

# Inflation Reduction Act Funding for Climate Readiness Planning

Staff Discussion Paper for Council Review, September 15, 2023<sup>1</sup>

1 Introduction	1
2 IRA funding opportunity	2
3 Council action	3
3.1 Identifying initial objectives, issue areas, or projects	3
3.2 Process	5
3.3 Timeline	6
4 Synthesis of Council Information Related to Climate Ready Fisheries	6
4.1 Current Council initiatives	7
4.2 Climate readiness themes	8
4.3 Potential ideas for IRA funding - staff synthesis as a starting point for Council discussion	10
Appendix 1: Initiatives and Resources	14
Council initiatives	14
SSC activities	16
NMFS initiatives	17
Appendix 2: Issues and themes	19
Theme 1: Support a Council process that can be both proactive and responsive	19
Theme 2: Build and use information on-ramps	22
Theme 3: Include stakeholders and partners in building climate readiness	23
Addendum 1: Excerpts from Climate Readiness Synthesis Report	27
Addendum 2: Excerpts from SSC February 2023 Workshop Report	30

## 1 Introduction

The Regional Fishery Management Councils have an unprecedented opportunity to invest in climate readiness with support from the Inflation Reduction Act (IRA). In June 2023, the Secretary of Commerce announced \$3.3 billion in IRA funding to support climate resilience, with \$1.2 billion allocated to NOAA Fisheries. \$349 million is dedicated to supporting the agency's Climate Ready Fisheries program, with \$20 million dedicated to the Councils to support climate resilience and responsiveness to climate change impacts.

This discussion document describes past and ongoing work the North Pacific Fishery Management Council (Council) can draw upon to prepare a proposal for IRA-funded activities and deliverables. The Council has already made significant strides toward implementing ecosystem-based management approaches and identifying opportunities to build climate resilience and readiness. IRA funding provides the opportunity to build on this work, create synergies across Council initiatives, and implement actionable steps to improve climate readiness.

---

<sup>1</sup> Prepared by Diana Evans, Council staff, and Katie Latanich, Consultant

In the sections below, we describe the IRA funding opportunity (Section 2) and the Council guidance requested for the October 2023 meeting (Section 3), including a series of discussion questions to help the Council provide feedback on an initial approach for an IRA project proposal. Staff have provided some initial synthesis (Section 4) of current Council initiatives, climate readiness themes, and potential project ideas as a starting point for Council consideration. The background materials that were used for this synthesis are also provided in more detail in two appendices. Appendix 1 describes climate-related Council, Scientific and Statistical Committee (SSC) and NMFS initiatives that could support IRA-funded activities. Appendix 2 provides a summary of cross-cutting topics and includes the ideas and recommendations provided by the SSC and the Climate Change Task Force (CCTF) for supporting climate readiness, including addendums with specific excerpts from the SSC and CCTF reports.

## 2 IRA funding opportunity

NMFS has provided the Regional Fishery Management Councils with the following information and guidance regarding IRA proposal development.<sup>2</sup> Funds must be used before the end of 2027, and **proposals must focus on fishery management and governance topics**, with two overarching goals:

1. Implementation of fishery management measures necessary to advance climate ready fisheries by improving climate resiliency and responsiveness to climate impacts; and
2. Development and advancement of climate related fisheries management planning and implementation efforts in support of underserved communities<sup>3</sup>.

NMFS has preliminarily<sup>4</sup> identified the following priorities the Councils could support through IRA funding:

- Operationalize fish climate vulnerability assessments or other scientific products (e.g., ecosystem status reports, Integrated Ecosystem Assessments, etc.);
- Operationalize recommendations from climate scenario planning efforts;
- Implement management changes to address climate vulnerability or improve climate resiliency of fisheries, including those that are important to underserved communities;
- Implement measures that increase responsiveness of allocations or other management measures to climate impacts;
- Develop and advance climate-related fisheries management planning and implementation efforts in support of underserved communities.

---

<sup>2</sup> From "Regional Fishery Management Councils - Inflation Reduction Act Climate Ready Fisheries Program Overview.". [Presentation](#) by Kelly Denit for the Council Coordination Committee special meeting, 7/17/2023.

<sup>3</sup> In the North Pacific, many fishing communities that are substantially dependent on or engaged in the harvest and processing of fishery resources may also be underserved communities (see definitions in the [NOAA Equity and Environmental Justice Strategy](#), p.5). This paper considers support for "fishing communities" as opposed to "underserved communities" in line with National Standard 8 guidelines, and in recognition that communities are complex socioeconomic and cultural groups that may or may not identify themselves as underserved.

<sup>4</sup> NMFS may adjust the wording of these priorities before the final grant application parameters are released.

NMFS will consider the following requirements in evaluating proposals:

- Rather than funding single activities (e.g., a workshop), it is preferable to bundle related activities under one comprehensive proposal. Proposals may span multiple years.
- Actions must be completely implemented or in the final phases of approval by 2027.
- Actions using IRA funds must be able to be sustained with no additional post-IRA funds.
- High priority consideration will be given to actions that leverage existing tools, actions that will be completed within 3 years, and cross-council projects and initiatives (where relevant).

NMFS has informed us that each Council may apply for an initial grant of \$375,000 in fall of 2023, which can be used, for example, to build capacity for the IRA-funded work. Proposals from all Councils to access the remaining \$17 million must be submitted in early 2024. If funding is still available, an additional proposal process may be held in 2025. Proposals will be semi-competitive and the level of funding awarded to each Council will depend on the activities proposed. Councils will be held to a high standard of accountability for monitoring and communicating progress, and achieving concrete outcomes in support of climate readiness.

We anticipate that NMFS will provide further clarity regarding the IRA funding opportunity priorities and application process at the October CCC meeting, which immediately follows this Council meeting.

### 3 Council action

At the October 2023 meeting, staff are asking the Council for direction about how best to respond to this funding opportunity. Specifically:

- **What are initial objectives, issue areas, or projects that the Council is interested to pursue under the goal of developing and advancing climate ready Federal fisheries in the North Pacific?**
- **Does the Council have feedback on the process for developing IRA funding proposals, and ongoing management of work under the grant which may affect a proposal?**

If the Council is able to provide initial guidance in October, staff can develop a more refined description of projects and their operational requirements, how they could be sequenced, and timelines to allow them to be implemented within the time period of the grant funding, for Council review in December. Our preliminary idea is that we would aim to put together a four-year proposal of approximately \$2.5-3 million, to include funding for a staff hire, facilitator/travel/venue costs for workshops, and contract help with analysis of specific projects.

#### 3.1 Identifying initial objectives, issue areas, or projects

Section 4 of this document provides a preliminary synthesis of available information as a starting point for the Council to begin to discuss objectives, issue areas, or projects that might

be included in a NPFMC proposal for IRA funding. The following questions are intended to help the Council frame its guidance to staff at the October meeting.

**» *Does the Council want to identify objectives for the IRA funding?***

NMFS has indicated that its intent for this one-time funding is to provide a transformational opportunity to invest in measures that will allow fishery management and governance to be better positioned to be climate resilient, including efforts in support of fishing communities. One approach for the Council might be to identify a strategic vision of what you want to have achieved at the end of the four-year duration of the funding, which would help focus a proposal. If the Council is not yet ready to articulate that vision, prioritizing the Programmatic EIS that the Council has already initiated could be an appropriate vehicle for its development.

**» *Should the proposal focus on existing priorities or cast a wide net to consider other opportunities?***

The Council has been considering climate-focused work for several years, and capacity has limited the Council's ability to move quickly on several projects. For example, there were several action modules originally discussed under the Bering Sea Fishery Ecosystem Plan (FEP) (e.g., interdisciplinary conceptual models of the Bering Sea ecosystem, ecosystem-based fishery management gap analysis) that could be resurrected. Additionally, the FEP's Climate Change Taskforce (CCTF) suggested a broader workplan than the one they are currently slated to accomplish. While the Council has begun to scope a Programmatic EIS, there may be inclusive approaches to promote public input that could be funded through the IRA grant.

Alternatively (or in addition), the IRA funding could be an opportunity for the Council to "think outside the box" and devote resources to topics that have not yet been considered, for capacity reasons. For example, comments by the EPA on a recent Council action highlighted the importance of conducting a greenhouse gas emissions study for Federal fisheries in order to understand the impacts of Council management measures; this is something that might be contracted through IRA funding. Similarly, a study on the effects of increases in Arctic shipping, potential impacts for Council fisheries, and opportunities for mitigation might be another direction for Council interest.

