

Executive Summary

Fisheries management in Alaska has long been recognized as being particularly responsive to ecosystem concerns. The North Pacific Fishery Management Council (Council) has practiced an ecosystem approach for many years. The Alaska Fisheries Science Center (AFSC) has worked closely with the management process (i.e., stock assessment authors, Plan Teams, SSC and Council members) since the early 1980s to incorporate ecosystem science into decision-making. The Council has adopted harvest conservation measures, protection measures for ecosystem resources, and has adopted ecosystem-based policy goals for its groundfish Fishery Management Plans (FMPs). Nonetheless, while these strong relationships between management and ecosystem science in Alaska are recognized worldwide as exemplary, they often remain informal.

At the same time, the Bering Sea is experiencing significant environmental changes. With the loss of sea ice, the ecosystem is undergoing shifts in species distribution that affect fisheries and fishing communities, and which may have sustainability implications for all marine species. Understanding connections among species, humans, and the physical environment within the Bering Sea and throughout surrounding areas is increasingly important. Further, designing, testing and transparently implementing environmentally-robust management systems that account for a full range of ecological and human interactions will be critical to ensuring long-term resource sustainability.

Accordingly, the Council is formalizing its ecosystem approach in the Bering Sea as ecosystem-based fisheries management (EBFM) through the development of this Bering Sea Fishery Ecosystem Plan (BS FEP). The Council has acknowledged that moving toward EBFM is a process and as new information or tools become available the Council responds by improving the fishery management program. The BS FEP will serve as a framework for continued incorporation of ecosystem goals and actions in regional management. Under the overarching guidance of the Council's Ecosystem Approach Statement, the BS FEP sets goals and objectives for the Bering Sea ecosystem which direct the process by which the Council should manage fisheries, monitor the ecosystem, and prioritize new research through identification of projects, called "Action Modules". This document describes how the BS FEP will function as a framework for transparently describing the Council's current procedures and best practices for EBFM, and guiding Council work on ways to improve that process. The BS FEP also prioritizes the exchange of information through two-way communication with stakeholders, as a means of diversifying information inputs, knowledge, and perspectives. The Council's BS FEP:

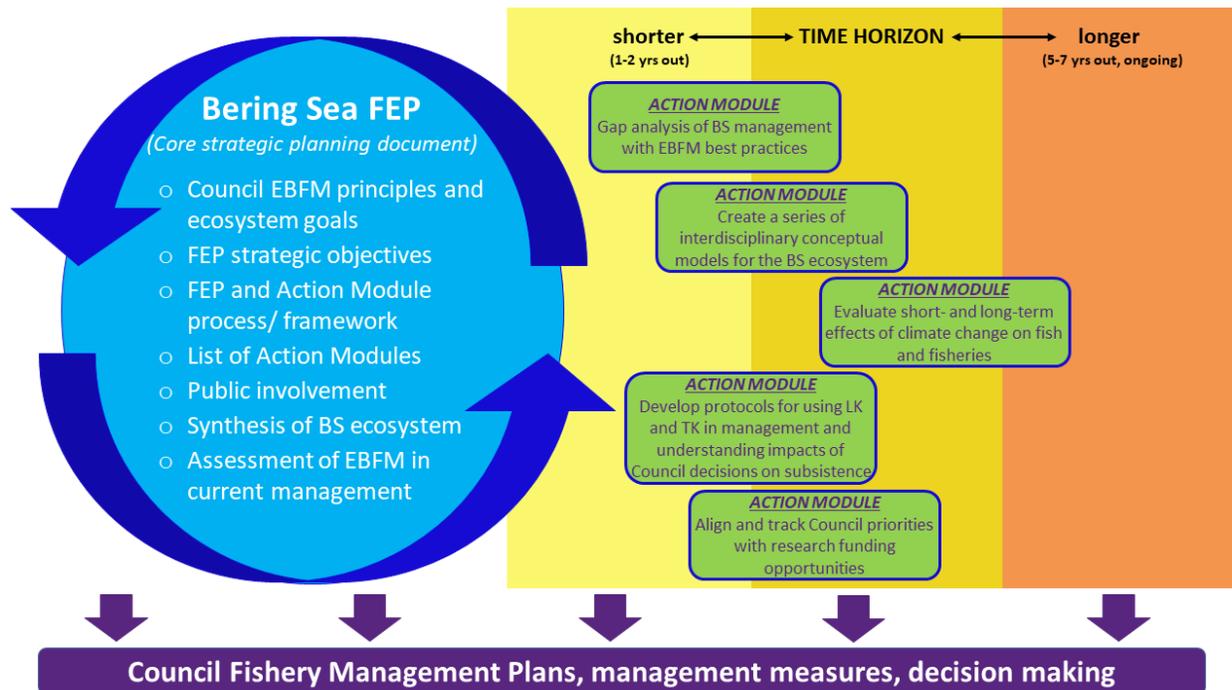
1. provides added value to existing Council documents, processes, and decision-making;
2. delivers targeted, evolving ecosystem evaluations but does not overwhelm the audience with a compilation of ecosystem information; and,
3. facilitates measurable improvements to Bering Sea fishery management but does not directly authorize management actions (action-informing rather than action-forcing).

