

Bering Sea Fishery Ecosystem Plan

DRAFT

Bering Sea Fishery Ecosystem Plan

October 2018



North Pacific
Fishery Management Council
September 2018



Bering Sea Fishery Ecosystem Plan Team

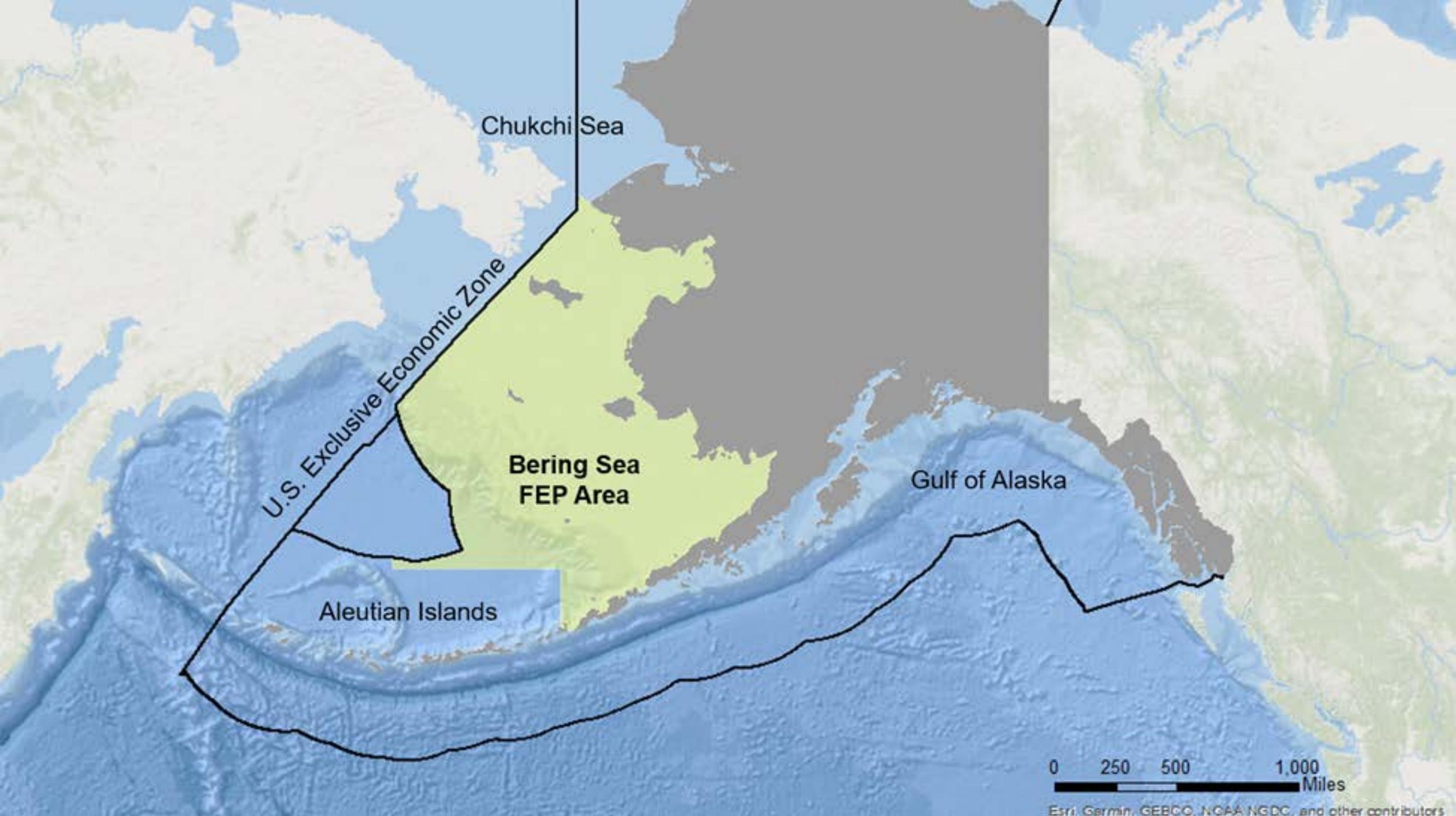
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Outline for presentation

- What is a Fishery Ecosystem Plan (FEP)?
- Why did the Council develop a FEP for the Bering Sea?
- Structure of the Bering Sea Fishery Ecosystem Plan
 - What is the Core FEP and what are the Action Modules?
 - How is the Fishery Ecosystem Plan organized?
 - Draft Action Modules
 - Public involvement
 - Other content in the Fishery Ecosystem Plan
- How will the Fishery Ecosystem Plan change the Council process?
- What is the Council's action here today and at final action?



