Atlantic States Marine Fisheries Commission

East Coast Climate Change Scenario Planning Initiative

August 2, 2023
1:45-3:45 p.m.
Hybrid Meeting

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome/Call to Order *(S. Woodward)* 1:45 p.m.

2. Review Findings from the East Coast Climate Change Scenario Planning Initiative (*T. Kerns)* 1:50 p.m.
   - Overview of Summit Meeting
   - Review Draft Possible Action Plan
   - Discuss Next Steps

3. Public Comment 3:35 p.m.

4. Adjourn 3:45 p.m.

The meeting will be held at The Westin Crystal City (1800 Richmond Highway, Arlington, VA; 703.486.1111) and via webinar; click here for details

Report of the February 2023 East Coast Climate Change Scenario Planning Summit Meeting

April 2023

Table of Contents

Executive Summary

This document provides a comprehensive summary of ideas generated at an East Coast Scenario Planning Summit Meeting attended by over 50 East Coast fishery managers on February 15-16, 2023. Summit participants consisted of representatives from each of the three U.S. East Coast Fishery Management Councils, the Atlantic States Marine Fisheries Commission, and the National Marine Fisheries Service.

The goal of the Summit meeting was to develop a set of potential governance and management actions resulting from a scenario-based exploration of the future. It was not possible for the Summit to cover all the issues raised throughout the 2-year scenario process. Instead, focus was placed on three overarching themes highlighted in Council and Commission discussions during their meetings in November and December 2022. These themes were:

- Cross-Jurisdictional Governance and Management: evaluating the current East Coast fishery governance structure and identifying potential changes to increase our ability to respond effectively to changing conditions
- Managing Under Increased Uncertainty: identifying actions to take to prepare for and respond to an increase in uncertainty, where historical conditions can no longer be used to predict the future
- Data Sources and Partnerships: identifying how to better coordinate data collection systems and develop partnerships to leverage existing funding

The Summit agenda involved breakout group conversations and prioritization exercises designed to highlight the most promising potential ideas to address the challenges in each of these themes. Many ideas were raised, with particular emphasis placed on the following:

Cross-Jurisdictional Governance

Discussions centered around the importance of future governance structures being more adaptable to continual change, but also recognized the trade-offs between flexibility and consistency/coordination. Participants discussed the possibility of a single, East Coast Management Council with state or fishery-based opt-in representation. But a change of this magnitude, and the barriers of losing the unique characteristics of regional councils and a need to revise the Magnuson-Stevens Act, led to a discussion focused on how we could work toward changes within our current governance structure. Specifically, many supported reconsideration of committee representation, while moving toward more consistent use of committees across Councils and with consideration of modifying voting rules to enhance the role of committees in the process. In addition, many participants raised issues around clarifications of roles and considerations of efficiency in jointly or cooperatively managed stocks. The group recognized that there is a spectrum of approaches to joint or collaborative management, and while not all joint management needs to operate the

same way, clearly defining and recognizing the pros and cons of different approaches would be helpful.

Participants also discussed when and how changes in management authority should be made. Generally, participants felt that triggers should be used to initiate a *review* of management authority, and not trigger immediate change. Participants felt improved coordination within and between all management bodies (all three Councils, the Commission, and the National Marine Fisheries Service or NMFS) was needed. Ideas that received particular attention included improving the coordination between and within NMFS regions, and increasing cross-pollination of the three Council Scientific and Statistical committees (SSCs).

Managing Under Increased Uncertainty

Attendees agreed that improved risk policies may provide a means to better account for current and future climate impacts on species, including both negative and positive impacts. Participants also discussed the possibility of moving toward robust management options rather than trying to account for all kinds of uncertainty within stock assessment models, and raised the idea of considering different management approaches at the leading and trailing edges of a shifting species range. Across all of these, we may be able to make better use of tools such as climate vulnerability assessments and management strategy evaluations. Qualitative sources of information and local ecological knowledge have the potential to inform management in a rapidly changing environment, but we will need mechanisms to include these sources in our work.

Data Sources and Partnerships

Fostering better coastwide cooperation must extend beyond jurisdictional issues to include data collection and partnerships. Many scientific surveys are conducted along the East Coast, including by federal and state entities, but the methods of data collection and storage vary greatly. Many regions/entities may not even be aware of what data is collected by another. This contributes to difficulties in sharing data and risks duplication of effort. Participants discussed creating consistent surveys across regions, and at a minimum standardizing the way that data is stored to improve accessibility. Other ocean users also collect environmental data that is important to track under changing climate conditions, so attention should be paid to better partnerships with offshore wind developers, aquaculture, marine transportation, and the military.

There was extensive discussion on reducing uncertainty in fisheries dependent data. This discussion covered incentivizing fishermen to improve reporting of data and collect new data, improving recreational data collection, and improving social-economic data for use in management.

Managing under a changing climate requires a lot of data input, but it is impossible to collect everything of interest. Data prioritization needs to occur – but this requires a clear understanding of how the data will be used. Prioritization must involve increased communication between the science centers and management bodies, including periodic reviews of research priorities.

Next Steps

It was agreed that a report of the Summit Meeting (this report) would be presented to the NRCC for their review at their May 2023 meeting. Presentations of the findings from the Summit will also be presented to each of the three East Coast Councils and the Commission.

In addition, the Scenario Planning Core Team will also draft a separate document to make specific suggestions on which potential action areas to explore further. Following review and discussion of the elements contained in this "draft action plan" document, the NRCC will determine a way forward.

1. Introduction

Over the past two years, representatives from these East Coast fishery management organizations have worked collaboratively and engaged diverse stakeholders to explore how climate change will affect various aspects of fishery management. This exploration was based on a multi-stage scenario planning process, where stakeholders generated several different possibilities for how climate change might affect east coast fisheries.

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Previous steps of the initiative have included: 1) conducting a scoping process for issues facing East Coast fisheries over the next twenty years; 2) exploring the drivers that will shape future change in East Coast fisheries 3) creating a set of four scenarios describing possible conditions in 2042, and 4) gathering initial feedback from managers, Councils and Commission on important issues to address in response to climate related challenges.

The goal of the Summit meeting was to develop a set of potential governance and management actions resulting from this scenario-based exploration of the future. During the meeting, participants discussed ideas already generated throughout the process, added new ideas, evaluated them, and identified some practical next steps to take them forward. In order to encourage creative thinking about what changes might be required, participants were asked to consider the following:

> *Imagine you are a fishery manager in 2043. What do you wish the fishery managers of 2023 had done back then? What actions should they have taken? What things should they have started?*

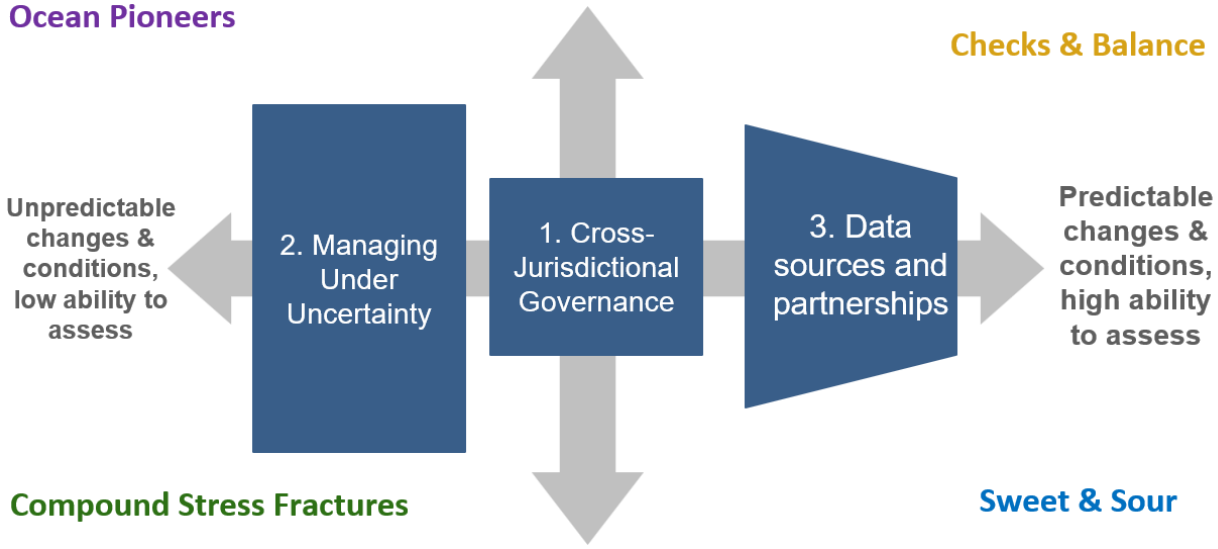
2. Overarching Discussion Themes

It was not possible for the Summit to cover all the issues raised throughout the scenario process. Instead, focus was placed on three overarching themes highlighted in Council and Commission discussions during their meetings in November and December 2022. The Summit began with scenario planning Core Team members providing an overview of each of the themes, followed by a brief plenary discussion.

Members of the Core Team provided a brief introduction to each of the three overarching themes, and outlined a number of key questions to be considered during the workshop. Additional detail on the themes below can be found in the Summit briefing materials, available at: https://www.mafmc.org/s/ECSP-Summit-Briefing-Materials-Feb-2023.pdf.

Theme 1: Cross-Jurisdictional Governance	A major goal of this initiative has been to evaluate the current East Coast fishery governance structure and identify potential changes to increase our ability to respond effectively to changing conditions. "Governance" here addresses the structure of power, authority, and responsibility for fisheries and geographic areas.
Theme 2: Managing Under Increased Uncertainty	Environmental changes are leading to changes in the distribution and abundance of marine resources. In some cases, these changes mean that historical conditions can no longer be used to predict the future, increasing our uncertainty around appropriate catch limits and management responses. Are there actions we can take now to prepare for and respond to this increase in uncertainty?
Theme 3: Data Sources & Partnerships	The scenario creation framework considered how well science will be able to assess and predict changes in stock production, distributions, and other changing dynamics. This hinges on the ability to produce and evaluate accurate and timely data. Summit discussions focused on how to better coordinate data collection systems and develop partnerships to leverage existing funding.

The three themes are related to the scenario framework in the following way:



- Cross-jurisdictional Governance: this theme is relevant across all expected future scenarios. Species range shifts will occur no matter which scenario plays out, so it is important to consider how fishery managers will cope with situations that pose challenges for existing governance structures.
- Managing Under Increased Uncertainty: this theme is particularly relevant for scenarios where climate change causes highly unpredictable changes in conditions, leading to less reliable forecasts and assessments (the left-hand side of the matrix). How must management and decision-making evolve to cope with such situations?
- Data Sources and Partnerships: this theme reflects the fact that fishery managers rely on timely and accurate information. This theme covers how best to coordinate data collection systems and developing partnerships to leverage funding - in doing so, this might shift us towards the right-hand side of the matrix, where better data creates an improved ability to forecast and assess future conditions.

Later sections of this report describe the discussions and outputs according to each of these three overarching themes. Although the report is structured in a way that treats each theme in turn, it is recognized that there are clear overlaps and interaction between the themes.

Participants were also made aware of a number of other issues that were raised during previous phases of the scenario planning process. These "other issues" were not the

focus of the themes for Summit meeting discussion, but it was recognized that they may intersect with the three overarching themes in various ways. The topics identified were:

- Planning for the challenges associated with other ocean uses (wind, aquaculture) and the potential for spatial analysis and planning to help with these challenges.
- Continuing movement toward ecosystem-based fisheries management (EBFM), and the need to consider the importance of forage species.
- Ensuring adequate shoreside access and infrastructure for recreational and commercial fisheries.
- Increasing trust between stakeholders and managers, including improving communication on science and uncertainty.
- Protecting the edges of stocks that move into new areas or as new fisheries emerge.
- Consider the appropriate role of the Councils, Commission, and NMFS in creating and supporting markets for fishery products as conditions change.
- Planning for the aging of the fleet.
- Understanding that politics (and litigation) can play a big part in fisheries
- management.

Participants were encouraged to add any potential actions for these themes by writing on flipchart sheets or using post-it notes.

Following the Core Team's presentation of the themes above, participants had the opportunity to ask clarifying questions and express initial reactions to these discussion categories. During this discussion, participants noted the need for this process to be able to consider multi-directional changes (e.g., in ocean temperature), the need to keep in mind the differences between open access vs. limited access fisheries, and the need to think about the possibility of increased funding and how to best use additional funding should it materialize (rather than just flat or reduced funding).

3. Summit Design and Agenda

Breakout Group Conversations

Following the introductory presentations, participants were divided into three breakout groups, each containing around 18 people. Each group had the chance to discuss a theme in a rotation format, with each breakout conversation lasting for approximately 90 minutes. For example, Group 1 started by discussing Cross-Jurisdictional Governance. After 90 minutes, they rotated to another room to discuss Managing Under Uncertainty. Finally, they moved to another location to discuss Data Sources and Partnerships. Groups 2 and 3 also rotated through the three themes, beginning with a different issue.

The result was that groups were able to generate ideas and review ideas from groups that had previously discussed the issues. By the end of the first day of the workshop, each participant had the opportunity to explore ideas across all of the three themes.

The main ideas that emerged from these breakout group discussions are presented in sections 4-6 below, according to theme. A more complete summary of all breakout group ideas is contained in the Appendix for each theme (Appendices B, C, and D).

Summary of Potential Actions

At the end of Day 1, the Core Team facilitators reviewed the notes from the day's breakout group conversations for their theme and created a non-prioritized list of potential action areas that had been identified throughout the day. It was not possible to capture every idea as an individual potential action, but the Core Team was able to group comments and ideas made across breakout groups into common themes and potential areas for action. The list of potential action areas is presented in the following report sections.

The full lists of potential actions were shared with all participants at the start of Day 2. Each breakout group had a chance to review the list of potential actions for each theme, and ask clarifying questions about what the potential action covered. This resulted in a small number of adjustments to the wording of some potential actions.

Prioritization of Potential Actions Using Dot-Voting

Participants were then asked to prioritize the potential actions in the following way. Everyone received 8 votes in the form of dot stickers. Votes could be allocated across any of the potential action areas in any of the themes, but participants could not vote for the same potential action more than once.

Participants were asked to prioritize and choose their votes based on the following considerations:

- Potential actions that will help fishery managers prepare for and cope with the challenges of climate change;
- Potential actions that fishery managers are able to influence;
- Potential actions that are feasible to implement, or where some progress can be made.

The results of the dot-voting exercise are presented in Appendix E.

Plenary Discussion to Identify Preliminary Next Steps

The dot-voting exercise revealed the potential actions areas that the group felt should be addressed as a matter of priority. We held a full plenary discussion to identify how best to make progress for each of those priority action areas. The details of these discussions, and the preliminary next steps agreed to by the group, are presented in Sections 4-6 below for each of the themes.

4. Cross-Jurisdictional Governance

The sections below provide an overview of the guiding questions for cross-jurisdictional governance, a summary of the main ideas discussed in the breakout group, the list of potential actions identified, and a summary of the follow up plenary conversations. Additional details on the breakout discussions around cross-jurisdictional governance can be found in Appendix B, and prioritization exercise (dot voting) results can be found in Appendix E.

Overview

Climate change impacts are already affecting ocean conditions. Ocean temperatures are expected to continue to rise in the decades ahead, no matter which of our scenarios plays out. These rising temperatures will lead to an increased likelihood of stocks shifting their location, often moving north and into deeper waters. In some scenarios, the shifts in location might not be as predictable as this, but changes are still highly likely to happen. These shifts will pose challenges for current governance structures and arrangements, which were mostly established under the assumption that stock locations would remain relatively stable over time. This is no longer the case. In all the scenarios identified in this process, we must assume that stocks will shift, and identify ways that governance approaches can respond.

During the small group discussion portion of the meeting, groups were asked to focus on three organizing questions related to the overall theme of "Cross-Jurisdictional Governance":

- What is the best structure and representation for governance on the U.S. East Coast?
- When and how should management authority change?
- How can we improve the efficiency and the efficacy of joint fishery management plans?
- How can we improve coordination and collaboration among management entities?

Breakout Group Discussions: Main Ideas

The three breakout groups discussed the governance questions outlined above, with an emphasis on the importance of future governance structures being more adaptable to continual change. The groups discussed broader governance organization, including discussions on how many decision-making groups there should be and who is represented at these decision-making groups. For stakeholder involvement, too many governing groups make participating in the process more difficult. There was discussion around whether the ideal governance structure could de-emphasize state-by-state representation, but many felt that state-by-state approaches had value.

The largest structural change discussed was a change to a single, East Coast Fishery Management Council with state or fishery-based opt-in representation by species or fishery management plan, similar to the Board opt-in process used by the Commission. A change of this magnitude would require substantial revisions to the Magnuson-Stevens Act, which was acknowledged throughout the discussion. While some participants thought the opt-in approach would allow for focused participation and a system that could more easily adapt to changing conditions, others felt that a Council of this size would be tricky to populate and would result in stakeholders feeling less invested in and with less influence over the organization and its outcomes.

Much of the discussion was focused on the varying uses of committees across the various management bodies. Participants acknowledged that each Council uses committees somewhat differently, with committee use in the South Atlantic and New England somewhat more similar to each other compared to the Mid-Atlantic. The number of joint management plans with the Mid-Atlantic and the Commission Boards makes committees difficult to administer. Many felt the approach being used to add voting members from other Councils to species committees has been successful. However, others felt that this positive influence is muted when the full Council makes a different decision than the committee or when the committee is not used at all in the decision-making process. As a result, many supported moving toward more consistent use of committees across Councils, and consideration of modifying voting rules to enhance the role of committees in the process (for example, limiting the power of a Council to overturn a committee decision during final voting, with failed Council approval resulting in issues being returned to the committee).

In addition, many participants raised issues around clarifications and considerations of efficiency in jointly or cooperatively managed stocks. The group recognized that there is a spectrum of approaches to joint or collaborative management, and while not all joint management needs to operate the same way, clearly defining and recognizing the pros and cons of different approaches would be helpful. Joint management has benefits for representation, but also can hinder efficiency and efficacy when groups disagree, particularly if decision making is sequential. More explicit agreements between joint management participants could help to increase transparency and help groups work toward streamlining joint management processes. For both the committee and joint plan discussions, it was emphasized that these changes should apply at the plan level and would not need to be used across all plans in the same way.

Participants also discussed when and how changes in management authority should be made. Generally, participants felt that triggers should be used to initiate a *review* of management authority, and not trigger immediate change. Some participants felt strongly that a change in authority request should only come from one of the Councils. Additionally, because of the concerns regarding Council member and staff expertise, as well as the resources required for transition, transitions should be well-thought out and should not be structured in such a way that frequent changes would be required.

Participants felt improved coordination across and with all management bodies (all three Councils, the Commission, and NMFS) was needed. Ideas that received particular attention included improving the coordination between and within NMFS regions and increasing cross-pollination of the three Scientific and Statistical Committees (SSCs). SSC members and managers could benefit from more exchange of ideas and information across SSCs, particularly for species shifting across jurisdictions and for jointly managed species. In addition, mechanisms for more joint SSC workgroups or meetings and advice could be explored.