**» *Some topic areas may require considerable input from partners; it will be important to explore capacity prior to submitting a proposal***

Several of the ideas that were identified in the 2022 Climate Readiness Synthesis (prepared by the CCTF) and the SSC February 2023 Workshop Report focus on changes related to the harvest specifications process, dynamic reference points, stock biomass thresholds and risk considerations. Typically, the Council relies heavily on AFSC expertise when assessing changes to the Council process for using assessments or other tools. It will be important to ensure that NMFS is able to support work on these topics, under the required timelines, if the Council is to include them in a proposal.

## 3.2 Process

### » *What level of proposal review does the Council want in December?*

Staff are also looking for input from the Council as to how much of the details you would like to review, as we continue to develop a proposal under this funding opportunity. Our preliminary idea is to bring a more in-depth plan back for Council review at the December meeting, that fleshes out the operational considerations for projects the Council may be interested in, and ensures that there is a robust link back to the funding objectives. Staff would also highlight any tradeoffs or questions about available staff capacity at the Council and at partner agencies who may need to be involved, realistic timelines to achieve an implementable product, estimates of Council agenda time needed for IRA-funded vs existing projects, or other considerations. Staff could provide this information as an update in the Executive Director's report, or a separate agenda item, depending on how much discussion the Council anticipates. Alternatively, staff could work primarily with the Council's Executive/Finance Committee to scope out the details of a cost estimate for a proposal that responds to Council interest.

### » *What does the Council envision for ongoing management of the IRA-funded projects, which might affect costs in a proposal?*

It is useful to think ahead about the level of Council oversight that the Council envisions for the IRA-funded projects. NMFS has indicated that there will be a higher monitoring and reporting burden for IRA-funded work, to ensure funds are being used in accordance with the overarching goals of implementing measures necessary to advance climate ready fisheries. Council staff are fully tasked at present, and so our preliminary idea is to hire a **new staff person** for the duration of the grant (2024-2027), for IRA project analytical work, managing the suite of projects, and reporting progress under the grant to NMFS and the Council.

In addition, the Council might be interested in appointing a **committee to oversee progress** with the IRA-funded projects. One idea might be to use the existing SSC-Council subgroup, which has a remit to foster dialogue among members at the science-management interface. This informal subgroup could also be transitioned to a more formal Council committee, with regular public meetings as a way to report publicly on progress and maintain connections among various IRA-funded projects, especially if they involve contracting. A committee could allow the Council to maintain oversight without usurping as much agenda time from existing work. Given the likely subject matter, it would be advantageous to ensure that the Committee continues to include several SSC and Council members, even if membership is also extended to other individuals.

Finally, the Council may want to indicate its interest in creating opportunities for broader public involvement on the IRA-funded projects, for example through **workshops** that provide a more informal opportunity for discussion among the Council, advisory groups, and the public. Is the Council interested in holding more workshops on IRA-funding-related topics during the four years of the grant, for example? Are there other public access vehicles that the Council might be interested to pursue? Understanding what the Council's interest might be in activities that

occur outside of a standard Council meeting will help staff appropriately cost the proposal for meeting venues, travel, and facilitator needs.

The remainder of IRA funding would be available for **contracting** to persons who are able to help staff develop analytical products for the various projects that the Council might wish to pursue.

### 3.3 Timeline

<b>Oct 2023 Council meeting</b>	Initial Council input on topics/projects that might be prioritized for IRA funding, to guide staff
<b>Oct 2023 CCC meeting</b>	More clarification from NMFS on proposal process
<b>Fall 2023 (tentative)</b>	NPFMC submits grant proposal for initial \$375,000; funding is provided to NPFMC by NMFS
<b>Dec 2023 Council meeting</b>	Opportunity for Council to refine the list of projects that are to be included in a robust proposal for additional funds
<b>Early 2024</b>	Staff submits proposal to NMFS
<b>Mid 2024</b>	NMFS determines whether to award funding
<b>2024-2026 (2027)</b>	Staff work, Council action on IRA-funded projects
<b>2027</b>	For IRA funded projects that require implementation through FMP or regulatory amendments, Council action must be complete by end 2026 in order to allow for agency implementation in 2027
<b>End 2027</b>	All IRA-funded projects must be complete and implemented

## 4 Synthesis of Council Information Related to Climate Ready Fisheries

In order to help the Council consider what objectives, issue areas, or projects might be included in a NPFMC proposal for IRA funding, staff have reviewed ongoing Council projects and initiatives that relate to climate ready fisheries, and also synthesized themes and issues highlighted in several recent Council and NMFS documents including the Climate Readiness Synthesis (CRS) prepared by the Council’s Climate Change Taskforce, the report from the SSC’s February 2023 workshop, and the NMFS Bering Sea, Gulf of Alaska, and Arctic Climate Science Strategy Regional Action Plans.

This section includes additional information to support the Council’s direction to staff on responding to the IRA funding opportunity, including an overview of current Council initiatives and themes related to climate readiness, and examples of IRA funding opportunities compiled by staff as a starting point for discussion.

## 4.1 Current Council initiatives

The Council has initiated scoping for two initiatives in 2024 that could support additional IRA funding opportunities. These include scoping the development of a Programmatic Environmental Impact Statement, and planning for one or more workshops focused on climate scenario planning. IRA funds cannot support Council commitments and staff time that have been planned for under the Council's current operating grant. However, IRA funds could enable the Council to build on or amplify the scope of these activities; for example through additional preparation and information products, a larger suite of deliverables, and greater stakeholder participation. The Council could also pursue other ideas outside of these two initiatives.

### Programmatic Environmental Impact Statement

In June 2023 the Council initiated development of a Programmatic Environmental Impact Statement (PEIS) to clarify the management policy and objectives for all federal fisheries managed under the Council's jurisdiction in the Bering Sea, Aleutian Islands, and Gulf of Alaska. This work would update and extend the 2004 Groundfish Programmatic Supplemental EIS (PSEIS) to all active Council fisheries.<sup>5</sup> The Council adopted a purpose and need statement<sup>6</sup> for this action recognizing climate change as a driver for undertaking this initiative.

The Council identified two alternatives for scoping: the required status quo alternative (Alternative 1), and Alternative 2 to

*“Adopt a more adaptive ecosystem-based management policy and objectives for Council managed fisheries which would enable the Council to develop and implement climate-resiliency tools; new pathways to incorporate indigenous, local, and traditional knowledge; and new tools to assess and adapt to risk in the face of additional uncertainty in stock status and distribution due to climate driven marine ecosystem changes.”*

The PEIS process explicitly links the Council's work on climate readiness, ecosystem-based management, and integration of diverse knowledge sources. This work could provide the opportunity to link and further explore the ideas in this document, and other aspects of climate readiness identified by the Council community.

### 2024 Climate Scenarios Workshop - Climate Change Task Force

The Council has considered hosting one or a series of Climate Scenario Planning Workshop(s) in 2024. This workshop is being scoped by the CCTF, and the report from the workshop would represent their primary final output. The primary goal of this workshop would be to “synthesize and summarize the critical needs, resources, and process to develop and maintain a robust and inclusive decision making process to respond to climate change effects in the North Pacific.”<sup>7</sup> The initial intent is for the workshop(s) to use a combination of scenario planning exercises and case studies to explore effective planning and response to climate change in order to provide a

---

<sup>5</sup> Note, the Council considered but ultimately did not include the Arctic FMP within the scope of the initiated PEIS. The Arctic region is uniquely different than other Council regions, and does not currently allow commercial fisheries.

<sup>6</sup> As approved by [Council motion](#) on D2 June 2023

<sup>7</sup> D3 [CCTF March 2023 Meeting Report](#), April 2023

suite of management tools and recommendations for Council consideration. Workshop planning, including scoping the meeting approach, draft objectives, and a planning timeline, will be further discussed at their upcoming meeting in November. The workshop(s) could be an opportunity to engage the Council, stakeholders, and advisors in laying the groundwork for additional IRA-funded initiatives.

## 4.2 Climate readiness themes

The Council's current initiatives and the body of work by the CCTF, NMFS, and SSC together help advance common themes related to building climate readiness. The Council could reflect on these themes to consider what objectives, issue areas, or projects might be included in a NPFMC proposal for IRA funding. The Council can also consider other questions, for example:

- ❖ Are there other attributes of climate readiness that aren't captured here?
- ❖ Are there themes that have been difficult to gain traction on, or seem to be lacking clear next steps?
- ❖ Are there topics that are particularly challenging to discuss, and areas in which the Council community could become more conversant?