Chukchi Sea

U.S. Exclusive Economic Zone

**Bering Sea
FEP Area**

Aleutian Islands

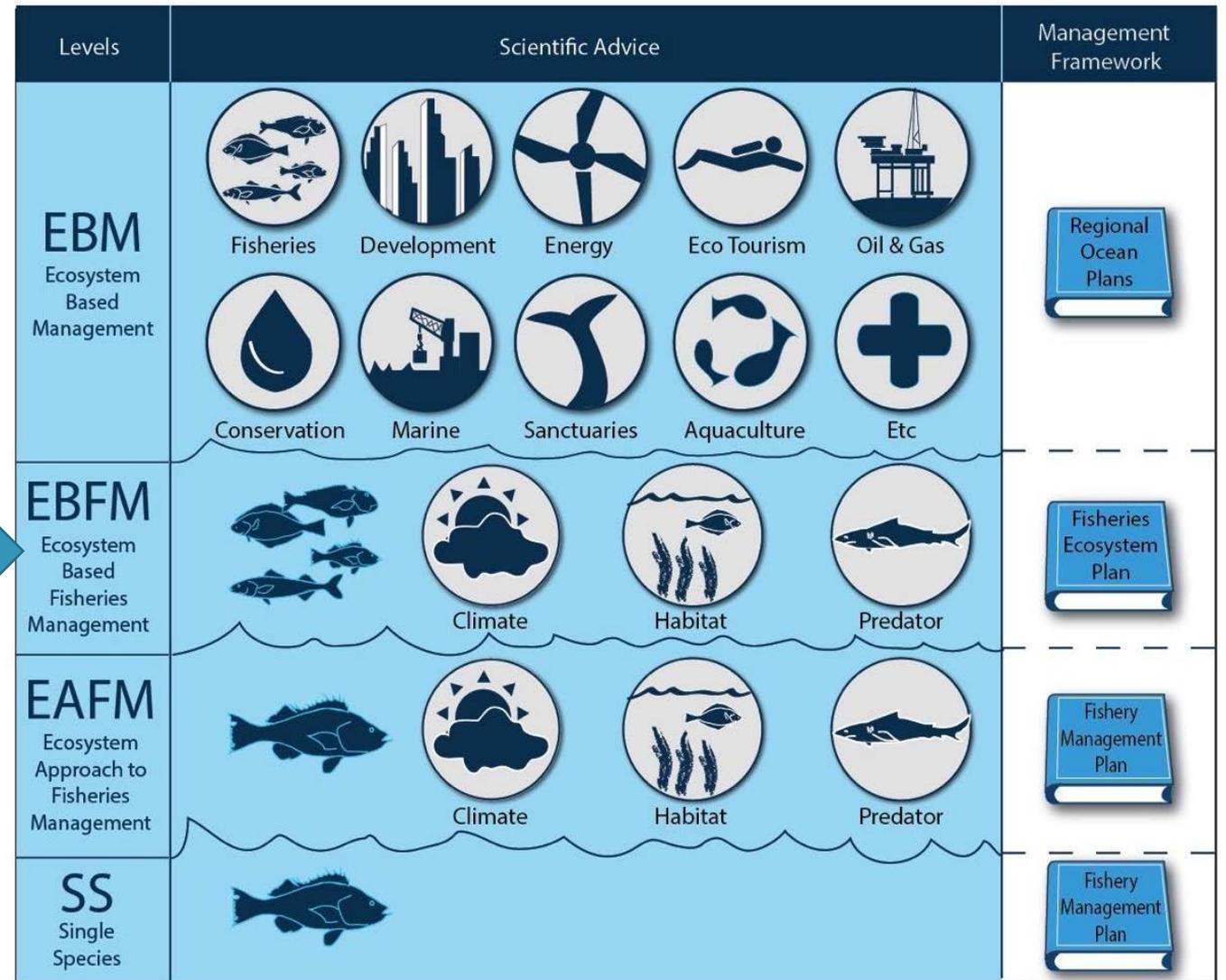
Gulf of Alaska

0 250 500 1,000
Miles

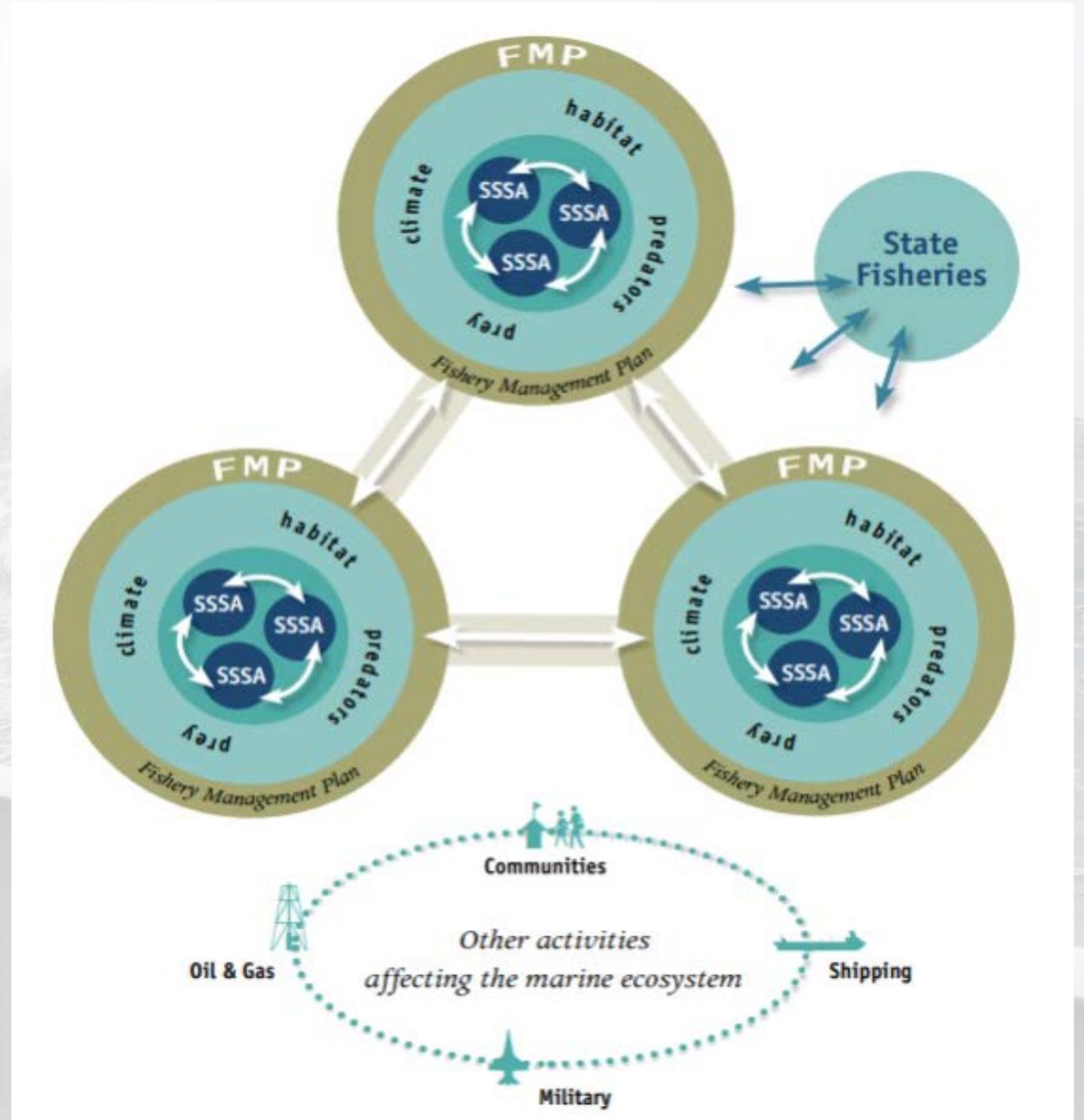