Potential Actions for Cross-Jurisdictional Governance (Non-Prioritized)

As discussed in Section 3, following the three breakout groups, Core Team members consolidated the concepts discussed into eight primary ideas for cross-jurisdictional governance. These ideas were primarily centered around the main questions that were considered, but were not presented in a way that required participants to make this/not that determinations. The dot voting was used to illustrate preferences for which actions should be investigated further in the shorter-term. The **potential actions highlighted in yellow** emerged as the top preferences in the cross-jurisdictional governance category.

Cross-Jurisdictional Governance – Potential Actions
Coastwide Council with varying voting representation by FMP ● One large Atlantic Coast Fishery Management Council that would allow members/states to opt-in to certain FMPs based on fishery interest. ● *Would require a modification to the MSA.*
Committee-Based decision making where committees have final vote ● In the style of ASMFC Boards, this would structure decision making so that the committees have final votes on FMP actions. The action would not need approval by the full Council. ● *Would require a modification to the MSA.*
Committee-Based decision making with final Council approval ● Modifying the Council SOPPs could allow increased decision making authority at the committee level, by changing procedures such that committee motions that do not pass the full Council get sent back to the committee to be reworked.
Clarify and potentially expand the roles of liaisons between Councils ● Consider more consistent use of liaisons across Councils ● *If roles were expanded to include voting rights, this would require MSA change.*
Change state representation on Councils ● Consider modifications needed to state representation, including potentially having more states sit on multiple Councils ● *Would require a modification to the MSA.*

Consider allowing proxies for Council members ● Proxies would help alleviate workload on individual members, especially if other changes such as increasing joint management or expanding committees occurs.
Re-evaluate and potential revise Advisory Panel representation ● Consider regional/stakeholder interests, including underrepresented/underserved groups
Evaluate mechanisms for cross pollination of SSCs, particularly for jointly managed species ● Managers could benefit from more exchange of ideas and information across SSCs, particularly for species shifting across jurisdictions and for jointly managed species. In addition, mechanisms for more joint SSC meetings and advice could be explored. This could include a coastwide SSC with species-specific complex decision making, joint SSC meetings or the use of SSC liaisons.
Move to more consistent use of committees across Councils and re-evaluate committee representation for each committee/FMP ● Currently, each Council and FMP uses committees differently in the decision-making process. Considering modifying regional/stakeholder group representation could be more effective if Councils used committees in a similar manner.
Improve coordination across NMFS Regional Offices, Science Centers, and General Counsel ● Coordination of processes, information, and guidance within and between different offices of NMFS will be critical as conditions continue to change.
Review joint management plans along coast to explore areas for increased efficiency ● Refers to management plans that are joint or complementary among two or more management entities. Review could occur for all joint plans at once or at an individual FMP level, or some combination of both.
Develop more explicit agreements for joint management ● Joint or cooperative management by two or more management entities currently has varying levels of explicit agreements about the joint management process. Agreements like MOUs could be developed (potentially with sunset provisions) to clarify roles, responsibilities, and processes.

Plenary Discussion: Identifying Preliminary Next Steps for Cross-Jurisdictional Governance

The above yellow highlighted potential actions were the focus of plenary discussion. The group discussed possible mechanisms to move these ideas into the management process. It was noted that the topic of governance structure would need a coordinating body (e.g., an expanded NRCC) to further examine the issues and make recommendations.

Move to more consistent use of committees across Councils, re-evaluate committee representation, and consider committee-based decision making with final Council approval

The discussion focused on finding mechanisms for more consistency in the governance structure between management regions, particularly more effective and better aligned use of committees between the three Councils. This could allow some representation concerns to be addressed in a more meaningful way without legislative changes, particularly for species where substantial portions of their distribution span multiple management jurisdictions or may in the future. Councils could come up with a framework with some consistencies across Councils but allow some flexibility to preserve the unique history and culture differences in the current process.

Evaluate mechanisms for cross pollination of SSCs, particularly for jointly managed species

The discussion focused on better mechanisms for information exchange between SSCs, particularly when two Councils are working on the same species. While there could be utility in looking at this issue on a national scale in the long term, it is important to address this on a regional scale to start. Sub-groups of each region's SSC could meet to discuss a topic or there could be one SSC for the whole region. The group noted that the Commission's scientific group should also be a part of this process.

Next Steps for the Above Actions

A leadership group should be tasked with the following as a first step to address the potential actions above:

- Leadership planning exercise to look at Council species committee structure (use of and more consistency). This would include the membership of the committee as well as how decisions are made.
- Leadership planning exercise to look at the SSC committee structure for cross pollination of Atlantic coast SSCs.
- Clarify Council liaison role and discuss how the liaison could be used consistently across the Atlantic coast Councils.
- For the long term, the national convening of SSCs (the Scientific Coordination Subcommittee of the Council Coordinating Committee) could be one venue to generate additional discussion of how to increase SSC cross-pollination and regional coordination.

Additional Governance Themes Identified for Near-term Wins

In the plenary discussion, participants also identified the following potential next steps for other governance-related actions:

- Identify additional coordination between the NOAA regional offices and science centers to decrease inconsistencies. Think about coordination among regional offices to promote consistent Council interactions.
- Reduce the number of committees and inputs to simplify the process; bring the stakeholders to one place. Seeking improved communication by reducing the number of layers instead of expanding the layers.
- Review the Joint and Complementary plans for ASMFC and the Councils for efficiencies (ways to segregate actions so there are less redundant actions) (this may be a short and long term potential action)
- Consider the final 304f Policy and the impacts to both the Councils and the Commission. The impacts of the 304f policy are important to consider when developing short and long-term potential actions.

5. Managing Under Increased Uncertainty

The sections below provide an overview of the guiding questions for managing under increased uncertainty, a summary of the main ideas discussed in the breakout group, the list of potential actions identified, and a summary of the follow up plenary conversations. Additional detail on the breakout discussions around cross-jurisdictional governance can be found in Appendix C, and prioritization exercise (dot voting) results can be found in Appendix E.

Overview

There are two main approaches to dealing with uncertainties in fisheries management: first, increase investment of time and funding into research and science to better understand the situation and potentially decrease uncertainty in predictions (moving towards the right side of the matrix), and second, create management approaches that will have a good likelihood of being successful even with uncertainty (moving toward the left side of the matrix). Given that conditions on both sides of the matrix are plausible, we need to prepare for all situations.

In addition to planning for uncertainty, being able to respond quickly to change (at management and stakeholder/community levels) will be both useful and necessary. Where science can predict and track changes (right side of the matrix), managers and stakeholders may be able to prepare for the coming changes (creating if/then structures to reduce response times). Where science is less able to predict and track changes, managers and stakeholders will need to be nimble as stocks shift, collapse or exhibit other unpredicted changes. See below for more on these ideas.

During the small group discussion portion of the meeting, groups were asked to focus on three organizing questions related to the overall theme of "Managing Under Increased Uncertainty".

- How can we increase flexibility, adaptability, and robustness in management?
- How can we better accommodate uncertainty in the stock assessment process and address related management challenges?
- How can we improve the ability for fishermen and other stakeholders to adapt to climate change?

Breakout Group Discussions: Main Ideas

Updating risk policies to better account for climate challenges was the topic discussed the most in the breakout groups. There was agreement that it would be useful to compare risk policies across all the Councils, including how they account for uncertainties due to climate. NEFMC has hired a contractor to compile this information and their report will be made available this spring. ASMFC has a draft risk policy that includes information on climate concerns and information on economic importance that can decrease or increase catch levels, respectively. There was concern that some

existing risk policies only decrease catch, and there is no mechanism for increasing catch for species showing positive responses to a change in climate. Multiple participants also noted a need to track risk, decisions, and consequences to better learn from past decisions (in management and in stock assessments). One participant noted the need to look at consequences, not just at risk, to help determine appropriate management. There were suggestions to include qualitative information when looking at risk. For example, this is done with red tide in the Southeast, and through risk tables in the North Pacific. Results of climate vulnerability assessments could also be used to understand areas of higher and lower risk. A participant noted that Europe has started providing maximum sustainable yield (MSY) as a range with other factors impacting what part of the range is used for management. Participants noted this would require Councils to be very disciplined or they would consistently pick the highest number on the range. One participant suggested moving toward dynamic reference points, but noted that as management adjusted to this new tool, there would be some failures before successes. Multiple participants agreed that the risk policy could be useful for determining what risks (and failures) would be acceptable.

During discussions focused on flexibility and adaptability, participants noted a need to define these terms to ensure common understanding and goals, and agreed that looking at what is achievable and what should be prioritized is also important. There was concern from some that too much flexibility could lead to large swings in management from year to year and that could be detrimental as businesses need stability for planning. At least one of the breakout groups spent a bit of time discussing permits and how they could be more adaptable. Revising or updating permits is a difficult subject to address, however, there could be some easier wins. For example, adding emerging species to existing permits and removing historical moratoria on permits could help add adaptability. There are also requirements to bundle permits that may no longer make sense and should be reconsidered. A few larger changes in permits were also suggested, such as switching from species specific permits to area based permits, and switching from state permits to a universal federal permit that would adjust to species distribution and abundances (for charter boats). When discussing some aspects of permit flexibility (e.g., area based permits or permits that provide flexibility to land a mix of species that are related or caught together)), the tendency for fishermen to target high value species would need to be considered to ensure this does not create more choke stocks. There was also a discussion on the need to improve flexibility in fishing gear regulations (Councils have restrictions on what gear can be used to fish what stocks).

Part of the breakout discussions also focused on the idea of if/then management triggers. In general, by identifying triggers and the appropriate management response before the trigger is hit, management will be poised to be responsive and it will reduce administrative work. There were suggestions on how these if/then triggers could be added to existing processes. For example, the MAFMC could add triggers to their risk assessment process, triggers could increase responsiveness when there is joint management across multiple Councils, and triggers could be tied to ABC control rules.

There was a comment that increasing uncertainty should not only equal increased precaution and decreased catch limits. Participants also noted the need to think outside the box, for example, how could this idea tie to EBFM? Is there a way to incorporate qualitative information from fishermen or other sources into the triggers? Can other information also be considered, such as habitat, or predator and prey information, especially in situations where there is a disagreement on the status of a stock? In all of these situations, good communication and transparency about the process will be key.

Potential Actions Identified Across Breakout Groups for Managing Under Increased Uncertainty

As discussed in Section 3, following the three breakout groups, Core Team members consolidated the concepts discussed into eleven primary ideas for managing under uncertainty. These ideas were primarily centered around the main questions that were considered, but were not presented in a way that required participants to make this/not that determinations. The dot voting was used to illustrate preferences for which actions should be investigated further in the shorter-term. The potential actions highlighted in yellow emerged as the top preferences in this category.

Managing Under Increased Uncertainty – Potential Actions
Identify and establish best practices for if/then trigger management • If/then triggers include Identifying conditions (and necessary data) that would trigger a pre-specified management response • Provide examples where this has previously been successful • Consider when this type of management process could be useful, include consideration of governance change triggers and ecosystem-based triggers
Look into streamlining NEPA compliance and documentation • Examine whether programmatic EISs (evaluating broad proposals or planning-level decisions) could streamline document preparation for actions tiered off the programmatic EIS • Consider possibilities for use of functional equivalencies where possible (i.e., using MSA documents to fulfill NEPA requirements) • Establish consistent guidance across regions, including from the NEPA program and form General Counsel • Expand use of Supplemental Information Reports (i.e., reference but do not include information in NEPA analyses that is available elsewhere)
Include spatial considerations in management • Consider whether and how to manage the leading and trailing edges of a species distribution differently, perhaps considering different management (harvest strategies) for different portions of the stock

I**mprove the use of risk policies to better account for current and future climate impacts on species (both negative and positive impacts)**

- Future proofing
- Consider pros and cons of moving toward consistency across species or regions
- Consider including qualitative and ecosystem information in the risk policy framework to improve the understanding of risk and appropriate management responses

Consider risk assessments to identify fisheries at risk of not meeting management goals

- Risk Assessments = an assessment of factors that could hinder a fishery from meeting its management goals (front end)
- Risk assessments can combine qualitative and quantitative information, so can include more sources of information
- Consider how risk assessments can be used not just to set priorities but also in stock assessments and management

Move toward robust management options rather than trying to account for all kinds of uncertainty within stock assessment models.

- Consider dynamic reference points and indicator based management
- Assess options for better including climate vulnerability assessment results into management
- Consider when management strategy evaluations and other structured decision making tools are useful.

Use qualitative information to improve management, including our understanding of risk. Specifically, better incorporation of local ecological knowledge / traditional ecological knowledge into management is needed.

- Inventory where and how qualitative information, including local and traditional ecological knowledge is currently being used in management and identify ways into management process
- Explore participatory modeling

Consider and clearly communicate intricacies of uncertainty when making policy/ changing management

- Where does uncertainty matter?
    - For example - 2 tailed distributions- is uncertainty bigger in one direction vs. the other? Are both tails being considered?
    - A large uncertainty may not be a big issue if there is certainty that the stock is improving

Create a more adaptable structure for fishing permits

- Compile information on permits across entire East Coast
- Assess diversity of permits (who holds them, where, in what combinations)
- Assess permit accumulations
- Identify where there are limits in flexibility for fishermen
    - Are there any easy fixes?
    - Identify first steps for harder issues

Identify and remove institutional baggage

- Permit bundles
- Mis-match of mesh sizes across FMPs = regulatory discards
- Gear/trip limits
- Legacy regs

Improve the use of community climate vulnerability assessments in management

- For example, Colburn et al. 2016 (https://doi.org/10.1016/j.marpol.2016.04.030)

Plenary Discussion: Identifying Preliminary Next Steps for Managing Under Uncertainty

During the prioritization exercise (dot voting) the following three potential actions emerged at the top preferences for this discussion theme. Additional information on the ranking exercise results for all actions under all three discussion themes are provided in Appendix F.

- Improve the use of risk policies to better account for current and future climate impacts on species (both negative and positive impacts)
- Move toward robust management options rather than trying to account for all kinds of uncertainty within stock assessment models. Move away from trying to model more and more uncertainties and consider robust management approaches
- Include spatial considerations in management

The plenary discussion, which is detailed below, focused almost entirely on these three issues, at the direction of the facilitator and Core Team. This is not intended to convey a lack of interest in these other ideas, and they can be addressed by the Councils and Commission in the future.

Improve use of Risk Policies

Risk policies are a way for fishery management organizations to consider multiple elements of uncertainty and risk tolerance in an organized and transparent manner, as part of the management process. Addressing uncertainty has always been a core element of fisheries management, but climate change is increasing the magnitude of these uncertainties, and the range of issues that we are unsure about.

The discussion focused in part on what should be included in risk policies. Suggestions included expanding these policies to explicitly include climate considerations, and guide managers towards decisions that will promote resilience in human and natural fisheries systems. Considering risk policies in light of the four climate scenarios was offered as a way to approach expansion of risk policies. One approach to incorporating climate change into risk policies would be to consider climate winners as species for which catch limits might be increased. Another might be to consider whether risk tolerance should be adjusted to reflect differences in climate sensitivity and exposure by species (as documented in fish-stock level climate vulnerability assessments). In the northeast, black sea bass is an example of a species for which the recreational harvest control rule includes consideration of the biomass relative to the target and thus can take advantage of this species being a "climate winner."

There was recognition that management organizations use risk policies differently. Commonly they are applied to setting catch advice, but some policies are broader to cover other categories of decision making. NEFMC has recently commissioned a review of all eight regional fishery management Council risk policies and how they are used. Although the Commission's risk policies were not covered in this report, it was noted that ASMFC uses Mid-Atlantic Council risk policies for their joint Commission-Council Fishery Management Plans, and is adopting its own risk policy soon.

It is important to learn from one another's policies, seeking alignment where possible, but retaining differences amongst Councils as needed. One area where alignment might be most appropriate is in policies that relate to setting catch limits for jointly managed species.

There was some discussion about the purpose of risk policies, how they can be used in theory, and whether they are effectively employed, in practice, for making and understanding decisions, and as a tool for communication. Another consideration is whether these policies are sufficiently broad in scope to cover all of the decisions that a Council or the Commission might make.

Move Towards Robust Management vs. Modeling Uncertainties

The concept here is that assessment models can be very complex, and can include uncertainties across multiple elements (e.g., uncertainties related to environmental changes, changes in predator/prey relations, changes in fishing behavior, etc.). A possible solution is to move away from trying to incorporate information on all of these uncertainties within the assessment models used to set catch advice and instead

towards alternative models or mechanisms for setting limits. For example, management strategy evaluation could be used to identify harvest control rules or trigger-based management processes that are robust despite these uncertainties. This action received substantial support from Summit attendees, but there was limited concrete discussion around short-term 'wins' or actions.

One near term step may be to look for examples of where this is used and has been successful, to begin a conversation about how these approaches might be employed. For example, bluefin tuna management employs management strategy evaluation to evaluate reliable indicators and simulate expected outcomes of alternative approaches.

Another near term step is to look across all east coast managed species to identify those where uncertainties are significant in scale or occurring in multiple facets of the assessment, and focus on developing new approaches and strategies for those species. As with the risk policy evaluation, climate vulnerability assessments may help to focus this work on species that have greater sensitivity or exposure to climate change.

Include spatial considerations in management

The concept here is that for species with shifting spatial distributions, management approaches might need to vary at the leading and trailing ends of their range. There could be biological reasons for this, perhaps to preserve genetic diversity found in these areas, or to allow stocks to successfully establish a population in a new area. A related issue is lack of fishery access at the leading edge of species' range. This might be more pronounced as a species moves into another Council region, or offshore of states with low quotas where the species cannot be landed. Another potential action, creating more adaptable structures for fishing permits, is a related issue. A challenge is that the Magnuson Stevens Act requires management of stocks as a unit across their range, but does allow for variable management across space. For equity and clarity of communication consistent management approaches across the species range may be important. Whatever the specific concern, adequate scientific information is needed to support differences in management by area. More information about these issues is needed in order to generalize insights and strategies across different stocks. Monitoring of stocks as they move is needed. Where possible, on the water observations by fishermen should be reflected in management measures, including through increased use of LEK and TEK. Consideration should also be given to whether catch accounting is accurate across the entire range of the species. While the directed fishery would have the same monitoring throughout the species range, other fisheries and gear types encountering the species might have different monitoring or reporting rates, especially if a species is new to an area.

Specific management approaches could be considered. For example, establishing de minimis status along the trailing edge of a species range, or considering measures that provide conservation equivalency. Different size limits by state might also be appropriate, perhaps if fish attain different sizes by location due to environmental conditions or genetic differences. Cobia is an example of different size limits by state.

6. Data Sources & Partnerships

The sections below provide an overview of the guiding questions for data sources and partnerships, a summary of the main ideas discussed in the breakout group, the list of potential actions identified, and a summary of the follow up plenary conversations. Additional detail on the breakout discussions around cross-jurisdictional governance can be found in Appendix D, and prioritization exercise (dot voting) results can be found in Appendix E.