Appendix 2 provides a more detailed description, mapping these themes to ideas and recommendations proposed by the CCTF and SSC.

### Theme 1: Support a Council process that can be both proactive and responsive

The Council can develop strategies to think proactively, respond quickly, and better understand linkages between management approaches and adaptive capacity, including by:

- Evaluating and improving the climate resilience of management actions: The Council can build on the CRS by taking a comprehensive look at its management tools to better understand their current flexibility and limitations, how they interact, and think about how to build approaches that are specifically designed to work well under climate change.
- Learning from past experience and "what if" scenarios: The Council has already experienced climate-related disruptions to the Gulf of Alaska Pacific cod and Bering Sea crab stocks. The Council can analyze what has been learned from these experiences, as well as explore and test hypothetical future scenarios to consider how to respond. The 2024 Climate Scenarios workshop will support this.
- Supporting a timely, responsive Council process: The decision-making and regulatory process are designed to support deliberation and public involvement, and can move slowly as a result. The Council can explore how to support the public process while also enabling rapid response to change and systematically looking at management actions through a climate readiness lens. This will be supported by the PEIS process.
- Building a shared understanding of resilience and adaptive capacity: People, communities, and fisheries are likely to respond to climate change in very different and personal ways. Discussing resilience and adaptive capacity with the Council community could help build a shared understanding of how and why people might respond to



change, and how these responses might impact the effectiveness of management measures.

## **Theme 2: Build and use climate information on-ramps**

The Council can contribute to building on-ramps and capacity for considering climate information in Council processes, including by:

- Including more climate information in analytical products: The CRS describes opportunities for increasing the uptake of climate information into SAFE reports and Ecosystem Status Reports. There are opportunities for further dialogue with SAFE report authors, especially as the Council refines its priorities and information needs for climate readiness including through the PEIS process and 2024 Climate Scenario Workshops.
- Strengthening the Council community's ability to talk about risk: Climate change will require making decisions in the face of increasing uncertainty, and clearly communicating with stakeholders about the likelihood and consequences of climate change impacts. The Council can become more conversant in the language of risk and risk tolerance through more dialogue with the SSC (i.e., the newly formed Council-SSC subgroup) and exploration of risk-based management approaches and tools including risk policies and risk tables.
- Linking ecosystem approaches with climate readiness: Ecosystem-based management approaches can help account for changing ecosystem conditions and provide a pathway for bringing diverse sources of knowledge into the Council process. The Council can more clearly articulate how EBFM supports climate readiness and continue building on EBFM approaches.

## **Theme 3: Include stakeholders and partners in building climate readiness**

The Council can more fully integrate diverse knowledge bases and support two-way stakeholder engagement to support climate readiness, including by:

- Strengthening engagement with Alaska Native communities: The Council can take steps to more fully integrate traditional knowledge and support two-way dialogue with Tribes and stakeholders, as detailed in the LKTKS protocol and on-ramps documents, and the CRS.
- Communicating clearly and regularly about climate readiness planning: Climate change amplifies the need for the Council to communicate about its work and to discuss complex issues in clear, accessible terms. The Council can consider how to create new and more accessible opportunities for participation and information sharing.
- Building a stronger network of partnerships: Climate change deepens the need for coordination and collaboration across agencies, research partners, industry sectors, communities, tribal governments, and other groups to share knowledge, fill data gaps, and account for the impacts of other activities. The Council can continue efforts to increase accessibility and broad participation in the Council process. Workshops are one way to provide greater access.

### 4.3 Potential ideas for IRA funding - staff synthesis as a starting point for Council discussion

Note, these ideas have been collated by staff from current initiatives and discussion threads that have occurred in the Council or in Council documents in recent years. **This list is not definitive or exhaustive; it is intended to spark discussion and ideas.** In October, the Council may add new ideas or develop any of these themes or projects in a way that is different from the brief description provided.

Project	Description	Status	Staffing / partnership needs	Implementation needs
<b><i>CLIMATE READINESS PROJECTS COUNCIL HAS ALREADY INITIATED</i></b>				
CCTF 2024 Climate Scenario Planning Workshop(s)	Synthesize and summarize the critical needs, resources, and process to develop and maintain a robust and inclusive decision-making process to respond to climate change effects in the North Pacific through a combination of scenario planning exercises and case studies, and provide recommendations regarding management tools.	Scoping phase  Council tasked the CCTF to scope out workshops.  Note, these workshops could also provide a scoping platform to develop specific objectives for projects included in the IRA funding proposal.	Staff work by the CCTF co-chairs and team  If discussion is intended to be based on a specific scenario, developmental work may be required from AFSC staff.	CCTF intends to provide recommendations to the Council, which the Council may choose to consider in terms of process change.
Programmatic EIS	Clarify the management policy and objectives for all federal fisheries managed under the Council's jurisdiction in the Bering Sea, Aleutian Islands, and Gulf of Alaska, acknowledging the need to be adaptive in the face of climate-driven marine ecosystem changes.	Scoping phase  Council adopted a purpose and need and alternatives in June 2023; initiated scoping.	Requires considerable Council staff work. Depending on the Council's ultimate approach, may also require considerable input from other AKR and AFSC staff.	FMP amendments to change the management policy for Council FMPs.  Potential for subsequent Council deliberation of actions to bring fisheries in line with a revised policy.

Project	Description	Status	Staffing / partnership needs	Implementation needs
<b>PROJECTS THAT HAVE BEEN DISCUSSED AT THE COUNCIL BUT NOT YET INITIATED</b>				
SSC workshops	The SSC habitually holds a workshop every February on relevant topics, and in the 2023 workshop report, they highlighted several options for follow up, including information needs given shifting boundaries or ahead of future extreme events, identifying ecosystem bottlenecks, and how to track carrying capacity in a changing environment	SSC has not yet decided on a follow-on workshop topic.	The 2023 workshop took considerable organization by SSC members, for which they do not have ongoing capacity. Would need help to organize a follow-on workshop of similar scale.	May provide an avenue to discuss and develop focused projects that would result in management change.
Harvest control rule/ dynamic reference points/ tier system changes	Consider current policies affecting harvest control rules, and develop new approaches for accounting for changes in ecosystems related to climate change, including the exploration of environmental data to help inform recruitment.	Considered but not yet prioritized by Council  Groundfish Plan Teams recommended a working group in Dec 2022; SSC to provide more focus.	Needs considerable input from Council Plan Teams and AFSC assessment authors.  SCS8 meeting may also provide input.	Potentially FMP amendments to change the tier system to better account for climate-enhanced control rules.
Bering Sea Fishery Ecosystem Plan	Consider initiating new action modules for the Bering Sea FEP, focused on Council priorities; or support development of new information reports for the Bering Sea that track climate vulnerability or ecosystem status relative to Council objectives.	Considered but not yet prioritized by Council  BS FEP team and CCTF have discussed various ideas, but capacity is limited.	Would require considerable input from AFSC and, for an action module, a taskforce team including external experts	Depends on the specific project, but FEP work typically provides policy guidance to Council that is implemented as nec through subsequent work
Gulf of Alaska Fishery Ecosystem Plan	Develop a FEP for the GOA, to highlight unique regional ecosystem objectives and to prioritize Council work to meet those objectives.	Considered but not yet prioritized by Council  Ecosystem Committee in support, but PEIS higher priority given staff capacity	Would require identifying an interagency team to author FEP.	Depends on the specific project, but FEP work typically provides policy guidance to Council that is implemented as nec through subsequent work

Project	Description	Status	Staffing / partnership needs	Implementation needs
<b>PROJECTS THAT ARISE FROM SSC WORKSHOP REPORT OR CLIMATE READINESS SYNTHESIS</b>				
Retrospective studies of GOA Pcod and BS snow crab collapses	Use two retrospective case studies to determine what knowledge would have caused the Council to have taken different fishery management actions in case of rapid stock declines	Discussed at SSC workshop	Requires expertise on GOA Pcod and BS snow crab. AFSC staff would need to be closely involved.	Would determine what monitoring/ modeling is useful to react to future extreme events.
OY cap performance under climate change and alternative sub-designs below the 2m mt cap	Evaluate / re-evaluate OY cap performance under climate change and alternative sub-designs (e.g, proportional caps, dynamic as function of climate indices) below the 2MT to ensure this measure continues to impart stability and productivity benefits under future change; consider management implications.	Discussed in Climate Readiness Synthesis	Analysis is currently underway through ACLIM for initial study; coordination needed for management discussion.	Potential for subsequent Council action as needed.
Determining climate resilient fishing communities	Study to clarify how community resilience is defined in Council management and analyses. Compare and contrast with mandated policy goals like the sustained participation of fishing communities; explore scales and impacts of climate changes on fishery access, fishery dependence, and harvest and knowledge production for sustainable communities.	Discussed at SSC workshop	Approach should include mechanisms for communities to be involved	Once reviewed and approved by the Council, the report would be cited in Council impact analyses to support FMP and regulatory amendments for fishery management measures.
Risk policy considerations	Articulate a risk policy to improve consideration of risk in stock assessments and management	Discussed at SSC workshop	Needs AFSC/Plan Team input	Council risk policy could be included in FMPs or could be a standalone Council guidance document.