How will the Bering Sea Fishery Ecosystem Plan function?

This BS FEP uses and improves upon the Council's existing open and transparent process of public involvement in decision making. This is a strategic planning document that describes a process for addressing management concerns about the Council's expressed ecosystem policy and goals and is flexible to new information and changing resources. The BS FEP is structured with a Core BS FEP identifying a series of strategic components for the BS FEP (Figure ES-1). **The Core BS FEP identifies goals for the Bering Sea ecosystem and strategic objectives for the BS FEP to achieve those goals.** There are sections describing the purpose and structure of the BS FEP and assessing the Council's current management approach to establish a baseline for ecosystem-based management elements. A close connection is intended between the Core BS FEP and the annual Ecosystem Status Report for the Bering Sea (also known as the Ecosystem Considerations Report), which will be the annual vehicle for the

Council to monitor the status of the Bering Sea ecosystem compared to BS FEP objectives. The BS FEP includes information about public involvement and methods for the Council to bring information into management from those people closest to the resource, including through local knowledge and traditional knowledge (LK and TK).¹

Figure ES-1 Illustration of the relationship between the Core Bering Sea Fishery Ecosystem Plan and example Action Modules



The intent is to form a structured BS FEP framework to regularly evaluate and initiate Action Modules to address Council priorities. **Action Modules are specific projects that can be initiated within the framework of the BS FEP but are analyses or research efforts with their own scope, tasking, and timeline.** The Action Modules are linked directly to the BS FEP’s strategic objectives, and the purpose and scope of each task, as well as a description of how the outcome will be used in management, is defined in the Core BS FEP. Action Modules should be designed to focus on a specific Council need, and to ensure a strong connection between BS FEP work and its utility in the Council process.

Figure ES-2 provides an overview of how an Action Module moves through the Council BS FEP process. While ideas for an Action Module could originate with the BS FEP Team, the Council, its advisory bodies, or with the public, only the Council can approve an Action Module to be included in the BS FEP. From the approved list, the Council also has the flexibility to decide when to initiate work on each Action Module, depending on the Council’s interest, needs, or resource constraints. By providing the list and prioritization, however, even without immediately initiating work on an Action Module, the Council is