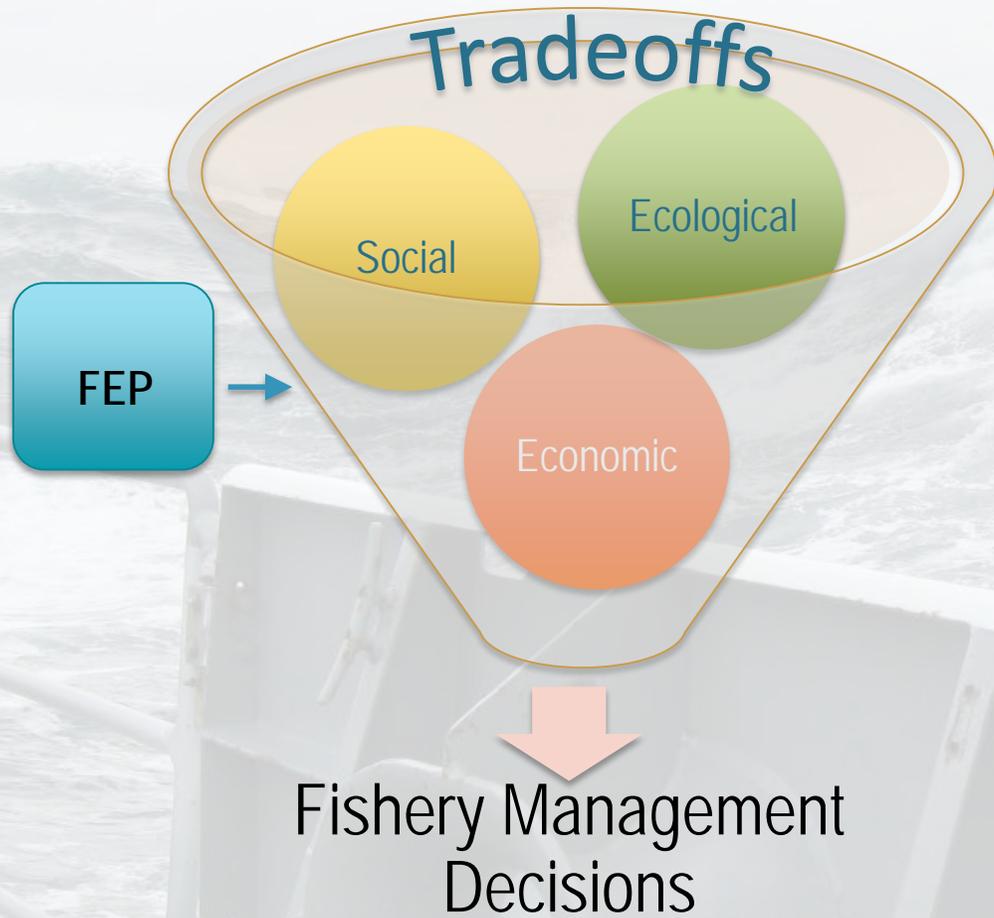
Esri, Garmin, GEBCO, NOAA, NGDC, and other contributors