Overview

One of the primary axes used to develop the scenarios was based on the predictability of ocean conditions, which includes how well science is able to assess and predict changes in stock production and distributions. While the first two themes are centered on how to handle cross-jurisdictional issues and evolving the decision-making process to handle uncertainty, this theme focuses on our ability to provide the information necessary to do both. Providing information about stocks and their locations hinges on our ability to evaluate accurate and timely data. This theme asks, "How do we better coordinate our data collection systems and develop partnerships to leverage funding?" Coordination between management entities, federal entities, academic partners, fisheries stakeholders, and other ocean users will play a large role in which side of the axis we find ourselves within the scenario framework.

During the small group discussion portion of the meeting, groups were asked to focus on four organizing questions related to the overall theme of "Data Sources and Partnerships".

- How should we prioritize data/information needed to manage in a changing environment?
- How can we use current funding more efficiently?
- How can we better utilize the fishing industry for data collection?
- What are the best ways to foster outside partnerships for sharing data, especially with other ocean users?

Breakout Group Discussions: Main Ideas

During the Data & Partnerships breakout sessions the three breakout groups discussed a variety of different topics using the four organizing questions from above. The conversations went in a number of different directions. However, there were several main ideas that emerged from the discussions including fostering better coastwide cooperation, improving fisheries dependent data collection, and ensuring that data is being utilized for management.

The East Coast has a lot of jurisdictional issues that were discussed in other themes. However, fostering better coastwide cooperation extends to data collection and

partnerships as well. There are many scientific surveys that are conducted along the East Coast, including by federal and state entities. The methods and data collection/storage varies greatly across these surveys. In addition, regionalized institutions have created scientific silos where other regions/entities may not even be aware of what data is collected by another. Both of these factors contribute to difficulties in sharing data and may contribute to duplicative efforts across the region. Suggested actions to remedy this situation include creating consistent surveys across regions and at a minimum standardizing the way that data is stored so that it is more easily accessible to other researchers. Similarly, there are other ocean users that are collecting environmental data that is important to track under changing climate conditions. It would be good to align various ocean users' needs and wants to attempt to leverage new partnerships and reduce the burden on fisheries surveys. Some potential partners include offshore wind developers, aquaculture, marine transportation, and the military.

Aside from fisheries independent surveys, fisheries dependent data is an important part of fisheries management. There was extensive discussion on reducing uncertainty in fisheries dependent data. This discussion can be characterized by three main points: 1) incentivizing fishermen to improve reporting of data and collect new data, 2) improving recreational data collection, and 3) improving social-economic data for use in management.

The first point stems from the need for finer spatial scale data as well as more environmental data. The latter is extremely important when addressing climate change concerns. Fishermen are on the water for a greater proportion of the year than any fisheries independent survey and could provide data at a much finer spatial and temporal scale than surveys can. The question is how to get fishermen to provide accurate data and even expand what data they are collecting. Devising an incentive structure that rewards fishermen for providing data is one potential solution. There also seems to be a lack of communication between the science community and fishermen. Many fishermen are willing to provide data if given an opportunity but lack the instruction or instrumentation to do so. Often it comes down to whether funds are available or not. This led to a suggestion of creating shovel-ready projects that when funding becomes available can be quickly executed by fishermen.

The most discussion during the data sources and partnerships theme was centered on improving recreational data collection. Participants felt that it was a glaring need in the management process with some fisheries, particularly in the South Atlantic, having greater than 50 percent of their catch allocated to the recreational sector. Some of the suggestions on this topic address the other two points as well, such as creating incentives for reporting. Other suggested actions included the creation of a recreational study fleet to help improve recreational estimates. The structure of this study fleet would need to encompass a wide swath of user types from private shore-based anglers to charter vessels. Another suggestion was to utilize crowdsourcing as a means to expand data collection. This included mining of social media to get data from something recreational anglers love to do which is post pictures of their catch.

The third point, while not discussed in as much detail as the other two, is also very important as we deal with a changing climate and shifting biological productivity. In the end, fisheries is about managing human activity and therefore the human dimensions of the system need to be addressed and monitored. Changing conditions could alter the very definition of what it means to be a fisherman. Do fishermen continue to fish on a particular species or adapt to whatever species are nearest to their port? The cost of chasing a species up the coast could become too prohibitive for smaller owner-operators. The data required to address this point can be difficult to collect and analyze but should be considered when any data prioritization within the region occurs.

The final main idea from data sources and partnerships was ensuring that data is being used in management. Managing under a changing climate requires a lot of data input to make the most informed decisions on the future. Unfortunately, it is impossible to collect everything. Therefore, data prioritization needs to occur. Before that prioritization happens there needs to be a clear understanding of how the data will be used. This will require increased communication between the science centers and management bodies. This should include periodic reviews of research priorities so that the management system can leverage partnerships with other institutions such as NGOs and academia that may look to those priorities when applying for funding. Discussions around priorities will also inform the other main ideas from this theme. For example, coastwide collaboration will be improved by considering what data is essential to collect during fisheries surveys and the shovel-ready projects to improve fisheries dependent data would also align with priorities.

Potential Actions Identified Across Breakout Groups for Data Sources and Partnerships (Non-Prioritized)

As discussed in Section 3, following the three breakout groups, Core Team members consolidated the concepts discussed into eight primary ideas for data sources and partnerships. These ideas were primarily centered around the main questions that were considered but were not presented in a way that required participants to make "this/not that" determinations. The dot voting was used to illustrate preferences for which actions should be investigated further in the shorter-term. The potential actions highlighted in yellow emerged as the top preferences in the data sources and partnerships category.

Data Sources & Partnerships – Potential Actions
Modernize data management to facilitate better sharing of data and prepare for an influx of new data streams (e.g. offshore wind data)
Focus on AI/technology development to more rapidly get data into assessments
Develop a process between management and science organization to prioritize data needs for climate-ready management (e.g., human dimensions data)
Prioritize recreational data collection to reduce uncertainty including developing incentives for better reporting
Hire staff dedicated to fostering partnerships and coordinating data collection/sharing between other ocean users, management bodies, and within Federal agencies
Expand study fleet, include recreational fisheries and ensure data are used, include shovel-ready data projects
Use survey mitigation around offshore wind to transition to industry-based surveys or other survey platforms
Standardize data collection to breakdown geographic barriers along the East Coast (both state and federal)

Plenary Discussion: Identifying Preliminary Next Steps

The above highlighted potential actions were the focus of plenary discussion. The group discussed possible mechanisms to move these ideas into the management process.

Expand study fleet, including recreational fisheries, and ensure data are used, include shovel-ready data projects; Prioritize recreational data collection to reduce uncertainty including developing incentives for better reporting

Two of the potential actions that received the most votes for data sources/partnerships were primarily focused on the recreational sector. During the plenary discussion, these two potential actions were discussed in tandem. Recreational catch is an important piece to the story especially with regards to climate change. The recreational sector is often the first to see climate-related changes especially in regions or times where the commercial fleet is not operating. The clear message was to develop a plan for how the data will be used. The idea of a recreational study fleet would be to integrate with Marine Recreational Information Program (MRIP) to decrease uncertainty in its estimates. In order to establish a rec study fleet, the centers, regional office, and councils would need to work together in a partnership to identify priority data needs and establish a pathway for integrating the data into management. GARFO could lay the groundwork for such a partnership in its Recreational Saltwater Fisheries Policy Regional Implementation Plan. The Councils and Commission could follow-up by establishing work plans that use the recreational study fleet data. In addition to the

study fleet discussion, the topic of "shovel-ready" or "ready-to-go" projects were discussed. There are many data gaps that fishermen are willing to help fill but need to be provided the right guidance on what and how to collect data. Science Centers in conjunction with the management bodies could develop a series of projects that could be quickly implemented if funding becomes available. These "shovel-ready" projects should extend to the commercial sector as well.

Standardize data collection to breakdown geographic barriers along the East Coast (both state and federal)

The conversation around this potential action can be broken into two main points. The first was around fisheries independent surveys. As noted above, there are many federal and state fisheries independent surveys operating along the East Coast. Many of them use different gears and protocols from one another. This makes it difficult to directly compare survey indices. Standardizing surveys across the coast will not be an easy fix. Any changes to survey protocol could break time series. This is not something to be done lightly and therefore requires a clear vision of how the data would be used. The second point raised during the discussion extended beyond the biological and physical variables and centered around socio-economic data. This data is extremely important but is rarely the focus of data discussions. The need for good socio-economic data may be exacerbated by other ocean users such as offshore wind or catastrophic events such as hurricanes. There are examples of demand models being developed in the recreational sector that could be applied to the commercial sector. Economic models like this can help identify potential business decisions which in turn can inform potential impacts from management decisions.

7. Reflections and Concluding Thoughts

At the conclusion of the Summit Meeting, participants recognized the wide-ranging challenges that climate change poses for the future of East Coast fishery management. Session conversations revealed that climate change intensifies the pressures that fishery managers have been facing for years: limitations in information, the need to balance flexibility and stability, and the best way to promote coordination across organizations. Many of the themes identified are long-standing issues. Climate change has brought an added urgency for them to be addressed.

This meeting generated several ideas, and created a potential agenda for action that can help shape changes to fishery management approaches over the coming years. While the focus of this session was limited to three of the most important themes to address, it was clear that climate change will raise several other issues that fishery managers must deal with.

Regarding the next steps that followed from the Summit, it was agreed that a report of the Summit Meeting (this report) would be presented to the NRCC for their review at their May 2023 meeting. Presentations of the findings from the Summit will also be presented to each of the three east coast Councils and the Commission.

In addition, the Scenario Planning Core Team will also draft a separate document to make specific suggestions on which potential action areas to explore further and their appropriate next steps. Following review and discussion of the elements contained in this "draft action plan" document, the NRCC will determine a path forward.

8. Appendices

Appendix A: Summit Participants

Atlantic States Marine Fisheries Commission

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Appendix B: Cross-Jurisdictional Governance Breakout Groups Summary and Potential Actions

This appendix attempts to capture a complete paraphrased list of ideas and considerations raised during the brainstorming sessions for the cross-jurisdictional governance theme. These were ideas identified by participants for the purpose of generating discussion and creative problem solving. Not all of these ideas had broad support and in some cases may have had very little support.

Q1. What is the best structure and representation for governance on the U.S. East coast?

- *Enhance flexibility and adaptability in our governance structure.*
    - There is a general recognition of the need for more flexibility and adaptability in our governance structure.

- *Evaluate where questions of state vs. federal jurisdiction and authority may need additional clarity or revision.*
    - Additional clarity, definition of roles, and re-evaluation of responsibilities may be needed in some cases for cooperative state/federal management. States and the federal government have different tools at hand with different flexibilities and differing abilities to be nimble and responsive. We are currently taking advantage of these differences as much as possible, by picking which pieces work well for which parts of the process. However, this approach sometimes creates confusion about authority, and we could consider structural changes that make this piecemeal approach less necessary.

- *There is a need to think more critically about representation needs, both with regard to current concerns and future needs.*
    - What are the current representation concerns and what are they based on?
    - How many tables should there be, and who gets a seat at the table(s)?
    - When we think about representation needs for the future, we tend to think about it in terms of minor changes to current representation, but we should also think about who is currently underrepresented and underserved in our process.
    - We need to be thinking years and decades into the future about which FMPs will need expanded or modified representation. However, we should be cautious when thinking about this because there will likely be representation overlap between different groups which could create inefficiencies.

- *Consider moving away from designing governance around states as the primary unit of representation.*
    - Is it possible to rely less on organization of representation around the state level? It would be difficult to move away from federalism in this system and states would likely not support this; however, we are struggling to address state representation concerns.
    - Perhaps there is a way to better design the system for representing the best interests of the nation as a whole and introduce aspects of decision making that force conversations away from "what's in it for my state?" One way of doing this may be to integrate more neutral parties into the decision making process.
    - Increasing the number of at-large members could be another approach, and potentially designating at-large members based on affiliations other than states (e.g., stakeholder group).
    - Appointed Council members need to swear an oath under the MSA to manage for the overall benefit of the nation, but state designees do not. Maybe there should be consideration of state members having to compromise more on state interests.

- *Consider consolidating East Coast Councils into one large Council with opt-in species/FMP Boards or committees.*
    - Some suggested one big East Coast Management Council with opt-in participation by states. The full Council would not need to vote on each management plan; the opt-in participation could be at the level of Boards or committees designed to provide appropriate representation based on interest/fishery occurrence.
    - This may provide a system that is more flexible to manage on a species complex or area basis.
    - Expanded committees may be needed under this approach, where there are multiple representatives from each state (similar to the Commission's Board).
    - Coordination across the East Coast is somewhat built in with this approach, although there would likely still be governance complications with determining appropriate management authority between the federal Council and the Commission authority in state waters.
    - The Council system is likely to become more complex with an expanded number of representatives. It could also change current regional voting dynamics, for better or worse.
    - Finding members to represent more constituents across a broader area, and potentially having to cover more species/FMPs, may be difficult.
    - Depending on how it's structured, some stakeholder representation and connection to Council members may be lost (see below).
    - Under this type of system, a similar structure could be used for a large SSC, structured with differing representation by stock complex.

    - Some would consider this to be a longer term idea to consider if more modest adjustments to our governance structure don't accomplish what we need. In the coming decades, if there is increasing overlap in representation needs, it may be more efficient to consolidate the East Coast Councils.

- *Consider the important and unique role of the Councils in stakeholder representation when considering possible changes to governance structure.*
    - Fishermen in each region still need Council members who represent them.
    - One coastwide Council, or an expanded Council jurisdiction, could leave stakeholders with less access to their Council representatives and less invested in the process. Fishermen need to know who to reach out to and have easy access to them.
    - However, an ASMFC Board-style arrangement with a consolidated Council could help maintain sufficient regional representation for stakeholders.

- *Consider changes in state representation on Councils.*
    - Some states serve on two Councils (e.g., North Carolina and Florida) and this could be worth considering for more states.
    - Rhode Island has attempted to get a seat on the Mid-Atlantic Council based on landing more mid-Atlantic managed species than every other mid-Atlantic state. Coastal representation could be balanced by considering changes in voting representation on Councils.
    - Giving states votes on Councils has an advantage over giving liaisons voting rights, as it would allow access to at-large seats.
    - Changing state representation on Councils would require a change to Magnuson and is likely a less flexible/nimble way of changing governance structure.

- *Consider that representation/changing distributions may not always become a problem worth revising governance structure for.*
    - Many current plans manage a unit stock that extends beyond the Council's boundaries, and some of these are working well and may continue to work well under changing conditions.
    - Solutions that don't require the entire governance structure to change in the same way for every FMP may be more flexible.

- *Reconsider the use of committees across Councils, and reconsider committee representation/structure.*
    - The Councils currently use committees differently. Adding voting members or otherwise modifying representation has more of an impact for some Councils than others.
    - There is a sense that the committee level is where most of the work either gets done or should get done. In other regions, the Council vote is more of a formality because the more difficult work has already been done by the committee. In the South Atlantic this is even more effective with many of the committees presently structured to include all Council members.
    - Councils could modify their rules to give committees more authority The groups discussed a few different ways this could be done.
        - Simply giving committees the final vote could be accomplished through a Magnuson revision.
        - It also may be possible to change the Council's SOPPs to cede authority to the committees on certain types of decisions. The full Council may still need to vote, but a procedural change could make it so that if the full Council vote fails, the issue is simply returned to the committee.
        - Additional legal guidance may be needed on this issue and the question of whether the full Council would necessarily need to vote on every issue without changes to Magnuson.
    - If relying more on committees, it may be beneficial to consider a more prescriptive approach to committee population. For example, considering the economic importance of each FMP to different states, or having a certain number of committee representatives by state/sector, etc.
    - Representation between the recreational and commercial fisheries would be important to consider on committees for many fisheries as well as state/regional representation.
    - Committee representation would need to be reconsidered periodically as species distributions and fishery characteristics change with climate change.

- *If committees are expanded, consider staff support from multiple Councils to support the work of the committee.*
    - In situations where committees are expanded and the role of the committee becomes more important, it could be advisable to have staff from multiple Councils, or the Commission, providing support to the committee. The lead staff person could be from the managing Council, but involving staff from other organizations could improve support for committee decision making and keep both management bodies in the loop about actions.

- *Consider voting rights for Council liaisons.*
    - One suggestion was to think about giving one Council a single vote on another Council. This could be done by giving liaisons voting rights, which has been suggested in the past.
    - There was some question whether giving liaisons voting rights would make a meaningful difference in most voting outcomes. Perhaps if the liaisons were the ones making motions it could, but one additional vote does not necessarily have a major impact.
    - Giving liaisons voting rights would require a change to Magnuson.
    - As discussed below under "General Coordination/Collaboration," the roles of liaisons can be variable in practice and may need to be clarified.

- *Allow for designation of proxies at the Council level.*
    - The Commission currently allows for the use of proxies in representation, while the Council does not for appointed members. Allowing proxies at the Council level could help alleviate resource and workload issues. Particularly as management evolves to adapt to changing conditions, approaches like more joint management, more frequent committee meetings, and broadening of stakeholder engagement efforts may mean more strain on individual Council members and their families.
    - Allowing proxies at the Council level would likely require a change to Magnuson.

- *Evaluate Commission-specific structures and policies for potential changes.*
    - The Commission may benefit from more standardized term limits, similar to Councils.
    - Use of proxies could also be reevaluated at the Commission level.

- *Other Governance Structure Considerations:*
    - There is some inherent tension between increased representation vs. efficiency and nimbleness. The process is in some ways intentionally slow to ensure proper opportunities for public comments and ensure constituents needs are met. Increased representation would likely further slow the process in some respects: the more people you get involved in management by expanding representation, the more inefficient or cumbersome the process could become.
    - Managers should look for ways to move toward less siloed management and permit structures.
    - Evaluations of appropriate governance representation should go beyond where the stocks are distributed in the water, and even where fishermen are catching them. There is also consideration needed to where the people are that are impacted by the fishery, including shoreside stakeholders and businesses.

Q2. When and how should management authority change?

- *Guidelines should be developed for when to start considering a management authority transition.*
    - These guidelines should be specific to initiating a review process to consider whether authority needs to change, and not guidelines for automatically changing management authority. Formulaic assignment of management authority would make governance less flexible.
    - Concern about indicators or triggers that would cause species responsibilities to shift too often, leading to an impractical inefficient system.
    - Indicators or factors to be evaluated should include both biological/ecological information about the species but also social and economic information about the fisheries and associated infrastructure.
    - Even when stock distribution does not appear to be changing, there could be a shift in the fishery's importance to different areas. This is something that could be considered to trigger a review of management authority, but does not necessarily mean that transfer needs to occur.

- *Requests to transfer authority should come from the Councils.*
    - Because of the huge impact to the Councils, a request to change management authority should come from one or more Councils involved (ideally, both Councils involved).
    - A management authority will not always necessarily want to take over management of an FMP, and they should have input in the decision.
    - Councils should also be able to request to give up management of a species.

