, based on specific meeting agenda topics.

Operations

Rotational Chairs

The Executive Directors, Chairs, and Vice-Chairs of the Councils and Commission, the GARFO Regional Administrator, and the NEFSC Science and Research Director will each rotate into the NRCC chair position on an annual basis. The rotational chair schedule is provided below:

GARFO		S2023, F2023	S2028, F2028
ASMFC	S2019, F2019	S2024, F2024	S2029, F2029
MAFMC	S2020, F2020	S2025, F2025	S2030, F2030
NEFSC	S2021, F2021	S2026, F2026	S2031, F2031
NEFMC	S2022, F2022	S2027, F2027	S2032, F2032

F= Fall; typically October S=Spring; typically May

As further described below, the chair is responsible for finalizing meeting agendas, including the selection of special agenda topics, and for leading the meeting discussions with the help of the lead NRCC GARFO support staffer.

Scheduling

The NRCC meets twice annually, in the spring and fall, to discuss assessment scheduling and crosscutting fisheries issues. Meetings are generally two days in length, but can extend to three days at the discretion of the NRCC chair to handle larger coordination issues, as appropriate. Intercessional calls may also be scheduled between in-person meetings.

Agenda Setting

Agenda topics for NRCC meetings that extend beyond assessment scheduling and prioritization should be relevant to at least three of the NRCC member organizations. Formal NRCC members are the points of contact for consolidating and submitting agenda items to GARFO NRCC support staff.
In preparation for each NRCC meeting, the NRCC chair will coordinate with support staff to finalize the agenda prior to the start of the NRCC meeting.

Logistics/Hosting Rotation

When member organizations are chairing the NRCC meetings, they will also host the meetings, which requires setting up the hotel reservations, making dinner reservations, and providing the necessary meeting space and equipment. The hosting rotation schedule is the same as the schedule provided under to Rotational Chairs section on page 2. Logistical questions for hosts should be sent to the current NRCC GARFO support staff.

Decision Making

The formal NRCC members are decision makers for setting stock assessment priorities and schedules (See Assessment Scheduling below). Voting in these cases is accomplished by consensus and decisions are recorded in the meeting summaries. If there is ever a need to conduct a formal vote, each organization will vote as a block and represent one vote.
In other instances, the NRCC's role is to be a coordinating body that makes consensus recommendations to be considered by the Councils, Commission, NEFSC, and GARFO.

Assessment Scheduling

With respect to assessment priorities, the NRCC (a) sets/recommends long-term (five-plus year) schedules for both the management and research track, (b) reviews and adjusts those schedules as needed, and (c) recommends priorities among complex management track assessments (i.e., assessments requiring expedited or enhanced peer reviews) in situations where more complex assessments are proposed than can be accommodated.
The specifics of the assessment scheduling process is outlined in Appendix 1: Description of New England and Mid-Atlantic Stock Assessment Process

NRCC Committees

NRCC members will occasionally form (and appoint membership to) ad-hoc sub-committees as needed. These sub-committees will be focused on particular subjects that arise from NRCC discussions and will convene only as long as necessary to complete a particular task.

Public Engagement

The primary purpose of the NRCC is to coordinate actions and resource allocations for the member groups. Meetings are generally open to the public. Occasionally, a conference call will be available when a requested presenter or NRCC attendee cannot attend a specific meeting.

The NRCC meeting agendas, briefing material, and meeting summaries are made publically available on the NEFMC's website (https://www.nefmc.org/committees/northeast-regional-coordinating-council-nrcc).

Signatures and Approval

We, the formal membership of the NRCC, hereby agree to the terms of this NRCC charter, as initially finalized on 2/5/2019.

DATE

Regional Administrator, GARFO

Science and Research Director, NEFSC

Executive Director, ASMFC

Chair, ASMFC

Vice-Chair, ASMFC

Executive Director, MAFMC

Chair, MAFMC

Vice-Chair, MAFMC

Executive Director, NEFMC

Chair, NEFMC

Vice-Chair, NEFMC