What is a FEP?

- FEPs are a method for putting ecosystem-based fishery management (EBFM) into action
- EBFM considers interactions among ecological, economic, social and cultural components of a system



What is a FEP?



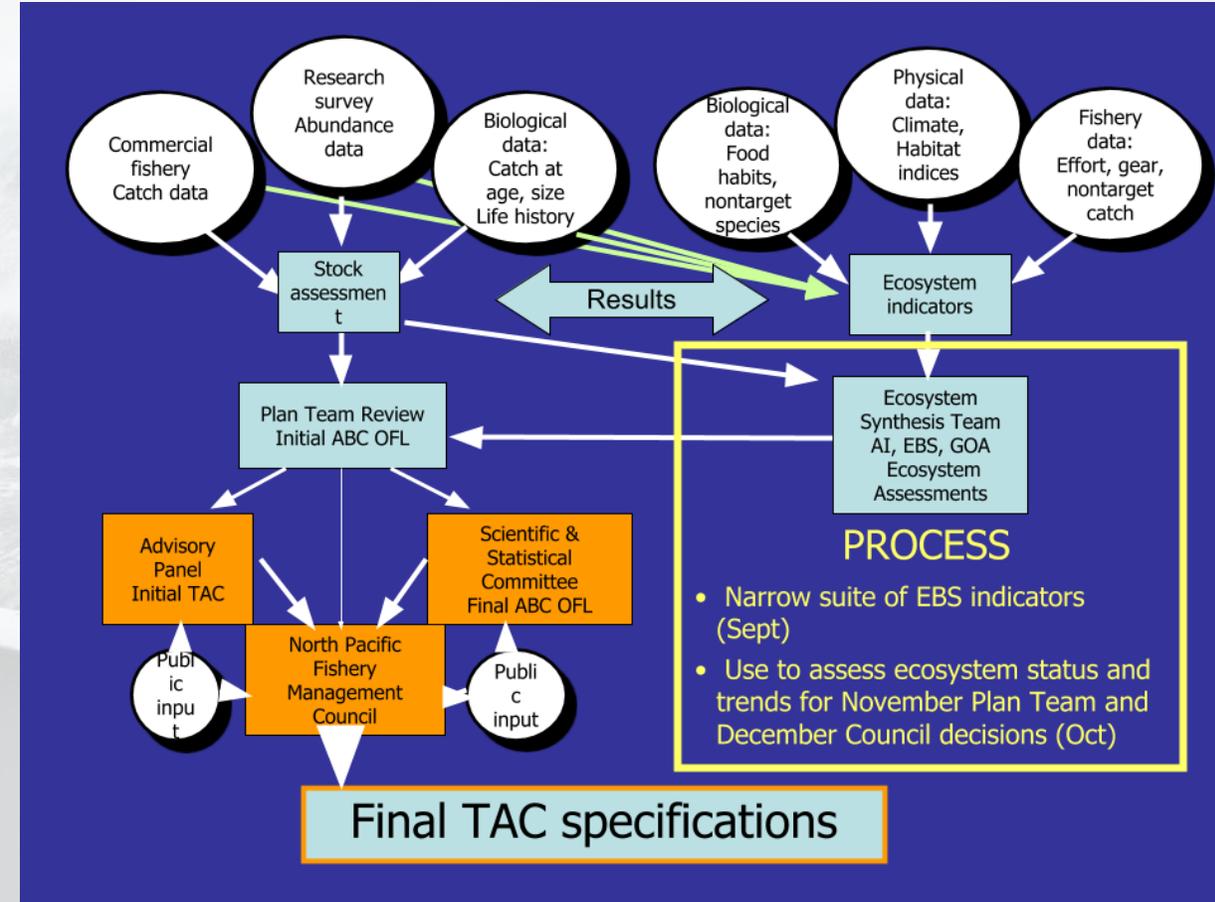
What is a FEP?



From Lenfest fishery ecosystem task force

Why did the Council develop a FEP for the Bering Sea?

- NPFMC has a 30+ year history of EBFM implementation and EBFM management measures
 - Ecosystem OY, forage fish ban, Ecosystem Committee, Ecosystem Status Reports, Ecosystem Considerations for individual stocks
- “Organically-developed” best practices and procedures that evolve over time
 - e.g. the request for an October briefing from the ESR team when unusual environmental signals are evident).
- What would an FEP add?



Why did the Council develop a FEP for the Bering Sea?

Council White Paper (December 2015) based on public scoping:

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

Why did the Council develop a FEP for the Bering Sea?

- Assess Council management with respect to **ecosystem-based fishery management best practices**, and identify areas of success and gaps indicating areas for improvement on a regular basis
- Identify **connected Bering Sea ecosystem components**, and their importance for specific management questions
- Serve as a **communication tool** for ecosystem science and Council policy
- Create a **transparent public process** for the Council to identify ecosystem values and management responses
- Provide a **framework for strategic planning** that would guide and prioritize research, modeling, and survey needs
- Provide a **framework for considering policy options and associated opportunities, risks, and tradeoffs** affecting FMP species and the broader Bering Sea ecosystem (e.g., evaluation of management tradeoffs among FMPs, fisheries, or with other activities)
- Build **resiliency of Council management strategies**, and options for responding to changing circumstances (e.g., climate change-driven changes to fish distribution and abundance, changes in shipping patterns, etc.)