- *Transfers of authority should be slow and thoroughly considered.*
    - Transition should not occur overnight; an intermediate step such as joint management will likely be needed (though perhaps not in every case).
    - Much expertise and institutional knowledge will be lost in the transfer process and this needs to be considered.
    - It will likely be resource intensive to transition authority, in terms of staff time and potentially in terms of public involvement/outreach.

Q3. How can we improve the efficiency and the efficacy of joint fishery management plans?

- *Clarify definitions of "joint" management.*
    - There are many different configurations of joint management and differing arrangements and procedures. Using clear definitions when discussing joint management changes is necessary.

- *Consider modifications to joint voting procedures.*
    - For some species, sequential voting at separate meetings has produced mixed results, and there are mixed opinions on whether it works well. In some cases, it can cause wasted effort and inefficiencies when two groups disagree (for example, multi-year process to consider an IFQ program for monkfish).
    - In some cases, joint management doesn't feel truly joint where there is a "lead Council," in that decisions often flow from that Council and their SSC.
    - Consider changing voting structure to majority of total members instead of a majority of each group.

- *Consider where some aspects of joint management are currently working well and may continue to work well into the future.*
    - The problem of changing stock distributions isn't necessarily a new one; it is a problem that had to be dealt with in the original setup of the Council system. Some of the joint management plans we currently have may continue to work fine under changing conditions.
    - For some jointly managed plans, it is not clear there is much additional efficiency that could be achieved.

- *Consider where joint management agreements and procedures can be improved and made more efficient, in anticipation of more joint management agreements potentially being needed in the future.*
    - Additional joint management agreements, particularly between multiple Councils, may be needed under future changing conditions. In anticipation of this, it would be wise to review ways to improve joint management agreements and processes.
    - Joint management is currently a process that typically takes up a lot of time and resources. It can be a cumbersome and resource-heavy process. There may be ways to streamlining portions of it.
    - Joint management can also be heavily siloed and it is worth considering ways to break down the siloed approach and have a broader conversation about shared values and objectives.
    - Under a system with more heavy reliance on committees, formation of joint committees between management bodies may improve the efficiency of decision making.

    - Increased SSC coordination between joint Council-managed species could also streamline decision making.
    - A review of different types of joint management, and comparison of where they might work or not work in certain situations, should also look at other examples such as joint management agreements between the South Atlantic and Gulf of Mexico Councils. Some of these plans appear to be working well by allocating a certain amount of the resource to be managed essentially separately by each Council.

- *Consider degree of influence that one management group may have in comparison to the other management partner.*
    - In some cases, it feels as though one body has more influence than the other. This is often true in the cases where there is a "lead Council" and the other Council usually follows suit with management decisions.

Q4. How can we improve coordination and collaboration among management entities?

- *The role of Council liaisons should be clarified.*
    - The role of Council liaisons is blurry. They should be there to represent what their Council thinks, not their personal opinion, but this does not always happen (and is not always possible, based on the timing of meetings and when issues arise).
    - In some cases, issues come up where the liaisons may not know what the majority "position" of their Council would be, and there is not always time to consult.
    - Clarifying the role of liaisons without adding voting rights would not require a change to Magnuson.

- *Enhance mechanisms for SSC cross-pollination.*
    - Scientific advice may be improved by encouraging more idea-sharing between SSCs.
    - In addition, particularly for jointly managed species, having multiple SSCs weighing in on management decisions in a more coordinated fashion could help increase efficiencies and highlight potential issues earlier in the process.
    - Some existing mechanisms for SSC cross-pollination could be reviewed for application elsewhere in the process, and/or enhanced.

- *"Faction mapping" may help illuminate areas of potential efficiency*.
    - Faction mapping could be used to map out different bodies' authorities and stakeholders. Where stakeholders overlap, there could be ways to reduce duplicative efforts and create efficiencies.

- *Reevaluate and potentially revise Advisory Panel representation.*

- With changing distributions and changing access to the fishery, as well as changing fishery dynamics, advisory panel representation may need to be reevaluated based on regional/state representation as well as stakeholder group representation. This is particularly true if AP representation has not been revisited for a while.
- Expanded AP representation provides a way for more voices to be heard in the process covering a broader regional extent.
- As noted above under Governance Structure & Representation issues, there is a need to better represent underrepresented and underserved communities on our Advisory Panels.
- In some cases it has been a struggle to achieve adequate representation when populating Advisory Panels. Increased use of webinar meetings and other virtual tools may be one way to broaden the universe of potential advisor input.
- However, it is also worth thinking about circumstances under which expanded representation may or may not actually be needed. For example, if a species distribution is changing, it may not be necessary to increase advisory representation until the importance of that species to the local community reaches a certain threshold.

Other Governance Issues

- *The complexity and disconnected nature of the East Coast permitting structure is a governance and management issue that warrants further consideration.*
  - Intersecting with management is the issue of permit silos. Many participants would like to make it easier to acquire permits in different fisheries. This needs to be weighed against the continued need to limit capacity in many fisheries.
  - Many hold permits that they are having to travel further distances to use. They may wish to get out of moving fisheries and into another fishery, but are limited in their ability to do so due to permit structure.

Appendix C: Managing Under Uncertainty Breakout Groups Summary and Potential Actions

This appendix includes the considerations and potential actions we heard during the managing uncertainty breakout groups. We did our best to include the ideas we heard during the breakouts. The ideas are grouped according to guiding questions, presented prior to the breakout discussions, and by potential action.

Q1: How can we increase flexibility, adaptability and robustness in management?

- There is a need to define the terms flexibility, adaptability, and robustness to ensure common understanding and goals.
- We need to better understand risk. Risk includes the probability that something will happen combined with the consequence if it happens. Many Councils/NMFs are not looking at risk this way.
- Looking at what is achievable is also important.
- Too much flexibility could lead to large swings in management from year to year and that could be detrimental as businesses need stability for planning.
- In all of these situations, good communication and transparency about the process will be key.

Identify and establish best practices for if/then trigger management.

- If/then trigger management describes a process where specified information is collected (stock, environmental, or other conditions), monitored, and when a specific threshold or trigger is met or passed, a pre-identified management response is implemented.
- This (if/then trigger management) will reduce administrative workload associated with implementing changes to fishery management actions, since the actions will have been previously analyzed and/or could be implemented directly by the NOAA Regional Administrator.
- This will also reduce flexibility in how management responds (and will not be able to account for other factors that may be important such as availability of alternative options).
    - Could if/then situations be created to allow some flexibility in response?
- It can be difficult to envision future conditions and set up if/then triggers.
- The tool assumes NMFS/Councils will know when a trigger has been met.
- Could qualitative information from fishermen or other sources be incorporated into the evaluating whether triggers have been reached?
- This tool already exists; there are allocations set up this way.
    - For example, the Bering Sea and Aleutian Islands FMP includes pre-arranged "if/then" allocations for yellowfin sole between two sectors depending on the total allowable catch (TAC). If the TAC for the two

sectors is greater than 125,000 metric tons (mt), then the first sector is allocated 60 percent; if the TAC for the two sectors is less than 125,000 mt, then the first sector receives an increasing apportionment.
    - Another example is closure thresholds: if a given percent of the ACL has been caught, then the trip limit decreases.
- The lobster fishery has created a rule that if recruitment is below a given amount, then the fishery automatically changes gauge size
- Suggestions on how these if/then triggers could be added to existing processes were:
    - MAFMC could add triggers to their risk assessment process;
    - Triggers could increase responsiveness when there is joint management across multiple Councils;
    - Triggers could be tied to ABC control rules;
    - Could identify ecosystem level triggers that monitor larger ecosystem processes.
- The NE and Canada have an example system of adapting catch allocations for shared stocks based on historical and current distribution.
    - This system is not perfect as there can be large swings in TAC between surveys and distribution shifts.
- Communication on triggers, why they are important and why changes are needed when triggers are met, is important to improve fishermen compliance with the regulation and add transparency to management. Could fishermen provide input on the scale of the response?

Look into streamlining NEPA compliance and documentation.

- Could NEPA Programmatic Environmental Impact Statements decrease response times for management?
- Could the ASMFC concept of conservation equivalency/functional equivalency be implemented for a faster NEPA process?
- Supplemental Information Reports could be used more frequently for compliance with NEPA, when an action builds directly upon prior actions in that fishery management plan, the measures being suggested are typical of the FMP, and stock and fishery conditions have not changed substantially.
- Consistency in NOAA General Counsel guidance across all regions could be helpful.

Include spatial considerations in management.

- Could variable management across an area be considered (a geographic approach)? For example, decreasing or increasing fishing pressure at the edges of a population?
- Could we identify stock status (overfished, subject to overfishing) by regions?

Other comments related to increasing flexibility, adaptability and robustness in management.

- Learn from other Councils.
    - For example, MAFMC has streamlined their specs process to 1 meeting and 1 vote.
- NMFS and Councils should better account for size and age structure in monitoring and management decisions.
- Councils need more socio-economic information to make better management decisions.
- Think outside the box, for example, how could this idea tie to EBFM?
- There were a few comments on the need for better reporting from all fishing sectors, especially the recreational sector
    - There are participants willing to share their data, but they need a structure to do this.
- Different Councils have heard different advice on the use of EC species and what constitutes management action. Consistent advice is needed.

Q2: How can we better accommodate uncertainty in the stock assessment process **and address related management challenges?**

Improve the use of risk policies to better account for current and future climate impacts on species (both negative and positive impacts).

- Risk policies are different from risk assessments; both could be useful, but only risk policies are discussed here.
    - A risk policy articulates the bounds of how risk tolerant or risk averse an organization's management approach is, given certain criteria. Though informed by scientific advice, risk tolerance is ultimately a policy decision.
- A risk policy could be useful for determining what climate-related risks (and failures) would be acceptable.
- Councils approach risk policies and uncertainty buffers differently.
- It could be useful to categorize risk as long term vs. short term risk, as the management response may be different depending on the temporal outlook.
    - In the NE there is a tendency to look at short term risk to businesses and ignore long term adverse effects.
- There was agreement that comparing risk policies from all the Councils, including how they account for uncertainties due to climate would be useful.
    - NEFMC hired a contractor to prepare a report with this information for all Councils. It will be released in spring 2023.
    - ASMFC has a draft risk policy that includes information on climate concerns and information on economic importance that can decrease or increase catch levels, respectively.
    - SAFMC has an ABC Control Rule that is complicated. It seems subjective because uncertainty varies between stocks.

- There was interest in having more consistency in the risk policies across the different management bodies. Some felt consistency was needed and others thought the differences were appropriate. All agreed that inconsistencies will create challenges when stocks move across jurisdictional boundaries, especially if the Council in charge of the fishery management plan changes (see governance discussion).
- There was concern that some existing risk policies only result in a decrease in catch (i.e., they increase uncertainty buffers), and that there is no mechanism for increasing catch (i.e., decreasing buffers) for species showing positive responses to a change in climate.
    - We need a tool to identify species doing well and take this account within a risk policy.
    - We have $F_{rebuild}$ and F_{MSY}. Can we add a new F for stocks doing well? For example, if $B/B_{MSY} >2$, implement the higher F because of low risk.
    - Black sea bass are doing well but fishermen are not getting to take advantage of this. They feel like fishermen are being held accountable, but management is not being held to be accountable.
- Is there a way to influence SSCs to take more risk?
- When there is a required cut in catch, the response should be tied to the level of certainty, and anecdotal information should also be considered.
- In order to improve our understanding of risk, we could track risk, decisions, and consequences to better learn from past decisions (i.e., use adaptive management). This could be applied to both science and management decisions.
    - For stock assessments, we can improve our understanding of risk by looking at the history of assessments and retrospective variability.
- Results from NOAA's species and habitat climate vulnerability assessments could be used to identify species that have higher or lower risk of climate impacts.
    - For the Northeast, a crosswalk of the habitat and species assessments was recently completed that merges the findings of both assessments into a single evaluation.

Consider risk assessments to identify fisheries at risk of not meeting management goals

- Risk assessment is a systematic process of evaluating potential risks involved in an undertaking, including the probability that an outcome might occur and the severity of the consequences.
- Risk assessments can combine qualitative and quantitative information.
- Risk assessments help identify scientific and management priorities
- When you look at risk, the risk to the resource and risk to the permit holder should be discussed.

Move toward robust management options rather than trying to account for all kinds of uncertainty within stock assessment models.

- Consider moving toward dynamic reference points that adjust to account for current environmental conditions. There should be the expectation that as management adjusts to this new tool, there will be some failures before successes.
    - Use ecosystem and environmental information to inform appropriate dynamic reference points; use trial and error to ID systems that work.
- Accurately measuring uncertainty is hard if not impossible. Are there better ways to measure uncertainty?
    - One idea is to consider historical assessment variability rather than trying to quantify all forms of uncertainty.
- Could other information (habitat availability or condition, predator and prey information) be considered, especially in situations where there is a disagreement on the status of a stock?
- Management strategy evaluations (MSEs) can be used to identify management options that are robust to multiple possible future conditions.
    - Guidelines on how to focus MSEs could be useful.
    - There are other forms of structured decision making (similar tools to MSEs) that could be useful.

Use qualitative information to improve our understanding of risk. Specifically, better incorporation of local ecological knowledge into management is needed.

- Results from climate vulnerability assessments could be used to identify species that have higher or lower risk of climate impacts.
- NMFS and Councils could also explore participatory modeling that includes what fishermen are seeing on the water (good example from Gulf of Mexico)
- Fishermen can also collect data to clarify conditions on the water as they have done for red tide in the Southeast
- North Pacific Fisheries Management Council uses risk tables, a standardized framework to document concerns about the assessment model, population dynamics, and the ecosystem/environment that are not explicitly addressed within the stock assessment model. A qualitative scoring procedure is used to evaluate the severity of the concern.

Consider and clearly communicate intricacies of uncertainty when making policy/ changing management

- Not all risk is the same, and it can depend on the type and characteristics of uncertainty.
- The type of uncertainty matters.

    - A large uncertainty in fishing mortality might be more important than uncertainty of the utilization of a stock, especially in situations where there is certainty that the stock is improving.
    - More nuanced communication about the type of uncertainty is needed
- Characteristics of the uncertainty also matter.
    - For example, with a 2 tailed distribution- is uncertainty bigger in one direction vs. the other? Are both tails being considered? A highly skewed understanding of uncertainty could mean there were large consequences for a wrong decision one direction but not the other and this should influence decisions.

Other Comments related to improving our ability to account for uncertainty in management:

- Simulations could be used to better understand and communicate the risks associated with management decisions
    - There was concern that the high workload on assessment scientists would mean simulations will not be prioritized.
- If management does not account for current conditions, we could be aiming for rebuilding that is not possible. If we can show fishing is not the reason for a low abundance, then we can look to other management responses.
- Consider moving from the concept of maximum sustainable yield (MSY) to the concept of pretty good yield as it can provide more flexibility in its use
- ICES has started providing scientific advice on MSY as a range, with other factors (such as known uncertainties) driving what part of the range is used for management.
    - This would require careful adherence to a risk policy, so that management bodies could avoid consistently picking the highest number on the range.
- There were suggestions to better integrate considerations of scientific and management uncertainty (vs considering them mostly separately as is currently done).
- How do we deal with situations where the stock assessment was not approved. The Council needs the ability to do something in these situations.

- For stocks where we are lacking relevant survey information, what other information can we track? CPUE? An EBFM indicator? There was a suggestion that we need to decide in advance what will be used to make decisions.

Q3: How can we improve the ability for fishermen and other stakeholders to adapt to climate change?

Creating a more adaptable structure for fishing permits. Fishermen need the ability to change target species or locations in order to adapt to changes in environmental conditions and fisheries. Right now permits, permit systems, and

required reporting differ between Councils and between fisheries. Creating consistency in the permit system could allow for permits to be adjustable as stocks move and target fisheries change.

- Possible steps in this process include:
    - Compile information on permits across the entire East Coast.
    - Assess diversity of permits (who holds them, where, in what combinations)
    - Assess permit accumulations
    - Identify where there are limits in flexibility for fishermen.
    - Identify easy changes
    - Address coast-wide permit issues
- Easier wins were identified:
    - Splitting permits
    - Adding emerging species to existing permits
    - Removing historical moratoria on permits
    - Remove requirements to bundle permits that may no longer make sense and should be reconsidered.
- There is a need to consider and assess the community component of permits (who holds permits, and how changes impact communities) and track the accumulation of fisheries permits through time.
- There was concern that changing gear restrictions could increase uncertainty if this brings in latent effort.
- Different permits have different reporting requirements, which is challenging to fishermen.
- Permits are a difficult subject to address, given the financial investment many fishermen have in the existing system.
    - Should fishers granted permits/quota be treated differently than those who invested heavily in the permits/quota?
- Fishermen are concerned with "blowing up" the existing system. The combined impacts could impact uncertainties; so any changes should be tested with small changes first.
- If changes to permits are being considered, the capacity of a fishery should be considered as there are some fisheries that cannot add new capacity.
- It is easier to adjust permits when there are not state by state allocations. State IFQ programs also create less flexibility
- Larger changes in permits were also suggested, such as switching from species specific permits to area based permits (as the NEFMC eFEP contemplates), and switching from state permits to a universal federal permit that would adjust to species distribution and abundances (for charter boats).
    - When discussing a shift to area based permits, the tendency for fishermen to target high value species would need to be considered to ensure this does not create more choke stocks.
- Sub-regional permits could be used to address shifting stocks. There could be a stepwise approach to adding species to permits. For example, adding black

sea bass to lobster permits to allow lobster fishermen to land bass that are caught in the lobster traps.

Identify and remove institutional baggage. Some existing rules that limit the flexibility to respond to changes in fish stock abundance and distribution may no longer be needed or relevant. Councils should identify and remove this "institutional baggage". Ideas include removing:

- Restrictions on what gear can be used to fish what stocks
- Permit bundle requirements
- Restrictions on using one gear per trip
- Trip limits
- Mis-match of mesh sizes across fisheries (e.g., flounder and black sea bass)
- Limitations in endorsements (e.g., cannot crossover between pot and longline)
- Other legacy regulations

There was also discussion of shifting towards different means of conducting fishery-independent surveys. NEFSC is considering these issues under the Northeast U.S. Region Federal Survey Mitigation Strategy.

Improve the use of community vulnerability assessments.

- Climate change will likely create winners and losers. Are there management changes we can implement that will ensure everyone survives?
- Councils need more socio-economic information to better understand fisher needs

Other comments on improving the ability of fishermen to respond to changes:

- Increasing diversity of catch can increase stability and resilience of fishermen. However, specialized gears can make change hard. How can we incentivize diversity?
    - Potential action: Create a program to support diversification (gear, fisheries, etc.)
- Fishermen need stability. Large swings in management or catch limits are difficult for fishermen and processors.
- Economics (for example, gas prices) impact the ability to follow the fish.
- Commercial infrastructure is also important.
    - Loss of working waterfronts decreases options for where fish can be landed.
    - Sea level rise is also impacting these businesses
    - Could fisheries move to offshore infrastructure?
- Councils need to identify a better mechanism for managing emerging fisheries.
- Increasing market certainty could help with fishermen's ability to address other forms of uncertainty. For example, adding a market for an invasive species increases market certainty that may help fishermen deal with the ecosystem impacts of that invasive species.