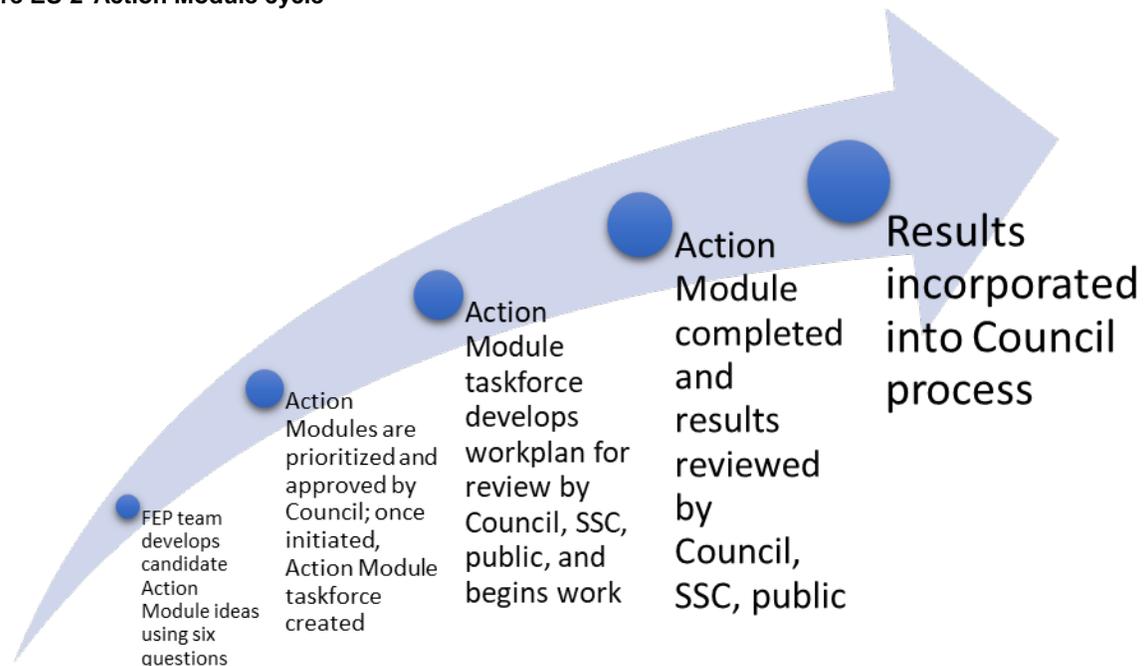
¹ Local Knowledge (LK) and Traditional Knowledge (TK) are two different types of bodies/systems of knowledge. LK generally describes knowledge of a person or group – non-Indigenous knowledge or Indigenous – that is based on observations, experiences, and other engagements with a particular environ. TK is a form of Indigenous knowledge and is a living body of knowledge which pertains to explaining and understanding the universe and living and acting within it. It is acquired and utilized by Indigenous communities and individuals in/through long-term sociocultural, spiritual and environmental observation, and is transmitted intergenerationally. A more detailed definition of TK can be found in Raymond-Yakoubian et al. (2017).

signaling the specific topics it is considering both now and into the future, which is helpful to research partners.

Once an Action Module has been initiated, the Council will designate a taskforce of staff and agency or external experts, as necessary, to develop a workplan, conduct the work, and prepare results for the Council. The workplan will include an explicit public involvement plan, and the Council and its committees (e.g., the BS FEP Team, Ecosystem Committee, Advisory Panel, Scientific and Statistical Committee) will provide input and review throughout each project. As Action Module work is completed, Action Modules will be synthesized and evaluated in aggregate by the BS FEP Team, with changes made to the Core BS FEP as appropriate. A BS FEP webpage will be developed to track the Action Modules, assessing progress that has been made in each active one, and reviewing findings of previous ones.

The Council envisions Action Modules will be an evolving part of the BS FEP that changes over time to meet novel management challenges and ecosystem pressures. As individual Action Modules are initiated by the Council and eventually completed, they will contribute to broader understandings of the Bering Sea ecosystem, EBFM actions that the Council is undertaking, and the tools available to the Council to make informed decisions.