Project	Description	Status	Staffing / partnership needs	Implementation needs
<b><i>OTHER POTENTIAL PROJECTS WITHIN THE COUNCIL'S ORBIT</i></b>				
Greenhouse gas emissions assessment	Develop an assessment of the various Alaska fisheries with respect to greenhouse gas emissions, and the factors (eg fishing methods, stock status, and composition) that influence production-related emissions	EPA comments on a recent Council NEPA analysis highlighted the need for better analysis of the impacts of climate damage from Council fishery management actions.	Potential to contract to external experts	Once reviewed and approved by the Council, the report would be cited in Council impact analyses to support FMP and regulatory amendments for fishery management measures.  Potential for subsequent Council development of incentives to reduce emissions.
Arctic shipping	Revisit partnerships to ensure that Council is well-positioned to respond to changes in shipping patterns that affect Council-managed fisheries.	Discussed several years ago by Council in conjunction with Aleutian Islands FEP and the Alaska Marine Ecosystem Forum.	Potential to contract to external experts	

## Appendix 1: Initiatives and Resources

The Council, SSC, and NMFS are investing in work that provides context, scientific tools and information products, and ideas and recommendations that can support the Council's IRA funding proposal. These resources include work specifically focused on climate change, as well as efforts to develop ecosystem-based management (EBFM) pathways and include diverse perspectives and knowledge, which are also critical to climate readiness.

The resources cited in this section also synthesize the potential impacts of climate change to North Pacific fisheries, identify problem statements and needs for climate readiness planning, provide working definitions of key terms including adaptation and resilience, and describe linkages with national policy guidance; this information is incorporated by reference and not restated here. A table describing the climate-related functions of Council bodies is also provided in Table 3-4 of the Climate Readiness Synthesis.

### Council initiatives

#### Council-SSC Subgroup

In April 2023 the Council approved the SSC's recommendation to form a subgroup of Council and SSC members to develop a roadmap that builds a bridge from assessment and climate science to adaptive management under climate change.<sup>8,9</sup> This recommendation is an output of the SSC's February 2023 workshop focusing on rapid change in the northern Bering Sea and southern Chukchi Seas. The Council's motion also tasked this subgroup with discussing capacity and planning for a February 2024 follow-up workshop that would focus on science and management recommendations from the 2023 SSC workshop, and options for increasing the level and frequency of dialogue between the Council and the SSC on issues that straddle the science-policy interface.

#### Bering Sea Fishery Ecosystem Plan

In 2018, the Council adopted the Bering Sea Fishery Ecosystem Plan (FEP)<sup>10</sup> and prioritized the concurrent development of two action modules to 1) Evaluate short- and long-term effects of climate change on fish and fisheries, and develop management considerations, and 2) Develop protocols for using Local Knowledge (LK) and Traditional Knowledge (TK) in management and understanding impacts of Council decisions on subsistence users. Under the FEP framework, action modules are intended to be discrete, time-bounded projects developed by an ad hoc taskforce. The Council also supported ongoing work under the FEP to develop a new Strategic Ecosystem Evaluation report, to provide a strategic focus on multi-year trends and whether the Council is achieving ecosystem objectives for the Bering Sea as identified in the FEP. As action modules are completed, the Council will consider how to support future work through staff tasking.

---

<sup>8</sup> Final SSC February 2023 Workshop [Report](#), B13 April 2023

<sup>9</sup> Council [motion](#) on D1, April 2023

<sup>10</sup> [Bering Sea Fishery Ecosystem Plan](#), NPFMC 2019

## **BS FEP Climate Change Action Module and Climate Change Taskforce**

The Climate Change Task Force (CCTF) was convened by the Council to develop and execute a work plan for a Climate Change Action Module under the Bering Sea FEP. The goal of the Climate Change Module is to facilitate the Council's work toward climate-ready fisheries management that helps ensure both short-term and long-term resilience for the interconnected ecological and human communities of the Bering Sea.<sup>11</sup> The CCTF's work plan identifies three objectives:

- Objective 1. Collate: Coordinate the review of existing and emergent climate information on impacts, adaptation, and residual risk.
- Objective 2. Synthesize: Assess key climate change impacts, adaptation actions, and residual risk.
- Objective 3. Communicate: Summarize and communicate potential risks and adaptation actions.

The CCTF recently completed the Climate Readiness Synthesis (CRS)<sup>12</sup>, a key output in support of Objective 1. The CRS is intended as a starting point for the Council to take stock of the climate readiness of the management system, and describes climate readiness in terms of “whether management tools, assessments, and information on-ramps are designed to address and consider long-term climate change and the unprecedented conditions and unique challenges that it presents (in contrast to addressing natural climate variability).” The synthesis is organized into three sections evaluating the climate readiness of 1) the management system, 2) Stock Assessment and Fishery Evaluation (SAFE) reports and products including Ecosystem Status Reports; 3) knowledge bases that support climate readiness and adaptation, focusing on indigenous community, industry, and NMFS and Council knowledge bases.

## **BS FEP Local Knowledge, Traditional Knowledge, and Subsistence Action Module and Taskforce**

Also under the Bering Sea FEP, the Council convened a Local Knowledge, Traditional Knowledge, and Subsistence (LKTKS) Taskforce charged with developing a roadmap for integrating LK and TK into the management process, and methods for assessing the intersection of Council actions with subsistence resources, users, and practices. The Taskforce has produced a protocol for identifying, analyzing, and integrating Bering Sea LKTKS into Council processes and a description of 11 onramps for integrating the eight guidelines contained in the Protocol;<sup>13,14</sup> the Council will decide in October whether to approve one or both documents.

---

<sup>11</sup> Supporting climate-resilient fisheries through understanding climate change impacts and adaptation responses: [Climate Change Task Force work plan of the Bering Sea Fishery Ecosystem Plan](#). NPFMC 2021.

<sup>12</sup> [Climate Readiness Synthesis](#). Prepared by the NPFMC Climate Change Task Force 2022

<sup>13</sup> D2 [LKTKS Protocol](#), April 2023. Protocol for Identifying, Analyzing, and Incorporating Local Knowledge, Traditional Knowledge, and Subsistence Information into the North Pacific Fishery Management Council's Decision-making Process. NPFMC 2023.

<sup>14</sup> D2 [LKTKS Onramp recommendations](#), April 2023. Onramps for Local Knowledge, Traditional Knowledge, and Subsistence Information in the North Pacific Fishery Management Council's Process. NPFMC 2023.

While the work of the LKTKS task force is not explicitly focused on climate change, Indigenous community knowledge is recognized in the CRS as a vital knowledge base contributing to climate readiness and adaptation. Other work including the February 2023 SSC workshop and NMFS Regional Action Plans recognize the importance of integrating diverse knowledge sources, particularly as climate change leads to more interactions between the Council management process and communities in the Northern Bering Sea and Arctic regions.

## **Research priorities**

The Magnuson-Stevens Act requires that Councils develop 5-year research priorities for “fisheries, fisheries interactions, habitats, and other areas of research that are necessary for management purposes”. The SSC to conducts this review on a triennial basis, and provides final recommendations to the Council. The Council’s research priorities consist of a wide range of science-based needs and interests that support or improve the Council’s ability to provide stewardship over marine resources off Alaska and maintain sustainable fishing communities. Council research priorities are provided to the Secretary of Commerce, the Alaska Fishery Science Center, as well as research and funding entities.