Appendix D: Data and Partnerships Breakout Groups Summary and Potential Actions

This appendix includes the considerations and potential actions we heard during the data and partnerships breakout groups. We did our best to include the ideas we heard during the breakouts. Participants used post-it notes to bring ideas to each guiding question. The ideas are grouped according to guiding questions, presented prior to consolidation, the breakout discussions.

Q1. How should we prioritize data/information needed to manage in a changing environment?

- Develop a process between the NRCC and SEDAR to prioritize data (Use ACCSP as example)
    - One participant noted that the NRCC does not have control over data collection and this should not be pursued.
- Implement better coordination between federal and state recreational permits
    - Then collect data
- Reduce uncertainty in recreational data for species with high recreational catch and effort.
- Shift standard recreational survey to a directed survey.
- Use eDNA for gut content analysis
- Incentivize better reporting both recreationally and commercially.
- Start a conversation about data storage with regards to offshore wind instruments
- Consider data management in addition to data collection.
- Expansion of ocean monitoring systems (e.g., IOOS) regionally.
- Work to better understand what environmental data is needed to improve assessments.
- Evaluate how existing fishery dependent and independent data have been used, then refine and streamline.
- Compatibility and continuity of fishery independent surveys with different gear types.
- Standardize data collection requirements across jurisdictions. States often have less robust data standards, but more flexible regulator requirements.
- Standardize and expand cross-jurisdictional surveys.
- Paperwork Reduction Act could be a barrier for nimbleness.
- Increase communication between science centers and states (e.g., through workshops) and have the group identify data holes and what is not used.
- Be ready to prioritize, say "no", and/or stop some projects to ensure resources are available for this effort.
- Require finer-scale catch reporting (10-minute square or better)
- Prioritize and develop:
    - Data standards/methods that can be useful for ecosystem management.

    - Standards for government, education, and other ocean user development.
- Identify training opportunities for fisheries managers to learn/experience why human dimensions data is important to decision making.
- Prioritize human dimensions data (how people feel about changes/identity/etc) in grant opportunities (S-K, FIS, ACCSP), etc.
- Comprehensive habitat mapping is needed to EBFM and monitoring species' range (contraction/expansion)
- Review the huge list of research needs
    - Sort out those related to climate change and identify gaps.
    - Prioritize those data needs.
- Review ACCSP mode of prioritizing data.
- NRCC and SEDAR initiate a conversation on what can be done and what we can stop doing. New high-level commitment.
- Need to expand the recreational demand model to the commercial sector and up/down the coast.
- Develop a message around why we are prioritizing data
    - Helps with incentives to provide data.
- Use legacy environmental and survey data to make retrospective forecasts of changes in stock distribution to determine which data elements are key in making future predictions.

Q2. How can we use current funding more efficiently?

- Current funding:
    - We cannot prepare for the future with current funding.
    - Need to bring congress into conversation.
    - Combine partnerships with new developing ocean users.
- Expand and utilize technology more.
- Expand current use of environmental data loggers, etc, consistently across the coast of industry vessels (better utilize industry and current funding).
- Centralized, cloud-based data management system.
- Determine if all current funding is still useful and redirect or develop cheaper technology.
- Require environmental monitoring stations on wind turbines
- Plan to fully implement A.I. solutions for data collection and data analysis.
- Partner with NGOs in prioritizing funding decisions, i.e., use fisheries climate change priorities in proposal ranking.
- Conduct modeling to determine how best to "knit" together different existing regional surveys.
- Prioritize data collection in areas, sectors, and gears where uncertainty is highest.
- Strategic planning coastwide for projects and data needs to identify efficiencies.

- Expand study fleet and citizen science approaches consistently across the coast and identify the data/questions each approach is most appropriate for to collect more real-time data.
- Review and collect existing data streams not traditionally used.
- Transition to more efficient sampling methods (drones, gliders, eDNA, etc)
- Right size data collection (if we subsample otoliths, we have collected too many)
- NMFS should be more organized in terms of our programmatic needs and priorities.
- Management needs should drive data needs, not vice-versa.
- Maximize relevant data collection from existing surveys.
- Breakdown geographic barriers, i.e., NEFSC vs SEFSC
- Unified collection (standards) and centralized data management.
- Work with states and feds to standardize gear/collection methods.
- NMFS/states should review long-term fishery dependent surveys and assess their current usefulness and decide to stop doing surveys based on the results of the analysis and reprogram funds.
- Stop building ships to skiffs, i.e., replace white ship fleet.
- One permit system.
- Standardize data collection along the coast (state and fed).
- Clean house of people who do not do their jobs.
- Use for-hire fleet to assist in spatial scale data to assist in the Albatross/Bigelow surveys.
- Partner with organizations that would benefit from serving as a platform for data collection, e.g., USCG, DOD, pilot training, schools, merchant marine academy, marine technical schools.

Q3. How can we better utilize the fishing industry for data collection?

- Collect data to calibrate catch composition with temperature.
- Recreational study fleet
- Reduce size of statistical areas to generate finer, more accurate scaled data.
- Study fleets: (recreational, commercial) use as priors on existing data sources.
- Turn losers, non-reporting, recreational tilefish permitters into data collection instead of fines/sanctions
- Consult a professional outreach expert/firm.
- Actually use stuff, study fleet.
- Ensure whatever is collected is actually used.
- Deploy environmental sensors on fishing vessels.
- Invest in temperature sensors/CTDs and put them on as many boats as possible.
- Better commercial fisheries monitoring, i.e. 100% ASM in NE Groundfish.
- Expand and create RSA programs, e.g. Scallop RSA. Be very thoughtful of program design.

- Use the for-hire fleet
    - eVTRs: Temperature, length of trip, lat/long
- Use fishing vessels as platforms (moorings, temperature, manual observation, eDNA)
- Cooperative/Collaborative research
- Scientific effort to merge/use data from different scales and sampling designs.
- Incentivize data collection. Hybrid fish for science/commercial fishing.
- Trust that the fleet can collect scientifically valid information.
- Tell the industry what you need and work collaboratively to get it.
- Expand the study fleet.
- Begin transitioning current large-vessel government vessel surveys to industry platforms.
- Create an example of how data will be used.
- Create incentives: explain why data is needed, how it will be used and how it will benefit science/management.
- Citizen science reporting for the recreational fishing sector.
- Citizen science and cooperative research. NMFS should increase funding and have a larger role.
- Expand the study fleet and recognize that not every fisherman is cut out to be a study fleet participant.
- Create flexibility and opportunities for fishermen who pitch in to collect data.
- Inclusion of collected data in the stock assessment process along with greater transparency and flexibility in the incorporation.
- Create a number of incentives for fishermen to participate in data collection.
- Utilize fishing industry:
    - First determine what to collect as a harvester (what is needed)
    - Outreach on how to best collect with industry.

Q4. What are the best ways to foster outside partnerships for sharing data, especially with other ocean users?

- Create more regular, structured coordination across relevant Federal organizations for data collection, science, etc.
- Approach well-funded foundations who are about oceans and climate change (not just Federal funding)
- Better prioritize applied research.
- Clearly define how the data are going to be used.
- Be wary of wind farms. They do not have a vested interest in the future of our environment.
- Seek mutually beneficial projects. Each party must benefit somehow.
- We have data. What do we do with it based on climate change?
- How will we use new data?
- Leverage universities to develop stock assessment models for added capacity.

- Use wind turbine money to fund surveys but the surveys are conducted and overseen by NMFS.
- Full-time staff with coordination roles to focus on communication.
- Use OSW turbines as platforms of opportunity to collect species distribution data.
- Foster data sharing:
    - New ocean users collecting standard data in elements partnership.
    - Develop recommendations on what is to be collected.
- Define data gaps and needs, then coordinate with other Federal agencies to determine whether data needs can be met. Is data already available?
- Identify other users and ask for data contributions.
- Collect the right data, not just more data.
- Actually use the study fleet.
- Host a forum of known established partners to discuss what is available and data gaps.

Appendix E: Prioritization Exercise Detailed Results

This appendix provides the detailed breakdown of voting from the prioritization exercise conducted on Day 2 of the meeting (as described in Section 3). Based on the Day 1 discussions, Core Team members finalized a list of potential actions for each theme. These actions are listed and briefly described in the three tables in the body of the Summit report (Sections 4-6). Summit participants were asked to prioritize the potential actions in the following way. Everyone received eight votes in the form of dot stickers. Dot stickers were color coded according to each participant's affiliation, with additional labeling for attendees who are members of both a council and ASMFC. Votes could be allocated across any of the potential action areas in any of the themes, but participants could not vote for the same potential action more than once.

Participants were asked to consider prioritizing:

- Potential actions that will help fishery managers prepare for and cope with the challenges of climate change;
- Potential actions that fishery managers are able to influence, and
- Potential actions that are feasible to implement, or where some progress can be made.

Cross-Jurisdictional Governance

Governance Potential Actions	Total
Move to more consistent use of committees across Councils; re-evaluate Committee representation	25
Evaluate mechanisms for cross pollination of SSCs	17
Committee-based decision making with changes to Council SOPPs (Committee motions not approved by full Council get sent back to Committee)	17
Improve coordination across NOAA Offices	13
Coastwide council with opt-in representation by FMP based on fishery interest	12
Clarify and potentially expand the roles of liaisons between Councils	11
Change state representation on councils	8
Review efficiency/effectiveness of joint management plans along coast	8
Re-evaluate and potential revise Advisory Panel representation	4
Committee-Based decision making where Committee has final vote (does not go back to full Council)	1
Consider allowing proxies at Councils to alleviate workload issues	1
Develop more explicit agreements for joint FMPs	1
Total Cross-Jurisdictional Governance Dots	***118***

Figure 1: Summit dot voting totals for Cross-Jurisdictional Governance. These vote counts represent the total dots received for each potential action, and do NOT reflect double counting of those representing more than one management body.

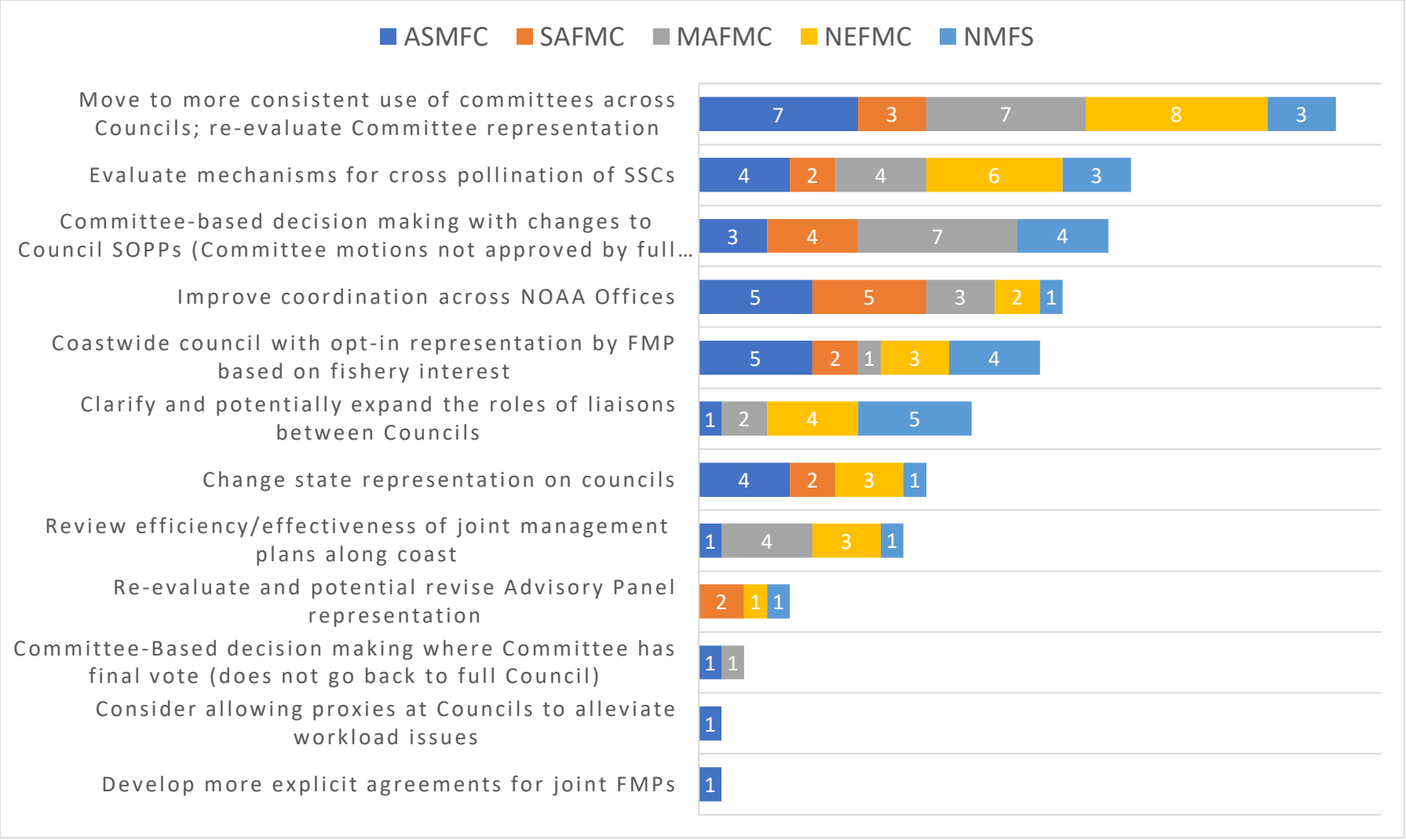

Figure 2: Summit dot voting results by management entity for Cross-Jurisdictional Governance. These results are intended to show interest by management body and therefore reflect double counting of those representing more than one management body. Totals will not add to those shown in Figure 1.

Managing Under Increased Uncertainty

Management Uncertainty Potential Actions	Total
Improving and better operationalizing risk policies	29
Move away from trying to model more and more uncertainties	25
Include spatial considerations in management	18
Identify/establish best practices for if/then management	14
Improve use of community vulnerability analyses	10
Look into streamlining NEPA compliance & documentation	8
Compile information on permits across entire East Coast	7
Consider risk assessment = meet management goals	5
Identify institutional baggage	4
Consider intracacies of uncertainty when making policy/changing management	2
Total Managing Under Uncertainty Dots	***122***

Figure 3: Summit dot voting totals for Managing Under Increased Uncertainty. These vote counts represent the total dots received for each potential action, and do NOT reflect double counting of those representing more than one management body.

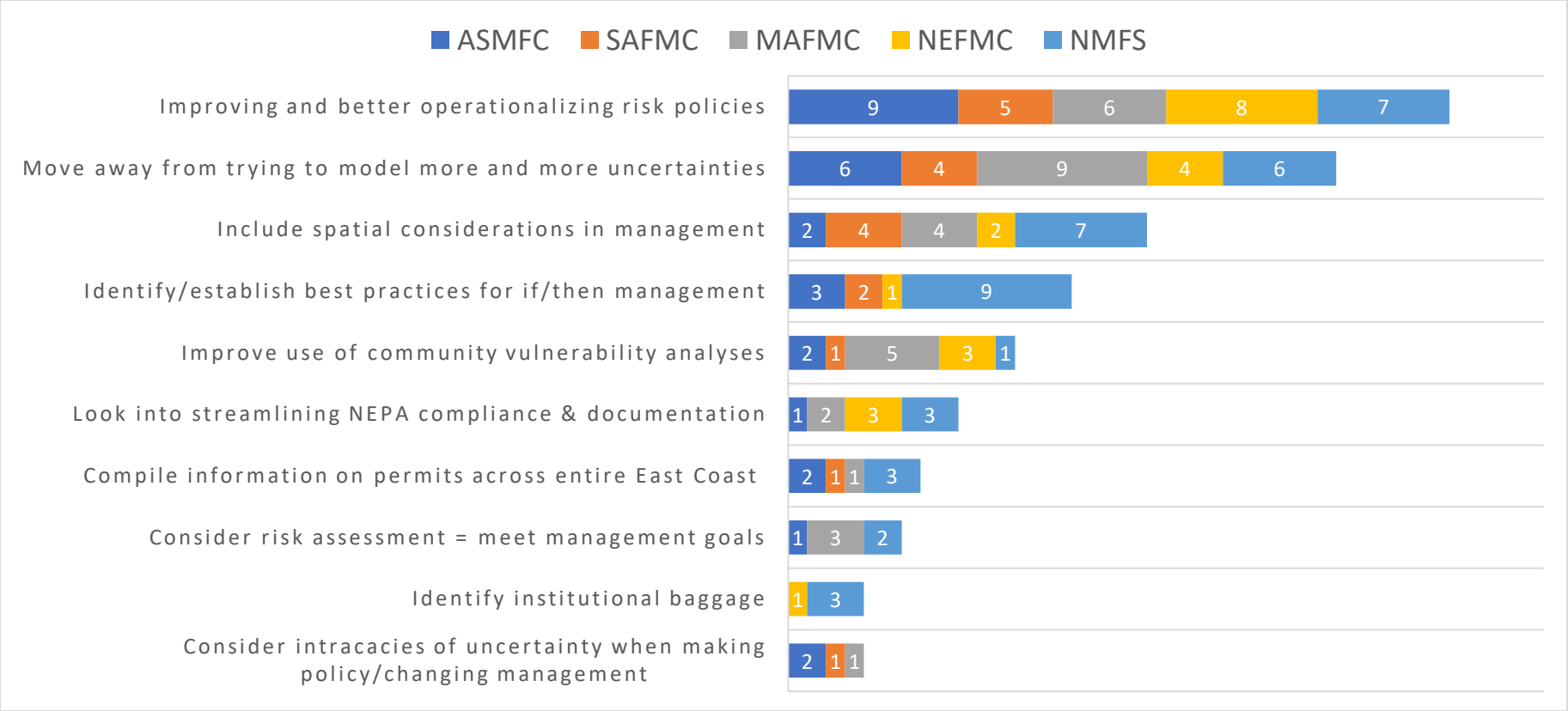

Figure 4: Summit dot voting results by management entity for Managing Under Increased Uncertainty. These results are intended to show interest by management body and therefore reflect double counting of those representing more than one management body. Totals will not add to those shown in Figure 3.

Data Sources and Partnerships

Data Sources and Partnerhips Potential Actions	Total
Expand study fleet, include recreational fisheries and ensure data are used, include shovel-ready data projects	26
Prioritize recreational data collection to reduce uncerainty including devleoping incentives for better reporintg	25
Standardize data collection to breakdown geographic barriers along the East Coast (both state and federal)	24
Modernize data manaement to facilitate better sharing of data and prepare for an influx of new data streams (e.g. offshore wind data)	16
Use survey mitigation around offshore wind to transition to industry-based surveys or other survey platforms	16
Focus on AI/techn development to more rapidly get data into assessments	5
Develop a process between management and science organization to prioritize data needs for climate-ready management (e.g., human dimensions data)	5
Hire staff dedicated to fostering partnerships and coordinating data collection/sharing between other ocean users, management bodies, and within Federal agencies	1
Total Data Sources and Partnerships Dots	***118***

Figure 5: Summit dot voting totals for Data Sources and Partnerships. These vote counts represent the total dots received for each potential action, and do NOT reflect double counting of those representing more than one management body.