Figure ES-2 Action Module cycle



Goals and objectives

The Council established an Ecosystem Vision Statement in 2014, which overarchingly applies to all Council management in the North Pacific. Through development of the BS FEP, the Council has identified six Ecosystem Goals, which are also universal to the Council's management across all Alaska fisheries. These are:

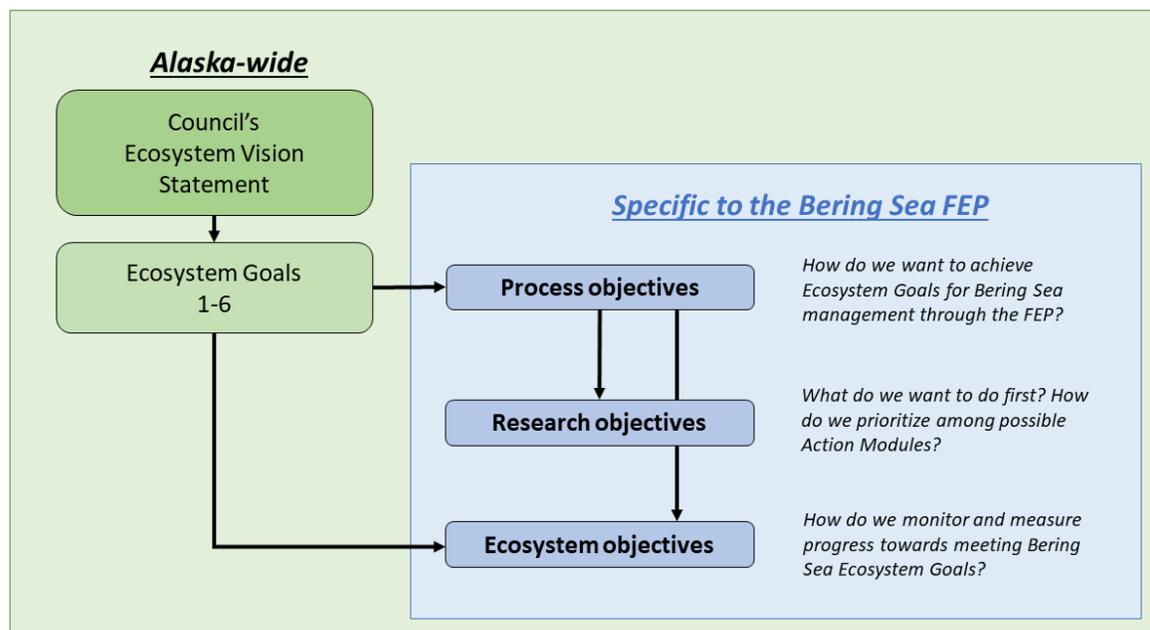
1. Maintain, rebuild, and restore fish stocks at levels sufficient to protect, maintain, and restore food web structure and function;
2. Protect, restore, and maintain the ecological processes, trophic levels, diversity, and overall productive capacity of the system;
3. Conserve habitats for fish and other wildlife;

4. Provide for subsistence, commercial, recreational, and non-consumptive uses of the marine environment;
5. Avoid irreversible or long-term adverse effects on fishery resources and the marine environment;
6. Provide a legacy of healthy ecosystems for future generations.

The Council’s main purpose with the BS FEP is to create a tool to help enable the Council to achieve the six Ecosystem Goals described above. As such, the BS FEP identifies a series of Process Objectives, which define how the Council aims to manage Bering Sea fisheries (Figure ES-3). Some Process Objectives call for monitoring ecosystem trends and performance metrics, to allow the Council to manage adaptively and responsively to changes in environmental conditions, especially associated with climate change, loss of sea ice, or ocean acidification. To help provide specific targets for monitoring the ecosystem, the BS FEP identifies a series of Ecosystem Objectives that provide specificity as to how the Ecosystem Goals should be translated in the Bering Sea ecosystem. Specific indicators will be associated with each of the Ecosystem Objectives and routinely monitored. An assessment of their status will be reported back to the Council at regular intervals, using the existing Ecosystem Status Report (or Ecosystem Considerations Report) process that is presented to the Council each December.