## **SSC activities**

### **National SSC Meetings**

The Seventh National Meeting of the Scientific Coordination Subcommittee of the Council Coordination Committee (SCS7) was hosted by the Council in August 2022, and focused on “Adapting Fisheries Management to a Changing Ecosystem.” A key message from the meeting was that while the impacts of climate change are increasing, the scientific products to support Council decision-making have advanced as well. The meeting report includes four findings:<sup>15</sup>

- Councils need to start preparing now for increasingly complex management decisions due to climate change;
- Investment is needed in the development of new data collection and analysis tools that are responsive to changing conditions;
- SSCs and Councils need to be prepared to transition toward a more sophisticated toolbox; and
- Stakeholder engagement will be critical for adaptive management to be successful.

The next national meeting (SCS8) is scheduled for August 2024, with the theme: “Applying ABC control rules in a changing environment.” The workshop will explore strategies for how to adapt ABC control rules given the highly variable and changing dynamics of climate, recruitment, and productivity, and use of alternative reference points and indicators in the absence of analytical assessments. The SCS8 workshop will explore how SSCs can better use their expertise in the

---

<sup>15</sup> Hollowed, A. and D. Stram (editors). 2023. [Seventh National Meeting of the Scientific Coordination Subcommittee of the Council Coordination Committee](#). Report of the Regional Fishery Management Council's National SSC Workshop. North Pacific Fishery Management Council, Anchorage AK.



social sciences to provide critical insight on the potential for control rules to achieve management goals, and how fisheries and communities can adapt to dynamic conditions.

### **SSC February Workshops**

The SSC habitually holds a workshop in February to provide the opportunity for an in-depth discussion on a relevant issue. In February 2023, the SSC expanded the scope and format of their workshop to include broader public involvement and more opportunities for informal dialogue and exchange. The 2023 workshop focused on “Rapid change in the northern Bering Sea and southern Chukchi Seas - Identifying ecosystem responses and effects on the management of Federal fisheries.” The goal of the workshop was to identify the science and monitoring requirements for supporting future Council decision-making under increased uncertainty, including exploration of proactive approaches for achieving management goals in a changing environment, and an assessment of how existing frameworks may or may not be able to address ecosystem variability.<sup>16</sup>

The meeting report includes recommendations for next steps, including the recommendation to convene a Council-SSC subgroup and to hold a follow-up workshop. Additional ideas and recommendations from the SSC workshop report are summarized in Appendix 2.

### **NMFS initiatives**

#### **Climate, Ecosystem, and Fisheries Initiative**

The NOAA Climate, Ecosystem, and Fisheries Initiative (CEFI) is a cross-NOAA effort to provide information and resources to support climate-informed decision-making. CEFI will receive \$40 million of the IRA funding dedicated to support climate-ready fisheries.

#### **Climate Science Strategy Regional Action Plans**

NMFS recently published updated Regional Action Plans that describe the regional work to implement the objectives of the NOAA Fisheries Climate Science Strategy through 2024. The three RAPs prepared for the Bering Sea, Gulf of Alaska, and Arctic large marine ecosystems describe the Alaska Fisheries Science Center’s current work, gaps and information needs, and proposed activities under level and increased funding scenarios; including work that informs the Council management process.

#### **Stock Assessment and Harvest Specifications Reports and Products**

The Council Plan Teams, working with Alaska Fisheries Science Center and Alaska Department of Fish and Game stock assessment authors, prepare annual Stock Assessment and Fishery Evaluation (SAFE) reports summarizing the best available scientific information to support the Council’s annual harvest specifications process. Several Plan Teams also develop risk tables to

---

<sup>16</sup> [Final Workshop Report](#): Rapid change in the northern Bering and southern Chukchi Seas - Identifying ecosystem responses and effects on the management of Federal fisheries. North Pacific Fishery Management Council Science and Statistical Committee Workshop, February 7-8, 2023

assist the SSC in determining whether it is appropriate to reduce ABC from the maximum resulting from application of the control rules in the Tier system.

In conjunction with the SAFE reports, Ecosystem Status Reports (ESRs) are prepared for the Bering Sea, Aleutian Islands, and Gulf of Alaska and provide contextual information to describe ecosystem conditions and trends and support decision-making.

The Arctic RAP recommends updating the Ecosystem Status Report for the Arctic LME to provide a regular mechanism for presenting information to the Council on ecosystem conditions and resource-dependent communities, and to support response to climate change impacts in the Chukchi and Beaufort Seas.<sup>17</sup>

### **Climate Vulnerability Assessments**

Climate vulnerability assessments (CVAs) characterize the relative sensitivity and exposure of stocks to climate change, and can help focus research and actions to reduce risk, and identify priorities for further analysis (e.g., management strategy evaluation). NMFS and partners completed a vulnerability analysis for Bering Sea groundfish, crabs, and salmon stocks in 2019<sup>18</sup> and a similar analysis is planned for the Gulf of Alaska.<sup>19</sup>

### **Alaska Climate Integrated Modeling Project (ACLIM)**

The Alaska Climate Integrated Modeling project (ACLIM) is a comprehensive effort by NOAA Fisheries and partners to describe and project responses of the Bering Sea ecosystem— both the physical environment and human communities—to varying climate conditions. The second phase of ACLIM will support the use of scenario planning to evaluate and inform the resilience of management strategies and provides an important opportunity for interaction between the ACLIM team, Council, and public.

### **Gulf of Alaska Climate Integrated Modeling Project (GOA-CLIM)**

The Gulf of Alaska Climate Integrated Modeling Project (GOA-CLIM), is a similar effort that includes research pathways focusing on ecosystem model development and socioeconomic modeling. The GOA RAP notes that one management application of GOA-CLIM is evaluating the Optimum Yield range for total groundfish removals in the GOA.<sup>20</sup>

### **EEJ Strategy**

NMFS recently released the agency's Equity and Environmental Justice Strategy, which includes the goal of prioritizing identification, equitable treatment, and meaningful involvement of underserved communities. The agency is currently developing regional implementation plans.

---

<sup>17</sup> [Chukchi and Beaufort Seas Regional Action Plan](#) to Implement the NOAA Fisheries Climate Science Strategy Through 2024. NMFS 2023 (p.18)

<sup>18</sup> Spencer PD, Hollowed AB, Sigler MF, Hermann AJ, Nelson MW. Trait-based climate vulnerability assessments in data-rich systems: An application to eastern Bering Sea fish and invertebrate stocks. *Glob Change Biol.* 2019;25:3954–3971. <https://doi.org/10.1111/gcb.14763>

<sup>19</sup> [Gulf of Alaska Regional Action Plan](#) to Implement the NOAA Fisheries Climate Science Strategy Through 2024. p. 26

<sup>20</sup> GOA RAP, p. 31

## Appendix 2: Issues and themes

This appendix provides a more detailed description and mapping of the themes in Section 4 to specific ideas and recommendations provided by the CCTF, SSC, and in other Council and NMFS documents.

### Theme 1: Support a Council process that can be both proactive and responsive

#### Evaluating and improving the climate resilience of management actions

Table 1-2 in the CRS (“Management measures and potential strengths and weaknesses”) examines the potential adaptive and maladaptive qualities of broad categories of management measures, and identifies opportunities for improvement. The SSC and CCTF have both expressed support for building on the approach used in Table 1-2 to identify concrete ideas for tactical and strategic steps for building resilience. The CCTF notes this is intended to be an outcome of the 2024 Climate Scenarios workshop.

A primary suggestion of the CRS for future work is to develop metrics for resilience and considering time scales for management responses:

*Future work could create a set of metrics that provide measures of climate resilience across management actions and, potentially, climate warming scenarios. These key metrics could provide detail that better ties management actions to adaptation, maladaptation, limits to adaptation, and amount of adaptive flexibility relative to anticipated climate outcomes. In addition, time scales related to management response could also be considered such that some events may require a large and rapid response (e.g., heat waves), whereas other events may be slow to develop and offer a longer lead-in period for management response (e.g., movement of core stock areas).*

Additional ideas suggested in the CRS include:

- Evaluate the effectiveness and feasibility of measures that increase flexibility in current and future Council- defined management actions and which may allow for rapid responses to change
  - The CRS notes a comprehensive approach that considers interactions between management measures could assist with identifying adaptive and maladaptive characteristics.
- Explore measures that support appropriate and timely response mechanisms in management
- Development of metrics to evaluate climate resilience in management measures
- Explore the performance of, and feasibility to implement, spatial and temporal dynamic management measures through case studies like those identified in [Section 1 of the CRS]

- Evaluate / re-evaluate OY cap performance under climate change and alternative sub-designs (e.g, proportional caps, dynamic as function of climate indices) below the 2MT to ensure this measure continues to impart stability and productivity benefits under future change.
- Identify enabling factors to support industry led measures to increase rapid adaptation, reduce impacts, and respond to climate driven changes (e.g., communication and near-real time information sharing).