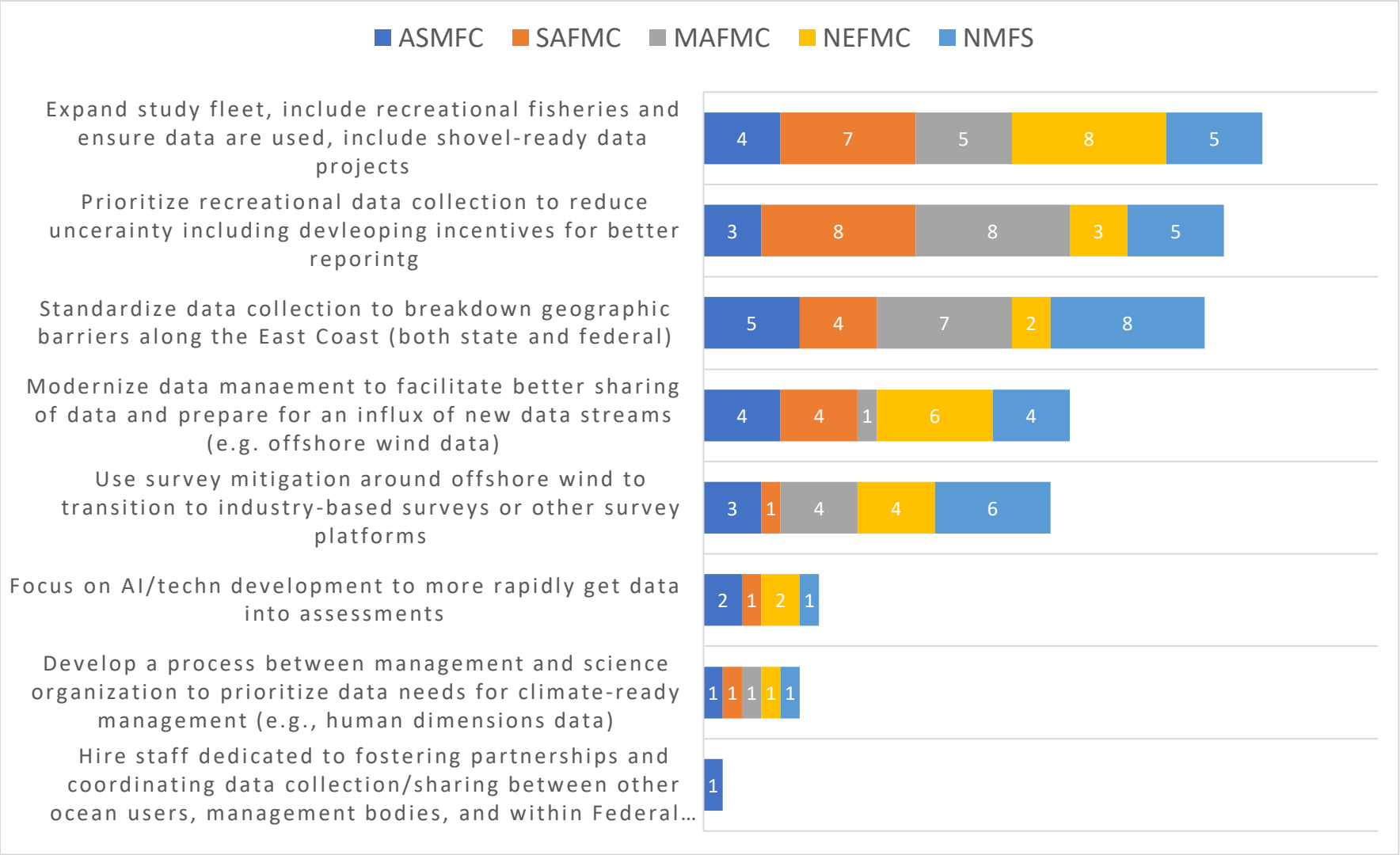

Figure 6: Summit dot voting results by management entity for Data Sources and Partnerships. These results are intended to show interest by management body and therefore reflect double counting of those representing more than one management body. Totals will not add to those shown in Figure 5.

East Coast Climate Change Scenario Planning
Potential Action Menu
June 2023

Introduction

The U.S. East Coast Fishery Management Councils (Councils, New England, Mid-Atlantic, and South Atlantic), the Atlantic States Marine Fisheries Commission (Commission), and the National Marine Fisheries Service (NMFS) conducted an East Coast Scenario Planning Initiative to explore jurisdictional, governance, and management issues related to climate change and fishery stock distributions. Representatives from these fishery management organizations have worked collaboratively and engaged diverse stakeholders to explore how climate change will affect fishery management. This exploration was based on a multi-stage scenario planning process, where stakeholders generated several different possibilities for how climate change might affect east coast fisheries.

East Coast Scenario Planning Summit

The capstone to this initiative was the East Coast Scenario Planning Summit, held on February 15-16, 2023. It was attended by representatives from each of the organizations identified above. The goal of the Summit was to develop a set of potential governance and management actions resulting from a scenario-based exploration of the future. It was not possible for the Summit to cover all the issues raised throughout the scenario process. Instead, focus was placed on three overarching themes: Cross-Jurisdictional Governance, Managing Under Increased Uncertainty, and Data Sources and Partnerships. A report of the Summit meeting proceedings is available at: https://www.mafmc.org/s/ECSP-Summit-Report_April-2023.pdf.

As described in the Summit report, participants discussed ideas already generated throughout the process, reflected on them, and added new ideas for potential actions. The core team then grouped comments and ideas raised by participants into potential areas for action. After a prioritization exercise, Summit participants identified potential practical next steps for a limited number of ideas under each of the three themes. There was not time to develop practical next steps for all potential actions that generated some level of support.

Role and Structure of Potential Action Menu

This potential action menu reviews the actions identified at the Summit and suggests possible next steps beyond what could be considered at that meeting. In some cases, the core team has taken the list of potential actions from the Summit and consolidated those with similar themes and would have similar next steps. Thus, the list of potential actions in this document does not always align completely with those in the Summit report. Each potential action includes multiple next steps items.

The Northeast Region Coordinating Council plus the South Atlantic Fishery Management Council leadership reviewed all the potential actions and prioritized them into three levels (high priority, medium priority, and parking lot). A full list of potential actions by priority level can be found in the Appendix.

High priority potential actions are those that could be quick wins and/or that the NRCC working with SAFMC leadership viewed as important issues to address in the near term. Some of these actions

include next steps that are already underway. The medium priority potential actions (also referred to as the 'watch list') are also important issues but could take more time or resources to address. These were viewed as less immediately actionable or less of a priority for immediate allocation of resources compared to the high priority issues. Some high priority actions include next steps with a mix of priority levels. The parking lot highlights ideas that are a lower priority or infeasible to pursue at this time. The purpose of this section is to hold on to some of the Summit ideas for possible future reconsideration as conditions change and as our management systems and technology continue to evolve.

The action menu is intended to be an evolving document, used as a planning tool to guide development collective and individual priorities, and a place to capture future issues and ideas. It is not the intent that individual management bodies would necessarily approve or endorse this document in full, and not all potential actions will be appropriate to apply universally. Some may be relevant for only certain areas, management bodies, or FMPs, while others would need to be applied consistently or developed cooperatively to be effective. Many of the ideas discussed below are explicitly about coordination between organizations and would require collective prioritization and the cooperation of multiple management entities.

Thematic Work Areas

The potential actions in this menu are grouped according to the three themes discussed at the Summit: 1) Cross-Jurisdictional Governance; 2) Managing Under Increased Uncertainty; and 3) Data Sources and Partnerships.

Theme 1: Cross-Jurisdictional Governance

Environmental changes are expected to continue to modify the distributions of many fish stocks due to range expansions, range contractions, or shifts in distribution. These changes will pose challenges for current governance structures and arrangements, which were mostly established under the assumption that stock locations would remain relatively stable over time. The scenario planning process considered the ways in which governance structures and processes may need to be modified to address changes in species distributions and other conditions.

Identify improvements to structure and representation for governance on the U.S. East Coast

Many regional and state representation concerns have been exacerbated by changing fish distributions. In addition, the complexity and sheer number of organizations participating in the management process on the East Coast can pose challenges for adapting to changing conditions. The scenario planning process provides an opportunity to re-evaluate the current governance structure to consider alternatives that may work better under changing conditions.

Identify guidelines for when and how management responsibility should change

Rather than addressing this on an ad hoc basis, consideration should be given to under what circumstances, and by what process, management responsibility may need to be shifted or merged.

Improve the efficiency and the efficacy of joint fishery management plans (FMP)

Joint FMPs may become more common under changing conditions and fish distributions. Because joint FMPs can be more complex or less efficient than those managed only by one entity, it will be beneficial to explore ways in which joint management can be more efficient and effective.

Improve coordination and collaboration among management entities

Aside from joint FMPs, there is a spectrum of ways different groups coordinate with each other to develop FMPs and share information. Increased and improved coordination will likely be necessary in an era of climate change and changing species distributions, including improved processes for coordinating management, resources, and information among multiple entities.

Theme 2: Managing Under Increased Uncertainty

In some cases, environmental changes mean historical conditions can no longer be used to predict the future, increasing our uncertainty around appropriate catch limits and management responses. Are there actions that can be taken now to prepare for and respond to this increase in uncertainty?

Better accommodate uncertainty in the stock assessment process and address related management challenges

Changing ocean conditions are affecting the location of fish stocks, the productivity of fish stocks, and the fishing industry's interactions with bycatch, protected species, and other ocean users. Fish stocks could become less productive or move out of range of the fishermen who catch them. In addition, changing ocean conditions also impact the collection and analysis of data used in the stock assessment process. All of this means managers need to be prepared to make decisions with more uncertainty and less clarity.

There are two main approaches to addressing uncertainty in fisheries management: first, increase investment of time and funding into research and science to better understand the situation and potentially decrease uncertainty in predictions (moving towards the right side of the matrix of scenarios), and second, create management approaches with a good likelihood of success even under uncertainty (left side of the scenario matrix). Ideally, implementation of both options is needed to ensure ecosystem, fishery, and community resilience.

Increasing flexibility, adaptability, and robustness in management

The U.S. fishery management process was not designed to be especially nimble as it prioritizes public input/collaborative management. While there are definite advantages to this process, it can be difficult for management to be nimble and responsive to challenges associated with a changing environment. Given that the impacts of climate change could result in surprises in environmental and fishery conditions, creating management that is flexible, adaptable and robust is necessary.

Improve the ability of fishermen and other stakeholders to adapt to climate change

Fishermen and fishing related businesses need to be able to adapt their fishing practices to account for current or expected changes in fish stocks distribution or productivity. Are there management actions that can help fishermen adapt?

Theme 3: Data Sources and Partnerships

One of the key considerations used to develop the scenarios was the predictability of ocean conditions, which includes how well science is able to assess and predict changes in stock production and distributions. Providing stock information and locations hinges on the ability to evaluate accurate and timely data. Coordination between management bodies, federal agencies, academic partners, fisheries stakeholders, and other ocean users will also play a large role as we adapt to changing conditions.

Prioritizing data and information needed to manage in a changing environment

The next generation of stock assessments and the ability to perform climate ready management will hinge on the ability to have the right mix of data/information available to scientists and managers. As we plan for the future, we will need to determine what data and information to prioritize. We will also need to consider what can be accomplished at the national or regional level and what needs to be addressed on a council-by-council basis. Some of the data and information needed will be readily available while others will need a plan for how to collect and synthesize them.

Using funding more efficiently

Strategies need to be developed on how to efficiently allocate funds spent on data collection to maximize the data/information that are needed especially in a changing climate.

Utilize the fishing industry for data collection

A common theme that arose during the development and application phases of the initiative was the need to collect more fishery dependent data and to better utilize those data in assessments and management in a timely manner. Integrating science with what industry is seeing on the water would also help develop trust between science and industry partners.

Foster partnerships for data sharing

Many entities collect data about the ocean, including academic institutions, non–governmental organizations (NGOs), and other ocean industries such as offshore wind and aquaculture developers. Fostering partnerships with these users may prove to be beneficial for all parties.

Leadership and Staff Roles

The NRCC has agreed to form two groups to help implement and support summit actions, the East Coast Climate Coordination Group and the Climate Innovation Group. These groups will evaluate and address the potential actions highlighted below as well as bring forward new ideas to address Atlantic coast fisheries issues in a changing environment. Each potential next step lists a proposed group that could lead the work on the issue.

Both groups will need logistical and administrative support, in terms of organizing meetings, etc. We suggest that the organizational support is provided by Councils/Commission/NOAA on a rotating basis, like the way that support is provided to NRCC currently.

East Coast Climate Coordination Group

Implementing the potential actions identified through this process will involve important changes to fishery management approaches. Change is difficult to achieve, given how busy everyone is, and how much coordination is involved. To provide the best chance of making effective changes happen, the East Coast Climate Coordination Group has been formed to oversee the implementation of these potential actions. This body will ensure actions are prioritized, jointly or by individual management organizations, estimate resources needed, and executed in a coordinated fashion. Note that all potential actions do not need to be applied universally – some might apply to only some areas, or management bodies, or FMPs.

The body will meet at least once per year, before an NRCC meeting. The appropriate NRCC meeting (spring or fall) will be determined based on the availability of related data and analyses that would influence group discussions (for example, meeting shortly after the State of the Ecosystem reports are presented to the NEFMC and MAFMC might be useful). It will be made up of one member from the following entities: the Commission, MAFMC, NEFMC, NOAA-GARFO, NOAA NEFSC, NOAA SEFSC, NOAA SERO, and SAFMC.

Climate Innovation Group

An early task for the Coordination Group will be to establish and identify the role of a staff-level Climate Innovation Group. Below are possible tasks for this group; these will be refined by the Coordination Group as appropriate and may evolve over time.

1. Identify ideas at an earlier stage that are worthy of consideration by the Climate Coordination Group. Essentially, the Climate Innovation Group would look out for important changes, bring these to the attention of the Coordination Group, and identify possible actions to undertake.

2. Regularly review changes to the factors shaping East Coast fishery management. Using the scenarios as a framework, the group will highlight shifts that might push us towards a different scenario (or a completely new scenario). For example, the group could track evidence[1] showing changes in ocean conditions, new evidence of climate impacts, developments in technology, changing influence of new ocean users, shifting policy

[1] Relevant evidence could be sourced from indicators in existing reports (e.g., State of the Ecosystem), or in collaboration with Science Centers, scientific committees etc. Other more qualitative developments could be sourced from headlines / stories in relevant publications, or from scanning of social media posts.

environment etc. The group could also track various initiatives and tools that could be useful to apply when addressing the various action items. On a regular basis, the group will meet to review and assess new evidence and discuss whether conditions are changing in important ways.

3. Highlight potential actions from the broader list of Summit suggestions. The Climate Innovation Group should determine if some ideas may be resurfacing as more important / more supported than they were at the time of the Summit, or if the feasibility of implementing them has changed, based on changing conditions.
4. Generate any new potential actions. The group will also imagine potential new actions that seem appropriate given the changing conditions. For items (2) and (3), the basic approach will line up with the scenario theory about 'placing bets across a matrix'. Some actions might be robust (work across all scenarios). Others might be recommended to avoid a worst-case scenario. Others might be small experiments to try as a possibility comes more into focus.
5. Present an update of changes and revised potential actions to the Climate Coordination Group, who will decide if any additional actions should be prioritized, resourced and executed.

The existing East Coast Scenario Planning Core Team could form the basis of the Climate Innovation Group, but there will also need to be an evolution of the role and composition of this team. The Climate Innovation Group could encourage a broad range of colleagues and stakeholders to be part of the conversations. For example, it could be important to tap into economists and social scientists to understand changes in socio-economic conditions. The Group should also look to engage with and seek input from management bodies.

High Priority Potential Actions

Theme 1: Cross-Jurisdictional Governance

G1. Reevaluate Council committee structure, use, and decision making

Description: Several potential actions were identified at the Summit related to committee structure, use, and decision making. These actions have been grouped together here as they are interrelated and should be addressed simultaneously for them to have meaningful impact.

As discussed in the Summit Report, these actions primarily address representation concerns related to changing species distributions; specifically, stakeholders who may have increased access to shifting species but may not have "official" representation in the Council process.

Further discussion will be needed regarding whether the potential actions below should occur for all Council-managed species, or whether modifications are only needed for certain species or FMPs that may be experiencing or are projected to experience notable distribution changes.

1. The Councils should **re-evaluate committee representation**, with a focus on FMPs where managed species have shifted or are highly vulnerable to climate change.
2. Councils could **enhance the role of committees in decision making.**
    - The goal of this change is to give more weight to the opinions of committee members who are not members of the Council managing the species.
    - One approach would be to modify Council SOPPs or other procedures to allow increased decision-making authority at the committee level. For example, committee motions that do not pass the full Council could be sent back to the committee to be reworked. Under such a scenario, the Council could not simply override the committee and make a different decision; the measure would need to be sent back to the committee.
    - Other approaches to enhance committee roles in decision making that are not currently possible under MSA are noted in the parking lot section.
3. The Councils should **evaluate how to move toward more alignment in the use of committees across Councils**.
    - Again, the goal of these changes is to give more weight to the opinions of Committee members that are not from the Council with responsibility for managing the species.
    - Currently, each Council and FMP uses committees differently in the decision-making process. Some Councils rely heavily on their committees to craft and guide analysis of management actions, while other Councils rely more on staff, other technical teams, and discussions at the full Council level. Addressing regional/stakeholder group representation concerns by modifying committee structures may be more effective if Councils use committees in a more similar manner. This would not mean that every committee must be used in exactly the same way or that each Council would have exactly the same rules for its committees; but the Councils would aim for some degree of increased consistency.

Practical Next Steps:

Potential Action	Group
• Conduct a leadership planning exercise to further explore options for committee-based decision-making, committee structure, and committee use, building on ideas discussed at the Summit	East Coast Climate Coordination Group

Potential Barriers and Considerations:

- As noted above, the range of possibilities for modifying committee roles in the Council process is currently limited by what is possible under the MSA.
- There are multiple aspects of committee structure, use, and representation that will need to be considered together under this potential action. As mentioned above, these issues are interrelated. For more consistent use of committees to have the intended effects, committee representation will need to be reconsidered. Without more consistent use of committees, restructuring committee representation may have limited impact on management outcomes.
- Increased reliance on committees may have drawbacks in terms of further entrenching management "silos," given that more deliberation would occur in smaller groups, with more limited discussion occurring at the full Council. Depending on the extent of the Committee composition, this may lead to more differences in approaches between plans.
- If committee roles in decision making are enhanced, management could become less nimble if a Council and Committee become deadlocked, or if a committee cannot reach agreement. Both of these scenarios have occurred in the past.