In addition to the Process Objectives and Ecosystem Objectives, the BS FEP also defines a series of Research Objectives that the Council will use to initiate specific actions to further the overarching Ecosystem Goals. It is expected that Research Objectives will be the most likely to change and evolve as the Council identifies information gaps and research needs, and develops Action Module projects to address objectives under the BS FEP framework (see more on Action Modules in Chapter 3).

Figure ES-3 Schematic of the relationship between the Council’s ecosystem goals and the Bering Sea Fishery Ecosystem Plan objectives.



List of Action Modules

Four example Action Modules were proposed to the Council in December 2015 when the BS FEP was initiated. These four Action Modules were selected from a longer list of potential candidates by the Ecosystem Committee, to illustrate the range of ecosystem and management objectives that could be addressed through the Action Module process. Additionally, in spring 2017, the BS FEP Team suggested, and the Ecosystem Committee concurred with, including an additional example Action Module (the fifth

bullet below). As part of its adoption of a final BS FEP, and periodically thereafter, the Council will adopt a prioritized list of Action Modules that will be included in this section and will specifically initiate action on a subset of the Action Modules to move forward as active projects.

The example Action Modules included in the BS FEP at this time are as follows:

- Gap analysis of Bering Sea management with EBFM best practices
- Interdisciplinary conceptual models for the Bering Sea ecosystem
- Evaluate short- and long-term effects of climate change on fish and fisheries, and develop management considerations
- Develop protocols for using LK and TK in management and understanding impacts of Council decisions on subsistence use
- Align and track Council priorities with research funding opportunities

Public involvement

The Council recognizes that Bering Sea fisheries are important to coastal communities throughout the Bering Sea region, as well as to communities of people who, while they may reside elsewhere, come to the region to work or are significantly invested in the region (e.g., seasonal fishermen, offshore processors). One intent of the BS FEP is to engage stakeholders and the public in the process of implementing EBFM, so the BS FEP is continually informed by the broadest realm of perspectives and increases public connection with the Bering Sea marine ecosystem. An exchange of information through two-way communication with stakeholders has been highlighted as an important requirement for diversifying information inputs, knowledge, and perspectives (NPFMC 2018). Building shared knowledge can strengthen the Council and stakeholders' understandings of ecosystem function and change, provide insight to anticipate how stakeholders will respond, and develop broad support for fishery management science and decision-making. The BS FEP offers a framework for strengthening trust, transparency, and a sense of shared investment among managers, scientists, and stakeholders.

While the Council's existing framework provides for public outreach and involvement in all Council groups and processes, there is desire to improve that communication and consultation over time. There are three distinct phases of public involvement as relates to the BS FEP, and each phase may draw upon different tools for outreach or engagement.

Initial development of the Core BS FEP: The Council conducted extensive scoping when deciding whether to proceed with developing a BS FEP. The public is encouraged to provide feedback about whether this draft of the Core BS FEP is meeting the needs identified in scoping, information gaps that should be addressed through Action Modules, or other input that pertains to the Council's action to adopt the BS FEP.

BS FEP Action Modules: A public involvement plan will be created for each Action Module, including explicit steps for supporting and strengthening two-way communication along with all other forms of involvement (e.g., outreach, engagement, consultation, etc.).

Ongoing BS FEP EBFM process: Once the BS FEP framework is adopted by the Council, implementation will continue through the development of Action Modules and the monitoring of the Bering Sea ecosystem through the annual Ecosystem Status Report (also known as the Ecosystem Considerations Report). The Council has highlighted two-way communication as critical to enhancing and providing value to the decisions that the Council makes about managing fisheries in the Bering Sea ecosystem, and it will be important to consider how best to provide appropriate forums for such

information exchange, and how it should be synthesized and assessed in the Council decision-making process.

Other components of the Bering Sea Fishery Ecosystem Plan

The BS FEP includes chapters that provide a high level synthesis of connections and key components of the Bering Sea ecosystem (Chapter 6) and an assessment of the Council's current ecosystem-based fishery management practice (Chapter 7). There is a placeholder in Chapter 8 for a forthcoming ecological risk analysis. Considering risks and tradeoffs is one of the purposes of the BS FEP (there are ongoing studies at the Alaska Fisheries Science Center that will be synthesized in this chapter once the results are available).