The CRS also notes that the potential for current in-season regulations has not been investigated and is likely of interest to the Council.

### **Learning from past experience and “what if” scenarios**

Exploring future scenarios and analyzing past events are both valuable approaches for investigating management readiness, identifying information needs, and identifying actionable outcomes to improve the climate readiness of management actions. Socioeconomic scenario planning is an important component of ACLIM 2.0, and will help evaluate how management scenarios interact with environmental changes, estimate social and economic impacts, and explore tradeoffs and potential management changes for coping with climate change impacts.<sup>21</sup>

The 2024 Climate Scenarios and Advice workshop will provide one opportunity to engage in scenario planning exercises and examine case studies.

The SSC and CCTF have identified ideas for workshops and scenario testing, including:

- Utilize case-studies as thought exercises and consider the following questions: 1) what information was available and could shocks and impacts have been anticipated in terms of scope, timing, and impacts ahead of time; and 2) what information would have been needed to be able to plan and respond to such impacts, but was missing at the time of evaluation, to help characterize the types of tools and information needed to be ready for unforeseen events and climate impacts on management<sup>22</sup>
- Focus workshop discussions on how to anticipated or respond to infrequent shocks or tipping points; systematically develop a catalog of types of shocks and how they manifest for specific stocks<sup>23</sup>
- Conduct a quantitative assessment of Council bodies’ efforts and actions in the years preceding the GOA Pacific cod or EBS snow crab stock collapses to identify what we could have done (or not done) to increase our awareness of climate impacts taking place. This evaluation would be useful in designing scenarios for consideration in scenario planning exercises, as well as providing more realistic expectations about what is achievable by a “climate-ready” management system.<sup>24</sup>
- The SSC suggests that [case studies from Alaska and elsewhere] would be a good starting point in that learning from the past will help inform future scenarios, with an

---

<sup>21</sup> [ACLIM presentation](#) to Council, October 2021

<sup>22</sup> D3 [CCTF March 2023 Report](#), April 2023

<sup>23</sup> B10 [SSC Final Report](#), February 2023

<sup>24</sup> B10 [SSC Final Report](#), February 2023

emphasis on examples of what was done correctly vs. what would have been necessary for more effective management responses. Specifically, the SSC suggests that the CCTF should consider whether it is possible to draw upon examples of effective climate readiness in fisheries from both Alaska and other regions globally.<sup>25</sup>

### **Supporting a timely, responsive Council process**

Another component to climate readiness includes the procedural readiness to support a timely decision making and regulatory process. The PEIS process now underway is a primary mechanism for supporting procedural responsiveness and incorporating the ideas suggested by the CCTF and SSC. One of the SSC's suggested next steps from the February 2023 workshop is to incorporate the recommendations of this meeting into the PEIS process.

Additional ideas include:

- Build periodic review of climate ready actions into the Council process; conducting programmatic reviews through the lens of climate change might help identify how to make management more nimble; for example, distributional shifts are not systematically reviewed and regular review may help identify climate effects on catchability and access.<sup>26</sup>
- Identify process guidance on how to accomplish complementary and simultaneous policy actions, or omnibus actions, as part of a climate-ready toolbox<sup>27</sup>

### **Building a shared understanding of resilience and adaptive capacity**

The resilience of individuals, businesses, and communities to climate change impacts, and the adaptive strategies they may employ, are complex and challenging to discuss with a shared frame of reference. The SSC identified the opportunity for deeper exploration of community resilience, noting that community resilience has proven difficult to define and quantify and relates to how community is defined. The Regional Action Plans also cite the need for additional research on the relationships between fishery resources, participants and communities, and their adaptive strategies and capacity under climate change.

The SSC emphasized that community outcomes are dependent on policy, and provided suggestions to inform a deeper exploration of community resilience:<sup>28</sup>

- Comparing and contrasting the goal of community resilience (as generally defined in terms of community sustainability) and mandated policy goals like the sustained participation of fishing communities (as defined as being those communities that are substantially engaged in or dependent on fisheries with a federal management nexus).
- Exploring the different scales at which community resilience may be described and thinking across fisheries

---

<sup>25</sup> B13 [SSC Final Report](#), April 2023

<sup>26</sup> D3 [CCTF March 2023 Report](#), April 2023

<sup>27</sup> B10 [SSC Final Report](#), February 2023

<sup>28</sup> B10 [SSC Final Report](#), February 2023

- Clarifying what the goals of climate readiness, which are related to achieving the national standards, implies at the level of species and communities
- The CCTF suggested the 2024 Climate Scenarios and Advice workshop could provide a participatory approach to exploring community resilience by:<sup>29</sup>
- Collaboratively identifying and reviewing definitions of resilience and critically evaluating alternative methods and metrics to measure and evaluate community resilience.

## **Theme 2: Build and use information on-ramps**

This section includes ideas for building and utilizing on-ramps for diverse sources of information and knowledge.

### **Including more climate information in analytical products**

SAFE reports provide the basis for the Council's ecosystem-based fisheries management and harvest specifications. Section 2 of the CRS assesses the climate readiness of SAFE reports and information products, identifies on-ramps for climate change-informed advice, and provides ideas for improvement ranked high, medium, or low in near-term feasibility (see Appendix 1). The CCTF and SSC support continuing to evaluate "what information belongs where" to avoid overloading documents, and support both short-term tactical decision making and longer term planning.<sup>30</sup>

While implementing the CRS report ideas for would depend primarily on the capacity of NMFS contributors including stock assessment authors, Ecosystem Status Report editors, and plan team members, SAFE reports and products are intended to facilitate discussion and provide context for decision making, and can evolve in response to the Council's interests and guidance. Operationalizing scientific products is one of the priorities NMFS identified for Councils' use of IRA funds.

### **Strengthening the Council community's ability to talk about risk**

Managing fisheries under changing climate conditions will involve adjusting expectations and assumptions, and potentially managing to a "new normal." The SSC commented that the objectives for managing fisheries in a rapidly changing environment are not always clear, and the reality of changing productivity, changing distributions, and the increased likelihood of future ecological surprises need to be communicated to stakeholders and accounted for in management.<sup>31</sup> Addressing these uncertainties and specific questions—such as when and how to adjust assumptions about stock dynamics—are linked scientific and policy considerations that require understanding and communicating about risks and risk tolerance.

The SSC workshop report suggests forming a Council and SSC subgroup and planning for a February 2024 SSC workshop to address key management recommendations, including:

---

<sup>29</sup> D3 [CCTF March 2023 Report](#), April 2023

<sup>30</sup> B10 [SSC Final Report](#), February 2023 and D3 [CCTF March 2023 Report](#), April 2023

<sup>31</sup> February 2023 SSC [Final Workshop Report](#)

- Increase dialogue between SSC and Council on issues that straddle the science-policy interface;
- Renewed discussion on reference period determinations in light of increased periodicity of extreme events; and
- Improve the use of approaches that explicitly consider risks.

Another suggestion is to consider lessons from other regions or management bodies, such as the risk framework used by the Mid-Atlantic Fishery Management Council.

### **Linking ecosystem approaches with climate readiness**

Ecosystem-based management approaches can support climate readiness and provide a pathway for bringing diverse knowledge bases (as discussed in the CRS) into the management process. Ideas include:

- Articulate more clearly how ecosystem approaches will help support climate readiness<sup>32</sup>
- Increased development and implementation of EBFM tools across Council processes<sup>33</sup>
- Scope development of Fishery Ecosystem Plans in other regions for connectivity issues (e.g., Gulf of Alaska, Arctic), as discussed at the March 2022 meeting of the Ecosystem Committee<sup>34</sup>
- In order to implement EBFM in the Northern Bering Sea region and develop the science required to support it, develop goals and objectives in collaboration with residents. A review of ecosystem-level objectives, including the need for regional objectives, could be undertaken as part of a Programmatic EIS<sup>35</sup>

### **Theme 3: Include stakeholders and partners in building climate readiness**

The linked themes of leveraging diverse knowledge bases and supporting two-way stakeholder engagement to support climate readiness are prominent across all of the resources cited in this document. Section 3 of the CRS describes three knowledge bases, including Indigenous community, industry, and NMFS/NPFMC, and assesses the extent to which each is currently integrated into Council and NMFS processes.