G2. Re-evaluate and potentially revise Advisory Panel representation

Description: Climate-driven changes in species distributions are leading to increased concern about appropriate representation by geographic area in various parts of the management process. In addition to considering committee and other governance structures, the Councils and Commission should ensure that advisory panel (AP) representation remains appropriate and effective, including that it reflects the geographical distribution of the resource. A review of AP membership should also consider how other ecological and socioeconomic changes may drive changing needs for AP representation (e.g., changes in participation in a particular sector; trends in the use of certain fishing techniques or gears, etc.).

Practical Next Steps:

Potential Action	Group
• Individual management bodies conduct evaluation of AP representation and appointment process, including how AP members are recruited and identified, with consideration of underrepresented and underserved groups. This could be conducted for selected or all FMPs and should consider how representation needs (by geographic area, stakeholder group, or other factors) may be evolving with changing conditions.	Individual management bodies with staff level coordination between bodies

Potential Barriers and Considerations:

- Some management bodies have experienced recent struggles to recruit potential AP members, particularly when seeking broader representation. In addition, AP engagement can be challenging for some FMPs, which could limit the effectiveness of revised AP membership.
- The Councils and Commission should examine how AP input is currently used, and how it can better serve the process.
- Modifying AP representation does not necessarily mean expanding membership, but at a minimum considering whether representation is adequate given changing circumstances.
- If APs are expanded in terms of total members, increased costs may be incurred for meetings.
- AP members new to the management process will likely require training on fishery management and science concepts, e.g., through MREP or like programs.
- There could be other barriers to full AP participation, such as limited internet availability or access to a computer, for web-based meetings, limited English language skills, or inability to take time away from work uncompensated. Such issues would need to be addressed to ensure equity of access to the process.

G3. Develop joint management agreements with aim of clarifying roles and increasing efficiency

Description: Summit participants noted the importance of clarifying roles and increasing efficiency in jointly or cooperatively managed plans. There is currently a spectrum of approaches to joint or collaborative management, and while not all joint management needs to operate the same way, clearly defining and recognizing the pros and cons of different approaches would be helpful. Joint management has benefits for representation, but at times can hinder efficiency and efficacy when groups disagree, particularly if decision making is sequential. More explicit agreements between joint management participants could help to increase transparency and help groups work toward streamlining joint management processes. This issue may be particularly important to address if there is a desire or need for more joint management approaches in the future in response to changing species distributions. In addition, for species that are currently jointly managed, it would be beneficial to review whether the existing procedures and agreements are expected to continue working under different potential future conditions.

Practical Next Steps:

Potential Action	Group
High Priority	
• Review joint FMPs and agreements between the MAFMC and Commission (summer flounder/scup/black sea bass/bluefish) to identify areas for improved efficacy and efficiency	Commission and MAFMC staff
Medium Priority	
• Evaluate need for additional review and/or agreements on cooperative or jointly managed plans (Council-Council or Council-Commission plans)	East Coast Climate Coordination Group

Potential Barriers and Considerations:

- While considering joint/cooperative management relationships or FMPs on a case-by-case basis may be the most efficient and appropriate approach to this type of review, looking at other examples (within or across regions/management entities) could provide insight into potential ways of improving a particular joint management process.
- This topic will also be impacted by, and will impact, the consideration of committee structure under G1.

G4. Improve coordination across NOAA offices and regions

Description: Climate driven species distribution changes have begun to engage the Councils, and at times the Commission, with additional NOAA offices and regions. Processes and guidance can vary by office and region for similar issues or management problems. Improved coordination, particularly on process, will be important for efficiency in responding to management issues and the efficacy of the management response. It is also worth considering where there might be redundancies or duplicated efforts that could be coordinated to use resources more efficiently.

The idea of improved coordination was heard in each of the themes. The potential actions under M5 (evaluation of permit structures) and D4 (evaluation of data collection process) are linked to this issue.

Practical Next Steps:

Potential Action	Group
• GARFO and SERO review respective management action procedures and processing to highlight opportunities each employs which may benefit or expedite implementation of actions approved by the Councils.	GARFO, SERO

Potential Barriers and Considerations:

- This is a potential action that seemed to have some support but lacked specifics in how it should be approached, other than some specific actions considered under the other two themes (M5 and D4).
- The potential action above pertains to the regional offices, but future consideration could be given to whether a similar process for the science centers, or between the regional offices and science centers, or with other offices within NOAA, may be worthwhile.
- As noted above, this potential action intersects in important ways with the other two themes and many of the potential actions within them. Effective coordination between NOAA offices will be critical to making progress on this potential action menu.

Theme 2: Managing Under Increased Uncertainty

M1. Identify ecosystem-level contextual information that can be considered within the management process to help incorporate climate information into decisions

Description: Changing climate and ocean conditions can impact fish stocks, fish habitats, and interactions between species and fisheries, sometimes in surprising ways. It is important to proactively consider ecosystem level impacts when making management decisions. This can be via quantitative or qualitative information, including the use of ecological risk assessments[2], such as the risk assessment MAFMC uses as part of its ecosystem approach to fisheries management framework, which results in a more holistic consideration of issues. NMFS has written a technical memo that provides examples of how ecosystem risk assessments have been used in fisheries management.

Practical Next Steps:

Potential Action	Group
• NMFS offers to present findings of newly released Tech Memo looking at example ecosystem risk assessments to Councils and Commission	NMFS staff coordinating with Councils/Commission
• Consider adding major state-only-managed fisheries to these ecosystem risk assessments for a more complete perspective	NMFS
• Identify opportunities to use specific types of quantitative and qualitative ecosystem information to identify and avoid risks	Climate Innovations Group, individual Councils and Commission
• Share lessons learned	NRCC or other

Potential Barriers and Considerations:

- No forcing mechanism
- Need here is likely to be Council/Commission and FMP specific

Long-Term Objectives:

- Create a fishery management system aware of and able to respond to significant ecosystem changes.

[2] Ecological risk assessments are management decision tools that integrate information on individual and cumulative pressures to estimate the relative probability and magnitude of an undesirable ecological response. They provide a framework that can analyze relative risk broadly or in response to a small number of drivers. A climate vulnerability assessment is a more limited and targeted form of risk assessment.

M2. Streamlining FMP documentation and rulemaking

Description: Councils spend substantial staff time writing NEPA and other federal compliance documents, so processes that introduce efficiency should allow Councils to reduce administrative work, resulting in time savings that could be used to address new climate-oriented initiatives. Streamlining the FMP and regulatory processes is also a key way to make management more nimble and efficient, so that management responses to changing conditions can be completed in a more timely manner.

Practical Next Steps:

Potential Action	Group
• Review the use of programmatic Environmental Impact Statements (EISs) for Council actions and encourage their use where appropriate	MAFMC considering this near-term
• Identify areas where NEPA documents can be streamlined, including when incorporation by reference to recent related documents would be appropriate	GARFO, SERO, NMFS HQ, Councils
• Develop more clear and consistent guidelines for use of Categorical Exclusions (CEs) under NEPA, including MSA document templates; identifying NMFS vs. Council responsibilities	GARFO, SERO, NMFS HQ, Councils
• Work with NOAA General Counsel (GC) to establish consistent GC guidance with regards to the use of CEs and Supplemental Information Reports (SIRs), rulemaking, public comment etc.	GARFO, SERO, NMFS HQ
• Identify process steps Council and NFMS staff can take to use MSA documents to satisfy NEPA requirements	GARFO, SERO, NMFS HQ, Councils
• Consider alternative rulemaking approaches or action development approaches	GARFO, SERO, NMFS HQ

Potential Barriers and Considerations:

- Programmatic EISs involve a large investment of time and resources up front; should consider whether the efficiency gained on the back end is worth it.
- Might inadvertently limit opportunities for public participation in the process, in certain cases

Long-Term Objectives:

- Identify options for reducing burdens associated with NEPA and other documentation, without sacrificing the public process and opportunities for meaningful input.

Theme 3: Data Sources and Partnerships

D1. Expand study fleet, include recreational fisheries, and ensure data are used

Description: The vision of a study fleet is a partnership between the science centers, management bodies, and fishermen where the science centers define data needs for assessments and management. There is currently a small commercial fisheries study fleet in the Greater Atlantic region; however, expanding the study fleet along the coast, particularly to include recreational fisheries, would greatly benefit the assessment/management process under a changing climate. This would require cooperation by all parties to better utilize fishery dependent data in the assessment/management process.

Practical Next Steps:

Potential Action	Group
High Priority	
• Identify places where study fleet and associated projects' data can be utilized in Council and Commission work plans and actions. Develop a mechanism for Councils and Commission to access study fleet data. Develop a plan to track and communicate use of study fleet data. Find ways to incentivize industry to participate. Within this plan include using industry to collect more environmental data via instrumentation and data loggers.	Councils, Commission, and Centers
• Include Recreational Study Fleet Pilots in GARFO's Recreational Saltwater Fishing draft policy implementation plan (NEFSC has already initiated an initial pilot focused on the New England for-hire groundfish fleet)	GARFO, NEFSC
Medium Priority	
• Develop shovel-ready cooperative research projects that can be quickly initiated if funding becomes available.	Centers
Parking Lot	
• Develop plan to incorporate the recreational study fleet data to improve recreational estimates from Marine Recreational Information Program (MRIP)	Centers

D2. Use survey mitigation around offshore wind to transition to industry-based surveys or other survey platforms

Description: The development of offshore wind areas will present challenges for accessing survey areas using traditional methods/gear. This is an opportunity to redesign surveys and transition to industry-based or other platforms that could be more effective in offshore wind areas.

Practical Next Steps:

Potential Action	Group
• Implement the NOAA Fisheries and BOEM Federal Survey Mitigation Implementation Strategy - Northeast U.S. Region	NEFSC, adapting strategy to other regions in the future.
• Explore opportunities to utilize smaller platforms such as commercial vessels for conducting surveys	Centers
• Develop plan for integrating multiple survey data streams into the assessment process	Centers

D3. Improve the use of existing data

Description: While there is definitely a need for new and novel data sources, there is a wealth of data already available in the region that could be better utilized. This includes being more transparent on how current data is used but also thinking of ways to take advantage of existing behaviors (e.g., generating recreational catch data from social media posts). Making use of this kind of selective/anecdotal data as opposed to relying solely on census or survey data is more important when traditional data is scarce. In addition, as data collection activities expand, plans for how it will be used should be made. Some potential actions are listed below, but this priority should be ongoing. New ideas to use existing data should be supported moving forward.

Practical Next Steps:

Potential Action	Group
• Hold meetings to discuss what existing data streams and historical datasets could be better utilized to inform decision making, assessments, and monitoring. Do this across regions and management bodies.	Councils, Commission, Regional Offices, and Centers
• Have similar meetings at the PDT/FMAT level for more immediate FMP needs.	Councils and Commission

Medium Priority Potential Actions (Watch List)

The potential actions in this category are important but not as suitable for near-term action as those on the high priority list. This is referred to as a watch list because the Climate Coordination and Climate Innovation Groups will routinely track whether environmental or fishery conditions, and/or resources and support available for these actions, have changed in a manner that would increase the priority level of these actions.

Theme 1: Cross-Jurisdictional Governance

G5. Evaluate mechanisms for cross-pollination of SSCs

Description: As with G1 above, there are a range of possibilities for actions that could enhance cross-pollination between the different Council SSCs as well as the Commission's science groups, particularly for species that a) are jointly managed, and/or b) are experiencing changes in distribution across jurisdictional boundaries.

Mechanisms for increased coordination and information sharing between SSCs could include (but are not limited to) formation of cross-SSC subgroups, holding more joint SSC meetings, holding joint subgroup meetings, or assigning liaisons between different SSCs. Further discussion is needed to explore where it might be helpful to have multiple groups involved in decision making/recommendations, vs. simply more coordination and exchange of information/ideas.

Practical Next Steps:

Potential Action	Group
• Hold a workshop inviting a subset of all three East Coast SSCs and representation from the Commission Science Community to identify potential ways of improving coordination and knowledge sharing between East Coast SSCs, particularly for species spanning multiple jurisdictions and jointly managed species	Councils and their SSCs and invited participants from the Commission
• Consider adding to topics for discussion at future Scientific Coordination Subcommittee (SCS) meeting(s)	SCS steering committee; CCC

Potential Barriers and Considerations:

- Although the next steps and approach talk about sharing ideas, not developing shared management advice, if the latter is considered, this must be approached with caution as individual Councils are bound by the ABC recommendations of its appointed SSC.
- Higher costs of larger combined meetings could be an issue, given travel expenses for larger groups would be greater, and because SSC members are compensated for their time.

Theme 2: Managing Under Increased Uncertainty

M3. Improve the use of risk policies to better account for current and future climate impacts on species (both negative and positive impacts)

Description: Many fishery management bodies have existing risk policies. Risk relates to both the probability of an event occurring, and the severity of expected outcomes. Risk policies identify the bounds of how risk tolerant a management body should be given certain criteria. These policies inform and work in conjunction with harvest control rules.

Existing risk policies might be based on assumptions of stationarity. At the Summit, participants discussed how these policies could be reassessed to include the challenges related to a changing climate and non-stationarity in marine populations and ecosystems. Discussions noted a need to address species responding poorly to, and those benefiting from, changing ocean conditions. Summit participants also discussed North Pacific Fishery Management Council (NPFMC) use of risk tables as a quantitative way to assess and communicate multiple uncertainties, including those related to climate. During implementation of the risk policies, it will be important to clearly communicate uncertainty.

Practical Next Steps:

Potential Action	Group
• Share NEFMC compilation of risk policies from across all Councils. Present the report to NRCC and explain what NEFMC is doing to revisit its risk policy, which is a multi-year work priority starting in 2023. Also present the Commission's new policy when finalized.	NEFMC/ Commission
• Develop a staff-level working group to discuss pros and cons of different approaches for accounting for climate-related uncertainties within the risk policies, including how to respond to species doing well in a changing climate. Bring forward to East Coast Climate Coordination Group for discussion.	Climate Innovation Working Group
• Evaluate the need for all Councils/Commission to consider climate in their risk policies and explore potential benefits of aligning risk policies where practicable. Offer time to discuss alignment at future NRCC meetings.	East Coast Climate Coordination Group
• Identify steps individual Councils/Commission can take to make risk policies more reflective of climate challenges	All east coast Councils and Commission
• Ensure the risk policies consider and clearly communicate intricacies of uncertainty (including the shape of the uncertainties) when making policy/ changing management	All east coast Councils and Commission

Potential Barriers and Considerations:

- No forcing mechanism
- Need to consider benefits and challenges of aligning policies
- MAFMC recently updated their risk policy (2020) so are unlikely to want to update it again in the near future
- The Councils seem to want the ability to retain separate risk policies

Long-Term Objectives:

- Councils implement risk policies that account for climate change and this facilitates climate resilient fisheries. Provide pathways within risk policies for considering stocks that are climate change winners differently
- Where practicable and needed (i.e. for fisheries under joint management), align risk policies between management bodies so that management is consistent up and down the coast
- If there is interest, expand this discussion to include other Councils/regions via the CCC

M4. Identify and establish best practices for increasing nimbleness and/or responsiveness in management

Description: In situations where plausible future conditions can be predicted either quantitatively or qualitatively, it may be useful to create management frameworks that are nimble, adaptable, and robust to expected changes. For example, if/then triggers could be applied in certain limited management circumstances where a range of responses could be considered in advance. Resulting actions could then be implemented through an expedited process. This potential action was identified as a medium priority for a coordinated climate adaptation initiative because it can be addressed individually by each management body. Examples are available in existing FMPs.

Practical Next Steps:

Potential Action	Group

• Identify good examples of if/then triggers being used in management. Examine examples for best practices. Brainstorm other areas where if/then triggers might be useful such as ecosystem-based triggers or governance triggers.
  ○ Southeast Shrimp example: close federal waters when states request and have provided environmental info to the SE Regional Administrator
  ○ Commission example: GOM/GB lobster gauge size change triggered by recruitment index, striped bass immediate action if the assessment indicates specific outcomes, considering dropping fine scale monitoring northern shrimp unless a trigger condition is reached
  ○ New England skate example: if a skate total allowable landings limit (TAL) is exceeded for wing or bait by >5%, this triggers the Regional Administrator to reduce possession limits for the following fishing year
  ○ Mid-Atlantic surfclam example: minimum size waiver where discard, catch, and survey data indicate 30% of clams below 4.75 inches (50 CFR 648.75(b)(3))
	Climate Innovation Group; Councils, Commission, and NMFS

Potential Barriers and Considerations:

- Councils may be hesitant to use if/then triggers because unforeseen circumstances may make a certain trigger response less appropriate or effective. Changing the trigger response would be possible but could require a longer process.
- Given uncertainties in the stability of surveys, especially given changing ocean uses, it may be challenging to develop and implement triggers based on survey indices.
- Doing sufficient NEPA analysis in the action where triggers are developed could be challenging and require assumptions about future conditions.

Long-Term Objectives:

- Identify options for increasing nimbleness and robustness of the fishery management process.

M5. Create a more adaptable structure for fishing permits

Description: Lack of access to fishing permits, allocation, or quota can limit a fisherman's ability to adapt to changes in fish stocks. Fishing permits are not consistent between fishery management bodies or fisheries. Can managers revise the permit system to make it more flexible and adaptable to impacts from a changing climate?

Practical Next Steps:

Potential Action	Group

• Improve data systems (two interrelated actions)
  ○ Create a shared vessel registry to streamline data accessibility
  ○ Advance One Stop Reporting
	NMFS electronic reporting/monitoring group

• Review permit systems on the East Coast to identify areas where the regulations can be modified to allow for flexibility and adaptability by the fishermen.
  ○ Are there permits in place that can be split?
  ○ Can emerging species be added to existing permits?
  ○ Do some permits need to be bundled?
  ○ Engage industry through advisory panels or other means to identify issues. Multiple engagement approaches are likely needed.
	NMFS, Councils, and Commission working with fishing industry

• Present findings and recommendations to modify programs to allow for adaptability to Councils and Commission.	Council Staff/NMFS

Potential Barriers and Considerations:

- Fishing businesses have invested heavily in permits and thus may be hesitant to embrace change.
- U.S. East Coast permitting structure is extremely complex - state vs. federal differences, regional differences, species/FMP differences
- There are concerns that splitting previously bundled permits across two or more fishing vessels could increase fishing effort and therefore impact conservation.

Long-Term Objectives:

- Create a flexible and adaptive permit system. For example, create a system that allows fishermen to adjust fishing to match the species present in their historical fishing area, or allows them to follow the fish and land the fish in a new location.

Theme 3: Data Sources and Partnerships

D4. Standardize data collection to breakdown geographic barriers along the East Coast (both state and federal)

Description: Having standardized surveys and other data collection/storage methods across the various regions would allow data to be more easily transferable and usable. This is particularly important when considering survey changes/limitations arising from external factors like climate change and offshore wind development. This is the foundation of the fisheries management process. Securing funding and starting this process is important.