Changes to the Bering Sea Fishery Ecosystem Plan since the September 2018 Draft

The Council, SSC, Advisory Panel, and Ecosystem Committee reviewed an initial draft of the BS FEP at the October 2018 Council meeting. The following changes have been made to the document to address feedback received at the meeting:

- Revisions to text and figures in Chapter 3: How the BS FEP will function, especially the description of the Core BS FEP (section 3.1), Action Modules (section 3.2), the role of the BS FEP Team (section 3.3), and minor clarifications to sections 3.4 and 3.5. Clarifications emphasize that the BS FEP is a strategic planning document, and the BS FEP Team will work collaboratively to provide strategic guidance and avoid duplication with existing Council groups and processes.
- Revisions to Chapter 6, especially the description of ecological and oceanographic characteristics in section 6.2, communities in section 6.3.1, and additional information on cooperative management in section 6.3.2.
- Subsistence maps removed from section 6.3.3 and appendix.
- Minor clarifications to Action Module descriptions in Chapter 4 and Appendix A.
- Additional text added to Appendix B, suggestions from public comment for specific ways to engage with the public
- Minor edits throughout for clarity.

What are the next steps if the Council adopts the FEP at this meeting?

The BS FEP is intended to be a living framework for the EBFM process rather than a static document. This draft is presented to the Council as a document for ease of review. This is not a typical Council action, because by adopting the BS FEP, the Council is not taking a "final" action, but rather is beginning the process of using the BS FEP framework and its Action Modules to focus the Council's existing policy of and progress with ecosystem-based fishery management.

The following are actions that the Council may choose to take at this meeting:

1. **Adopt the BS FEP.** If the Council adopts the BS FEP, it is endorsing the expression of EBFM in the North Pacific as characterized in the document, as well as the ecosystem goals and Bering Sea strategic objectives that are included in the draft, and the articulation of how the BS FEP framework concept is supposed to work. Adopting the BS FEP does not have the force of law; there are no implementing regulations associated with it. It is a Council policy document, and especially because it is set up as a living document, the Council can modify, adapt, and update any section of the document at any time.

- If the Council adopts the BS FEP, staff will make any additional changes and revisions based on feedback from the December meeting, and create a final document. Staff will also transfer the content of the Core BS FEP to a webpage that will contain the strategic information captured in this draft BS FEP, and from which progress on Action Modules can be tracked and made available to the public
 - Unless the Council indicates otherwise, staff will assume the existing BS FEP Team will transition from developing the BS FEP to an ongoing BS FEP Team role. We would aim to schedule a BS FEP Team meeting in the early part of 2019, and report back to the Council perhaps in April. The BS FEP Team tasks are described in section 3.3.
2. **Decide whether to approve and prioritize all or some of the five Action Modules** included in the Draft BS FEP. Alternatively, ask the BS FEP Team to bring back these and/or other Action Module ideas following their next BS FEP Team meeting, for Council review.
- If the Council approves the existing Action Modules, the Council could then decide whether to initiate some or all the Action Modules for active work. Note that because of the lengthy time the BS FEP has been under development, progress has begun on almost all the five Action Modules that are described in the Draft, which would not be the normal case for future proposed Action Modules.
 - Staff will update the BS FEP (including Chapter 4) to reflect the Council's approved list of Action Modules, once the Council has taken action.
 - For any Action Modules the Council initiates, the next step would be for staff, consulting with the BS FEP Team, to bring back workplans and Action Module staffing recommendations for the Council, Ecosystem Committee, SSC, and Advisory Panel to review. Initial drafts of workplans have been outlined in Appendix A of the draft BS FEP, but these would be dusted off and fully fleshed out for Council review at a subsequent meeting.