The CRS provides the following suggestions for leveraging all knowledge bases and incorporating diverse sources of climate information and knowledge.

- Provide input into the Research Priority setting process foregrounding the importance of diverse sources of climate information and their relationship to climate-ready fisheries science and management

---

<sup>32</sup> [Opening remarks](#) from 7th National Meeting of the Scientific Coordination Committee of the CCC

<sup>33</sup> [Climate Readiness Synthesis](#)

<sup>34</sup> [Climate Readiness Synthesis](#)

<sup>35</sup> B10 [SSC Final Report](#), February 2023

- Test mechanisms within the CCTF (e.g., Climate Briefings, Ecosystem Matrix tool, etc.) for bringing diverse knowledge sources related to climate change into the Council process
- Finalize and implement LKTKS Taskforce protocol regarding incorporation of LK, TK, and subsistence information into the Council process
- Track and consider climate change information and implications in light of recommended evaluations (as suggested by the Ecosystem Committee in March 2022) of the Programmatic EIS
- Scope development of Fishery Ecosystem Plans in other regions for connectivity issues (e.g., Gulf of Alaska, Arctic), as discussed at the March 2022 meeting of the Ecosystem Committee
- Increased development and implementation of EBFM tools across Council processes
- Work on marine planning and protections that are equitable and inclusive of a diverse set of communities, people, knowledges, methodologies, and values
- Implement a number of the CEC Final Report (NPFMC 2021) recommendations which could increase the flow of diverse sources of climate change information (including resilience tools) into the Council process
- Increased uptake of broader climate change knowledge base not, or not fully, integrated into the Council process through additional steps not indicated above in other bullets, e.g., through exploring collaborations, partnerships and co-production (also see Section 2 for near-term steps to advance climate integrated advice)
- Conduct an analysis of Council documents as outlined above to explore whether and how the climate-relevant information from a variety of ‘other’ knowledge bases are currently making their way into the Council process in order to facilitate a gap analysis and recommendations for improvement, as necessary

### **Strengthening engagement with Alaska Native communities**

The CRS, the 2023 SSC workshop, and three Regional Action Plans recognize that inclusion of Indigenous community knowledge is critical to climate readiness, and not currently well integrated. This presents a particular challenge in the rapidly changing Northern Bering Sea, Southern Chukchi Sea, and broader Arctic region, where the Council process may increasingly need to consider user groups that it has not interacted with extensively in the past, and for whom marine resources are a matter of food security. There also exists the opportunity for deeper engagement and the integration of knowledge held by stakeholders and communities.

The recently completed LKTKS Protocol and on-ramps document, which are not focused specifically on climate readiness, were developed to consider pathways for integrating these valuable sources of knowledge into Council processes. The CRS, which does focus specifically on the integration of Indigenous community knowledge for the purpose of climate readiness, ranks Indigenous community knowledge as “1 - Not Ready,” concluding that while community knowledge is expansive and contains detailed information about changes and impacts" it is not



discussed or utilized in the management process. The report's suggestions, also cited in the introduction to this section, include finalizing and implementing the LKTKS protocol, and implementing recommendations from the Council's Community Engagement Committee's final report.<sup>36</sup>

The SSC's recent review<sup>37</sup> of the LKTKS protocol provides additional recommendations for improving the integration of LKTKS overall, and in ways that could help leverage Indigenous community knowledge base to support climate readiness. These ideas include:

- Should the Council support the protocol and/or specific onramps, have a communication strategy to roll out the protocol and allow Tribes and stakeholders to choose how best to engage
- Convene a formal or informal interagency group of individuals involved in efforts to incorporate LKTKS into management decision making processes, including Council, AFSC, Regional Office, other federal agencies, State personnel, and others<sup>38</sup>
- Consider potential onramps within the recurring cycles of updating and improving existing decision-informing analytic products such as Ecosystem Status Reports (ESRs), SAFE documents, including Ecosystem and Socioeconomic Profiles (ESPs) where relevant, and Annual Community Engagement and Participation Overview (ACEPO), among others.

### **Communicating clearly and regularly about climate readiness planning**

Climate change amplifies the overall need for the Council to communicate about its work and support meaningful opportunities for stakeholder engagement. This is a key message of SCS7 as well as the February 2023 SSC workshop, which recommends improving engagement with tribes and communities in the Northern Bering Sea and Chukchi Sea regions. One suggestion of the CRS is to implement recommendations of the Council's Community Engagement Committee, which focuses on rural and Alaska Native communities. Additional ideas for enhancing Council outreach and engagement are referenced in other documents, and include procedural opportunities to augment outreach components of existing and proposed Council initiatives. For example:

- The SSC suggested that the Council could collaborate with NBS residents to identify regional ecosystem-level goals and objectives as part of the Programmatic EIS process<sup>39</sup>
- The LKTKS Task Force recommends holding a workshop to solicit public input as part of the Research Priorities process planned for 2024.<sup>40</sup>

---

<sup>36</sup> D1 Community Engagement Committee Report, February 2021. North Pacific Fishery Management Council (NPFMC) (2021) [Report of the Community Engagement Committee: Recommendations to improve Council engagement with rural and Alaska Native Communities. February 2021.](#)

<sup>37</sup> B13 [SSC Report](#), April 2023

<sup>38</sup> The October 2021 [SSC Final Report](#) review of the RAPs also emphasized the need for coordination and efficient use of resources

<sup>39</sup> February 2023 SSC [Final Workshop Report](#)

<sup>40</sup> D2 [LKTKS Onramp recommendations](#), April 2023

Other suggestions for outreach and engagement focus on key messages and methods. The 2023 SSC workshop report highlights the need to communicate complex and difficult messages about changing conditions, the increasing likelihood of increasing ecological disruptions, and the concept of non-stationarity and potentially managing to a “new normal.” The SCS7 report findings also cite the importance of building stakeholder confidence in scientific products and management approaches for decision making increased uncertainty. Additional ideas identify examples of the barriers to reaching stakeholders (e.g. meeting costs, technical jargon) and solutions such as community-level workshops and plain language summaries such as the recent brochure summarizing outcomes of the February SSC meeting.<sup>41</sup>

Communication and engagement can be an agency as well as a Council function; the RAPs note steps the NMFS will take to share information and build and strengthen relationships, including through the newly created Tribal Research Coordinator position.

### **Building a stronger network of partnerships**

Climate change is deepening the need for efficient coordination and collaboration across agencies, academic and research partners, industry sectors, communities, tribal governments, and other groups to use resources efficiently in order to consider policy intersections, build knowledge and meet data and information gaps, and support inclusion and engagement.<sup>42</sup> While many of these opportunities are external to the Council process (e.g. NMFS, research community), the Council is able to engage and communicate its needs more broadly through its committees, advisors, and task forces, and through processes including the research priorities process.

---

<sup>41</sup> February 2023 SSC [Final Workshop Report](#)

<sup>42</sup> February 2023 SSC [Final Workshop Report](#); B10 October 2021 [SSC Final Report](#)

## **Addendum 1: Excerpts from Climate Readiness Synthesis Report**

### **Excerpt from Section 1: Management Overview**

#### **1.6 Future directions/Potential Future Work**

As previously discussed, this report is not intended to be a comprehensive overview of all management measures in the BSAI. Future work could create a set of metrics that provide measures of climate resilience across management actions and, potentially, climate warming scenarios. These key metrics could provide detail that better ties management actions to adaptation, maladaptation, limits to adaptation, and amount of adaptive flexibility relative to anticipated climate outcomes. In addition, time scales related to management response could also be considered such that some events may require a large and rapid response (e.g., heat waves), whereas other events may be slow to develop and offer a longer lead-in period for management response (e.g., movement of core stock areas).