Practical Next Steps:

Potential Action	Group
• Develop a National Survey Program	NOAA
• Northeast and Southeast Fisheries Science Centers develop a strategy for combining survey methodology (This could include standardizing survey gear where appropriate or a modeling framework to merge different survey technologies)	Centers/ State-Federal Programs
• Prioritize and develop data standards so data can be readily used in various modeling frameworks that combine data across regions	Centers/State-Federal Programs
• Standardize data management and storage so the data is readily accessible by researchers	Centers/State-Federal Programs

Potential Barriers and Considerations:

- Confidentiality of state/Fed data. Offshore wind reluctance to share data.
- Consider economic data as well as environmental and biological.
- Need to evaluate regional and coastwide fishery dependent and independent data systems to facilitate assessment of shifting populations.
- Consider reviewing and standardizing east coast permits because data collection is so tightly linked to the permits. See M8 above.

D5. Focus on Artificial Intelligence and technology development to get data into assessments more rapidly

Description: Under a changing climate there will be a greater reliance on multiple data sources. Quickly synthesizing data to keep pace with change will require reliance on technology to automate much of the processing.

Practical Next Steps:

Potential Action	Group
• Start developing AI to better integrate video and camera surveys as well as other large data integration needs	Centers
• Develop methods to directly funnel fishery-dependent data (VTRs, observer data, study fleet, etc.) into assessments and for use in monitoring.	Centers and Regions

Parking Lot (Lower Priority) Actions

As noted in the Introduction, this section is intended to hold ideas that are low in priority, infeasible to meaningfully address under current conditions, or are in conflict with other approaches with higher levels of support. All potential actions will be regularly reviewed by the Climate Innovation Group and the Climate Coordination Group. The Coordination Group will shift priorities as needed based on what is or is not working, and based on how conditions may be changing. The intent of this section is to maintain a record of these Summit ideas for possible future reconsideration as conditions change, but to take no near-term action on them.

Theme 1: Cross-Jurisdictional Governance

G1 (Parking lot). Additional ideas for reevaluating Council committee structure, use, and decision making

These items were raised during the Summit but would require changes to MSA and are therefore included in this section rather that with the other G1 actions. Potential actions for reevaluating Council committee structure, use, and decision making that could be considered in the short-term are discussed under G1 in the High Priority Potential Actions section above.

- Give committees final votes on FMP actions. The action would not need approval by the full Council.
- Allow for committees to take final action on some types of management tools or approaches without full Council approval, while other actions would require going back to the Council. E.g., committees could develop specifications without Council approval but amendments and frameworks would require Council approval.

Potential Barriers and Considerations:

- This would require legislative action.

G6. Coastwide Council with varying voting representation by FMP

Description: Some Summit attendees suggested the idea of having one East Coast Management Council with opt-in participation by states. This was primarily supported to increase levels of coordination, efficiency, and for increased ease of ensuring adequate representation as species distributions and other conditions change.

Under such an approach, the Council could be organized such that the full Council would not need to vote on each management plan; the opt-in participation could be at the level of Boards or committees designed to provide appropriate representation based on interest/fishery occurrence. Expanded committees may be needed under this approach, where there are multiple representatives from each state (like the Commission's Boards). This governance structure is not currently provided for under the MSA.

This potential action is included in the list of possible actions for potential longer-term consideration due to the legislative barriers to implementation, as well as the desire to first explore other, smaller scale changes within our current system. Some considered this to be a long-term idea to consider if more modest adjustments to our governance structure don't accomplish our objectives. In the coming decades, if there is increasing overlap in representation needs, it may be more efficient to manage species and stocks through a single East Coast Council.

Potential Barriers and Considerations:

- This would require legislative action.
- Concerns were expressed about this structure leading to the loss of more local representation by Council members and to stakeholders feeling less connected to and invested in the process.
- It may be difficult to populate a large East Coast Council if members would need to be responsible for keeping track of more management plans than they do currently.

G7. Change state representation on councils

Description: To address representation concerns caused by changing stock distributions, some Summit participants suggested evaluating which states would most appropriately have voting representation on each East Coast Council. This included the suggestion of evaluating whether there should be more states that sit on multiple Councils (like North Carolina and Florida currently do).

Giving states votes on Councils could be a more meaningful change in representation compared to giving liaisons voting rights, as it could allow access to at-large seats.

Potential Barriers and Considerations:

- This would require legislative action.
- Compared to some of the other governance potential actions in this document, this would be a less flexible or nimble way to modify governance structure. If additional changes are needed in the future, the likely need for further legislative action to do so could limit how quickly changes could be made.

G8. Clarify and potentially expand the roles of liaisons between Councils

Description: As species distributions change and effective communication and coordination between different management entities becomes increasingly important, the role of the liaisons between Councils may become more important. In addition, as representation concerns become more pronounced, it is important to clearly define the ways in which liaisons are expected to represent the views of their Council and what degree of influence they should have on another Council's deliberations. Summit participants discussed that the Council liaison role may be used somewhat differently between Councils, and between different people who have held that role at the same Council. The question of whether liaisons should be given some level of voting rights led to a discussion of the intended role of the liaisons, e.g., whether liaisons are intended to be representing the views and positions of their full Council (which is not always possible), and/or to serve in a general communication/coordination role. Additional clarity around the role of Council liaisons, and potentially increased consistency in their use, may be beneficial. In addition, consideration could be given to potential changes to the role of the liaison, particularly in light of the representation concerns described above under G1 (high priority actions).

Practical Next Steps:

Potential Action	Group
• Develop report on the roles and use of liaisons between Councils and between the Councils and Commission, potentially building on 2007 Mid-Atlantic Fishery Management Council's Report to Congress on COUNCIL MANAGEMENT COORDINATION, but with recommendations for improving clarity and effectiveness of the liaison role	TBD
• Conduct an evaluation of the feasibility and pros and cons of liaison voting rights (at full Council)	CCC

Potential Barriers and Considerations:

- If there is a desire to give liaisons voting rights at the full Council level, this would require legislative action.
- The role of liaisons may need to be considered in conjunction with, or following, reconsideration of committee structure and use as described above. These potential actions are motivated by similar representation concerns, and any potential changes to committee representation and use may influence the future desired role of Council liaisons.
- The Councils may wish to consider adding definitions/clarification of the liaison role into their SOPPs, operations handbook, or other written policies.

G9. Consider allowing proxies for Council members

Description: Currently, appointed Council members cannot use proxies or designees to fill in for them at meetings because the MSA only provides for the principal state officials, the Regional Administrator, and the nonvoting members to designate individuals to attend Council meetings in their absence. Allowing for proxies could help alleviate increased workload issues for Council members, particularly if future governance changes lead to increased committee meeting frequency, more joint management meetings, or other changes that increase workload for Council members. Currently, equity and representation issues may arise from the workload and time commitments required for Council membership and how they would limit many people from participating.

Practical Next Steps:

Potential Action	Group
• Consult with General Counsel on what would be required to allow proxies for appointed Council members.	NMFS Headquarters
• Raise at a future CCC meeting to gauge interest and explore feasibility.	Councils

Potential Barriers and Considerations:

- If pursued, additional thought would need to be given to the distinction (if applicable) between and definitions of proxy, designee, or alternate. With these definitions, the role and abilities of a proxy/designee/alternate would need to be clearly defined. For example, what would be the expectations and rules for attendance, voting, chairing committees, compensation, etc.?
- Additional clarity is needed on whether legislative changes would be required, and whether proxies would also need to be appointed by the Secretary of Commerce, potentially in conjunction with the appointment of regular Council members.
- In the Commission's structure, Commissioners are allowed to appoint proxies (ongoing, board specific or meeting specific). This has advantages for spreading the workload across multiple people, but also creates a cost barrier of sending multiple people to meetings. This could create similar issues in the Council system for Council proxies if both the appointed member and proxy need to attend a meeting, particularly when considering Council member stipends.
- The role of proxies may need to be considered in conjunction with, or following, reconsideration of committee structure and use as described in G1 (high priority). Some workload issues could be addressed under a review of committee representation and process (e.g., if there is explicit consideration of ensuring workload balance across committees for individual Council members; and if most committee meetings are held in conjunction with Council meetings or by webinar).

Theme 2: Managing Under Increased Uncertainty

M6: Include spatial considerations in management; specifically in relation to leading and trailing edges of shifting stocks

Description: Climate change is influencing the distribution of some fish stocks, including expansions, contractions, shifts northward, and shifts offshore. As stocks shift their distribution, there may be advantages to managing the leading and trailing edge of a stock differently. For example, if stock genetic diversity is high at one of the edges, more conservative management may make sense. Similarly, if an ecological niche has been recently vacated in an ecosystem, then management may want to minimize fishing on a replacement species to ensure the replacement species is able to form a viable population in the new area. Some stock assessments (e.g., work of the Transboundary Management Guidance Committee, which allocates quota to countries based on stock distribution) are already beginning to account for such shifts.

Practical Next Steps:

Action	Group

• Create a working group to explore this issue.
  ○ Compile examples of where spatial considerations across a fishery or stock have been used in management decisions.
  ○ Explore ways to measure stock shifts (scientifically) and how to identify what should be considered leading and trailing edges
	Climate Innovation Working Group

• Recommend East Coast Councils/Commission consider if spatial management is appropriate for any of their managed stocks.
  ○ Figure out which stocks this is an issue for using LEK and ecological information
  ○ Consider spatial distribution when making management decisions (Review King and Spanish mackerel and cobia management and consider these approaches for other stocks with a focus on leading and trailing edges being managed differently than the core).
	Councils/Commission

Potential Barriers and Considerations:

- National Standard 3 requires that stocks are to be managed as a unit throughout their range, to the extent practicable.
- National Standard 4 does not require the same management across the entire range of a stock, just management that does not discriminate between states.
- Enforcement could be more complex if regulations differ between areas.

Long-Term Objectives:

- Plan for shifting stocks; ensure management has considered the potential needs of stocks leaving or moving into an area (it would be detrimental to fishermen if important stocks leave an area and no replacement stocks move in), and ensure the ecosystem remains healthy.

M7. Consider alternative management options instead of, or in addition to, using stock assessments that directly incorporate environmental or ecosystem parameters within the assessment

Description: Changing climate and ocean conditions mean that underlying assumptions common to stock assessment models (i.e., environmental stationarity and ecosystem equilibrium conditions) are no longer valid. This will make identifying appropriate catch limits more challenging than it is now.

Given that changing climate and ocean conditions can impact many aspects of a fish stock (direct impacts on productivity and distribution of the stock, changes to habitat, changes to predator/prey relationships, etc.) it may be impossible to incorporate all important sources of uncertainty into stock assessment models and results. Therefore, in addition to incorporating climate indicators directly into traditional stock assessments, it may be important to consider alternative approaches to incorporating climate uncertainties into the management process, including other methods for accounting for uncertainty in the stock assessment and other methods for setting catch limits that are robust to multiple uncertainties. Alternative approaches may not be useful for all fisheries, and thus there will be a need to evaluate and identify which species could most benefit from alternative approaches.

Practical Next Steps:

Potential Action	Group

• Look for case studies on robust management options, including:
  ○ Indicator based management (Bluefin tuna)
  ○ Robust Harvest Control Rules (UCSB peer reviewed paper)
  ○ Dynamic reference points
	Climate Innovation Group

• Look for case studies on when MSE was useful in supporting decisions	Climate Innovation Group
• Using the CVA results, identify east coast managed species that are particularly vulnerable to climate change and consider developing new approaches for those species ○ For example, MAFMC and NEFMC are considering how a combination of species and habitat CVAs can be used to identify focal Habitat Areas of Particular Concern to prioritize consideration for conservation recommendations	All east coast Councils and Commission

Potential Barriers and Considerations:

- Communication across science and management spaces may be challenging
- MSE is costly with lots of upfront investment, but intended to save time/resources long term
- Robust HCRs should not be the only approach, especially in situations where the data or assumptions feeding into the HCR are incorrect.

Long-Term Objectives:

- Explore options for creating management frameworks, harvest control rules, etc. that are robust to the uncertainties associated with a changing climate.

M8. Better incorporate qualitative information including local ecological knowledge (LEK) and community vulnerability assessments to improve management in a changing climate

Description: Implementing quantitative analyses of climate impacts on all species is not feasible. Therefore, identifying options for incorporating qualitative information on how the ecosystem is changing and fisheries are reacting may be both necessary and useful. There are existing examples to build on: MAFMC has a risk assessment that combines quantitative and qualitative information to better understand the risk a fishery will not meet its management goals, and NPFMC uses semi-quantitative risk tables to understand risks not included within a stock assessment. Participants at the Summit expressed interest in ways to incorporate local or traditional ecological knowledge into the fisheries management process. These types of information are relevant across multiple actions identified here, including M1, use of ecosystem level context, M3, use of risk policies, and M6, spatial considerations.

Practical Next Steps:

Potential Action	Group

• Inventory where and how qualitative information, including LEK is currently being used in management and identify ways into management process, including:
  ○ Examine proposed and implemented ideas from the NPFMC climate taskforce
  ○ Consider examples from Southeast where participatory modeling incorporated LEK into stock assessments
	Climate Innovation Group

• Improve the use of Community Vulnerability Assessments
  ○ Identify NMFS' plans to characterize community vulnerability in the past and near future. Identify options for filling any gap
  ○ Discuss options for using knowledge of community vulnerabilities to plan for the future.
  ○ Note that not all community vulnerabilities are climate-focused.
	Climate Innovation Group

• Consider expanding State of Ecosystem (SOE, used in New England and Mid-Atlantic) and Ecosystem Status Reports (ESR, used in the South Atlantic) to include qualitative indicators, for example qualitative network models. ○ NEFMC discussed this during the 2023 SOE briefing	NEFSC/ SEFSC

Potential Barriers and Considerations:

- Need to establish trust of qualitative data and indicators as compared to quantitative indices
- Those who hold LEK will need to agree to provide it

Long-Term Objectives:

- Create a robust fishery management process responsive to quantitative and qualitative information.

Theme 3: Data Sources and Partnerships

D6. Develop incentives for better reporting to help reduce uncertainty

Description: The best way to improve the assessment/management process under changing climate conditions and shifting species distributions is to ensure the most accurate data is available. Fisheries dependent data is particularly useful as it is collected year-round and at a finer spatial scale than is possible with fisheries independent data. Therefore, it is important to incentivize accurate and timely reporting.

Practical Next Steps:

Potential Action	Group
• Develop tools to better utilize citizen science	Centers, Councils and Commission
• Develop a report that identifies weaknesses in fishery dependent reporting requirements	Centers
• Develop plan to monitor and enforce compliance to reporting requirements	Councils, Commission, Law Enforcement, Permit Offices
• Better coordinate with State and Federal recreational data collection to utilize state volunteer survey data	Centers and Commission

Potential Barriers and Considerations:

- More consistently apply and enforce reporting requirements

D7. Modernize data management to facilitate better sharing of data and prepare for an influx of new data streams (e.g. offshore wind data) and foster new partnerships

Description: Other uses of the ocean are rapidly expanding. While dealing with various sectors can be challenging, it also creates an opportunity for us to foster new partnerships. As such, we can and should anticipate an influx of new data streams.

Practical Next Steps:

Potential Action	Group
• Hire staff dedicated to fostering partnerships and coordinating data collection/sharing between other ocean users, management bodies, and within Federal agencies	Centers
• Explore new partners that would mutually benefit from serving as a platform for data collection (USCG, DOD, IOOS/Regional Associations, merchant marines, transit, National Marine Sanctuaries, etc.)	Centers
• Approach NGOs and Universities to develop mutually beneficial projects and funding.	Centers, Regional IOOS Associations
• Host a forum of known partners to discuss available funding sources, potential collaborations, and data gaps.	Centers, Regional IOOS Associations
• Use offshore wind turbines as platforms for data collection.	Centers, Regional IOOS Associations, State/Federal Programs

Potential Barriers and Considerations:

- Relationships with other ocean users can be contentious.

D8. Develop a process between management and science organization to prioritize data needs for climate-ready management (e.g., human dimensions data)

Description: The need for more data will continue to increase under a changing climate. It is unlikely that we will be able to expand on existing data collection without sacrificing data that is currently collected. It will be imperative for the agency and the regions to prioritize data needs to focus on what will be most important moving forward, especially human dimensions data.

Practical Next Steps:

Potential Action	Group
• Prioritize human dimensions data and identify training opportunities for managers to help them better consider human dimensions in decision making.	Councils, Commission, Regional Offices, and Centers
• Hold a workshop to determine which data needs are necessary across regions to inform decisions and prioritize the collection of those data. Consider the relevance of findings from the 2021 NOAA Fisheries Atlantic Coast Science Coordination Workshop, the NMFS Next Generation Data Acquisition Plan, and other relevant workshops and reports.	Centers

Appendix: List of Actions by Priority

G=Cross-Jurisdictional Governance
M=Managing Under Increased Uncertainty
D= Data Sources and Partnerships

High Priority

- G1. Reevaluate Council committee structure, use, and decision making
- G2. Re-evaluate and potentially revise Advisory Panel representation
- G3. Develop joint management agreements with aim of clarifying roles and increasing efficiency
- G4. Improve coordination across NOAA offices and regions
- M1. Identify ecosystem-level contextual information that can be considered within the management process to help incorporate climate information into decisions
- M2. Streamline FMP documentation and rulemaking
- D1. Expand study fleet, include recreational fisheries, and ensure data are used
- D2. Use survey mitigation around offshore wind to transition to industry-based surveys or other survey platforms
- D3. Improve the use of existing data

Medium Priority (Watch List)

- G5. Evaluate mechanisms for cross-pollination of SSCs
- M3. Improve the use of risk policies to better account for current and future climate impacts on species (both negative and positive impacts)
- M4. Identify and establish best practices for increasing nimbleness/ responsiveness in management
- M5. Create a more adaptable structure for fishing permits
- D4. Standardize data collection to breakdown geographic barriers along the East Coast (both state and federal)
- D5. Focus on AI/technology development to more rapidly get data into assessments

Parking Lot

- G1. Additional ideas for reevaluating Council committee structure, use, and decision making
- G6. Coastwide Council with varying voting representation by FMP
- G7. Change state representation on councils
- G8. Clarify and potentially expand the roles of liaisons between Councils
- G9. Consider allowing proxies for Council members
- M6: Include spatial considerations in management; specifically in relation to leading and trailing edges of shifting stocks
- M7. Consider alternative management options instead of, or in addition to, using stock assessments that directly incorporate environmental or ecosystem parameters within the assessment
- M8. Better incorporate qualitative information including local ecological knowledge (LEK) and community vulnerability assessments to improve management in a changing climate
- D6. Develop incentives for better reporting to help reduce uncertainty
- D7. Modernize data management to facilitate better sharing of data and prepare for an influx of new data streams (e.g., offshore wind data) and foster new partnerships
- D8. Develop a process between management and science organization to prioritize data needs for climate-ready management (e.g., human dimensions data)