##### **1.6.1 Near-term considerations**

- Evaluate the effectiveness and feasibility of measures that increase flexibility in current and future Council- defined management actions and which may allow for rapid responses to change
  - Seasonal flexibility in allocations, quota programs
  - Transferability amongst sectors and seasons
- Explore measures that support appropriate and timely response mechanisms in management
  - More rapid response in some circumstances while others may exhibit longer-term stability and/or flexibility in response timing
- Development of metrics to evaluate climate resilience in management measures
  - Improved integration of fishery dependent information with fishery independent information (e.g., habitat, oceanographic, survey, climate model outputs, stock dynamics) and coordination amongst data providers
- Explore the performance of, and feasibility to implement, spatial and temporal dynamic management measures through case studies like those identified in [Section 1 of the CRS]
- Evaluate / re-evaluate OY cap performance under climate change and alternative sub-designs (e.g, proportional caps, dynamic as function of climate indices) below the 2MT to ensure this measure continues to impart stability and productivity benefits under future change.
- Identify enabling factors to support industry led measures to increase rapid adaptation, reduce impacts, and respond to climate driven changes (e.g., communication and near-real time information sharing).

## Excerpt from Section 2: SAFE Report Review

This table summarizes the potential near-term, medium- high feasibility measures identified by the team. Details regarding these are provided below in the section 2.7 of the CRS, “Potential On-ramps”.

**Table 2-5 Summary Table: Potential near-term On-ramps**

Potential on-ramps	Near Term Feasibility
1. Indicator / climate change section in ESR	
a. Add ESR indicator regarding long term projections of climate variables (e.g., bottom temperature, cold pool, OA)	High
b. Add climate change synthesis section, similar to the climate variability and forecast section (Bond et al.) of the ESR	Medium
2. Separate section in SAFE or an independent climate change report	Low-Medium (requires an author to produce annually)
3. Intro section for each SAFE report could include a climate change section (e.g., in the ecosystem section)	Medium- High
4. SAFE Chapters (each species individual assessment) could include climate change information	Medium
a. Species specific climate change paragraph in each safe chapter	Medium
b. Each stock assessment chapter could include a climate change information section or slightly modified ESP	
c. Risk, vulnerability (and adaptation potential) table	
d. Safe author survey of climate readiness of each stock (based on their opinion and set criteria for climate readiness)	
5. Econ Safe Report could include climate change information (especially around risk, portfolio approaches to reduce risk, and future opportunities)	Low-medium
a. General paragraph on climate change, global demand, and global to regional economics	
b. Risk, vulnerability (and adaptation potential) table	
c. Synthesis of integrated socio-econ MSE results (e.g. ACLIM)	
6. Include a climate briefing as part of the Plan Team meetings to help inform this section	High
7. CCTF climate report(s) can be used to periodically update this information through producing synthesis sections for each species as well as the ecosystem as a whole.	Medium (will take coordination to draft and dedicated resources)

### **Excerpt from Section 3: Knowledge base overview**

#### **Section 3.6: Gaps and next steps: knowledge base elements and activities which can potentially be brought into the existing management system in the near-term**

- Provide input into the Research Priority setting process foregrounding the importance of diverse sources of climate information and their relationship to climate-ready fisheries science and management
- Test mechanisms within the CCTF (e.g., Climate Briefings, Ecosystem Matrix tool, etc.) for bringing diverse knowledge sources related to climate change into the Council process
- Finalize and implement LKTKS Taskforce protocol regarding incorporation of LK, TK, and subsistence information into the Council process
- Track and consider climate change information and implications in light of recommended evaluations (as suggested by the Ecosystem Committee in March 2022) of the Programmatic EIS
- Scope development of Fishery Ecosystem Plans in other regions for connectivity issues (e.g., Gulf of Alaska, Arctic), as discussed at the March 2022 meeting of the Ecosystem Committee
- Increased development and implementation of EBFM tools across Council processes
- Work on marine planning and protections that are equitable and inclusive of a diverse set of communities, people, knowledges, methodologies, and values
- Implement a number of the CEC Final Report (NPFMC 2021) recommendations which could increase the flow of diverse sources of climate change information (including resilience tools) into the Council process. This includes:
  - Co-presentation from Tribal representatives on all agenda items
  - Standing Community Engagement or Tribal Advisory Committee
  - Increase the input of Tribal Consultation activities into the Council process
  - Council travel to rural communities for Council meetings and visits
  - Continuation and ongoing improvement of current outreach practices to foster two-way engagement
  - Taking steps towards Co-Production of Knowledge
  - Increased capacity at AFSC in the non-economic social sciences, particularly as regards expertise working with Alaska Native communities and their knowledge
  - Increased Indigenous inclusion on Council advisory and working bodies
- Increased uptake of broader climate change knowledge base not, or not fully, integrated into the Council process through additional steps not indicated above in other bullets, e.g., through exploring collaborations, partnerships and co-production (also see Section 2 for near-term steps to advance climate integrated advice)
- Conduct an analysis of Council documents as outlined above to explore whether and how the climate-relevant information from a variety of 'other' knowledge bases are currently making their way into the Council process in order to facilitate a gap analysis and recommendations for improvement, as necessary

## Addendum 2: Excerpts from SSC February 2023 Workshop Report

The following is an excerpt from the final section of the workshop report, focusing on key recommendations and next steps.

### Key science and management recommendations (for science community and the Council)

	Science	Management
<b>Local (NBS &amp; Chukchi)</b>	<ul style="list-style-type: none"> <li>● Develop a monitoring program focused on understanding process changes in the NBS that inform current understanding of carrying capacity and expectations for future commercial fisheries.</li> <li>● Develop recommendations and secure additional funding for a periodic assessment of the southern Chukchi Sea ecosystem.</li> <li>● Improve overall science coordination in the region.</li> </ul>	<ul style="list-style-type: none"> <li>● Improve engagement with tribes and communities.</li> <li>● Consider mechanisms for incorporating the full spatial distribution of transboundary stocks into management.</li> </ul>
<b>‘Global’</b>	<ul style="list-style-type: none"> <li>● Re-assess the time periods that are currently used to define the productivity of crab and groundfish stocks.</li> <li>● Consider alternatives to current HCRs based on available analyses.</li> <li>● Increase dialogue between SSC and Council on issues that straddle the science-policy interface.</li> <li>● Identify which stocks are likely to do better or worse in a changing environment to help fishers build the best fishing portfolio.</li> </ul>	<ul style="list-style-type: none"> <li>● Increase dialogue between SSC and Council on issues that straddle the science-policy interface.</li> <li>● Renewed discussion on reference period determinations in light of increased periodicity of extreme events.</li> <li>● Improve the use of approaches that explicitly consider risks</li> </ul>

## Recommendations for next steps

- Consider outcomes from this workshop as the Council identifies research priorities for 2023-24.
- Incorporate the recommendations from this workshop into the development of the planned Programmatic Environmental Impact Statement process to better address the impacts of climate change on the marine ecosystems and on the people dependent on those ecosystems.
- Produce a brief, plain language summary report from this workshop as a useful outreach tool to invite further input and engagement, and to learn more about local needs and concerns.
- Form a sub-group of Council and SSC members (2-3 members each) to develop a roadmap that builds a bridge from assessment and climate science to adaptive management under climate change. The roadmap should include the products and recommendations from the Climate Change Task Force, the LKTK Task Force, and the national Council Coordination Committee - Scientific Coordination Subcommittee (SCS) meeting held in August 2022. The roadmap would recommend a direction and timeline for moving forward, recognizing the urgency for action as the North Pacific expects continued change in the near future. Questions for the subgroup to consider include:
  - Is the use of more dynamic reference points a viable alternative to current management practices, given the current Council processes under the Magnuson Stevens Act? This includes consideration of when to change the time periods over which reference points are calculated for crab and groundfish stocks.
  - Could and should social or economic objectives (e.g. Maximum Economic Yield, biomass thresholds, catch stability) be incorporated into adaptive management approaches for some stocks?
  - As stock footprints expand and shift in distribution, are regional allocations of catches in the EBS and NBS appropriate and could they be dynamic enough to address temporal variability?
  - Can risk considerations be improved upon in the context of both stock assessments (ABC considerations) and management (TAC considerations).
- Plan for a February 2024 follow-up workshop that focuses on discrete aspects of the key recommendations for science and management raised at this workshop to advise the Council. In addition to the outcomes from the sub-group roadmap, the SSC may consider the following questions that emerged during this workshop:
  - What temporal and spatial scales of information are needed to track non-stationary production, shifting boundaries, and changing species interactions?
  - What baseline information is required ahead of future extreme events to be better positioned to manage fishery responses?
  - How can we better identify ecosystem bottlenecks influencing production of key commercial fish species so the limited resources are effectively focused.
  - Can overall as well as benthic vs. pelagic carrying capacity be reasonably assessed and tracked to inform optimum yields in an environment changing as quickly as the NBS?