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The FEP sets up a *living process*

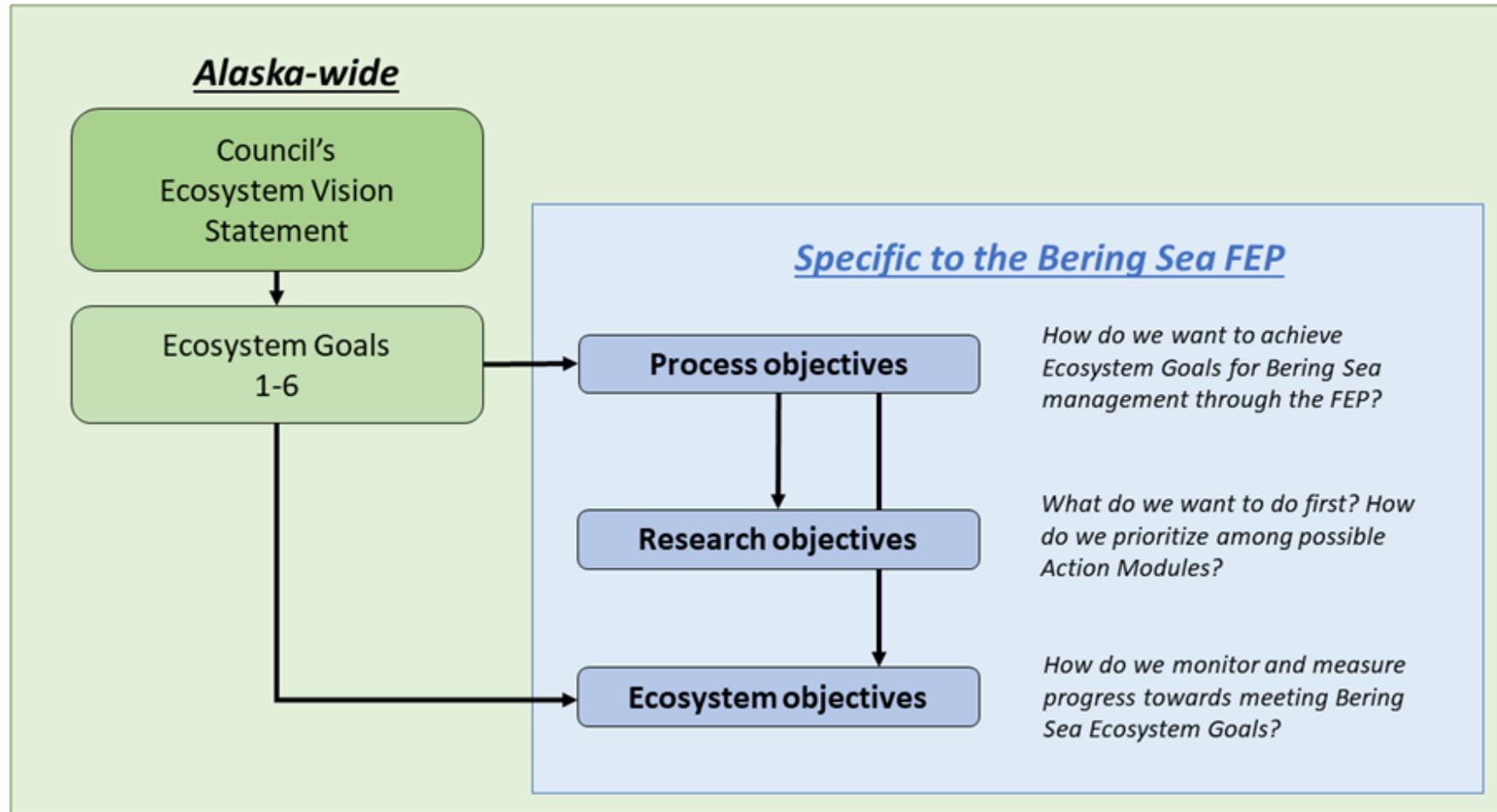
- Aleutians FEP described the ecosystem and associated risks, but did not set up an ongoing process.
- **Primary method:** Standing FEP science review team (provides strategic ecosystem-based science for existing Plan Teams and Council Committees). **NOT a parallel track to existing Plan Teams.**
- Promotes and coordinates **synthesis** of ecosystem information.
- Reviews/recommends **strategic activities** (Ecosystem goals and objectives, indicators, thresholds, “OK-ness”) through **Action Modules**.
- Provides **open and transparent processes** for incorporating ecosystem-based management.
- **Tracks results** through success indicators and metrics.

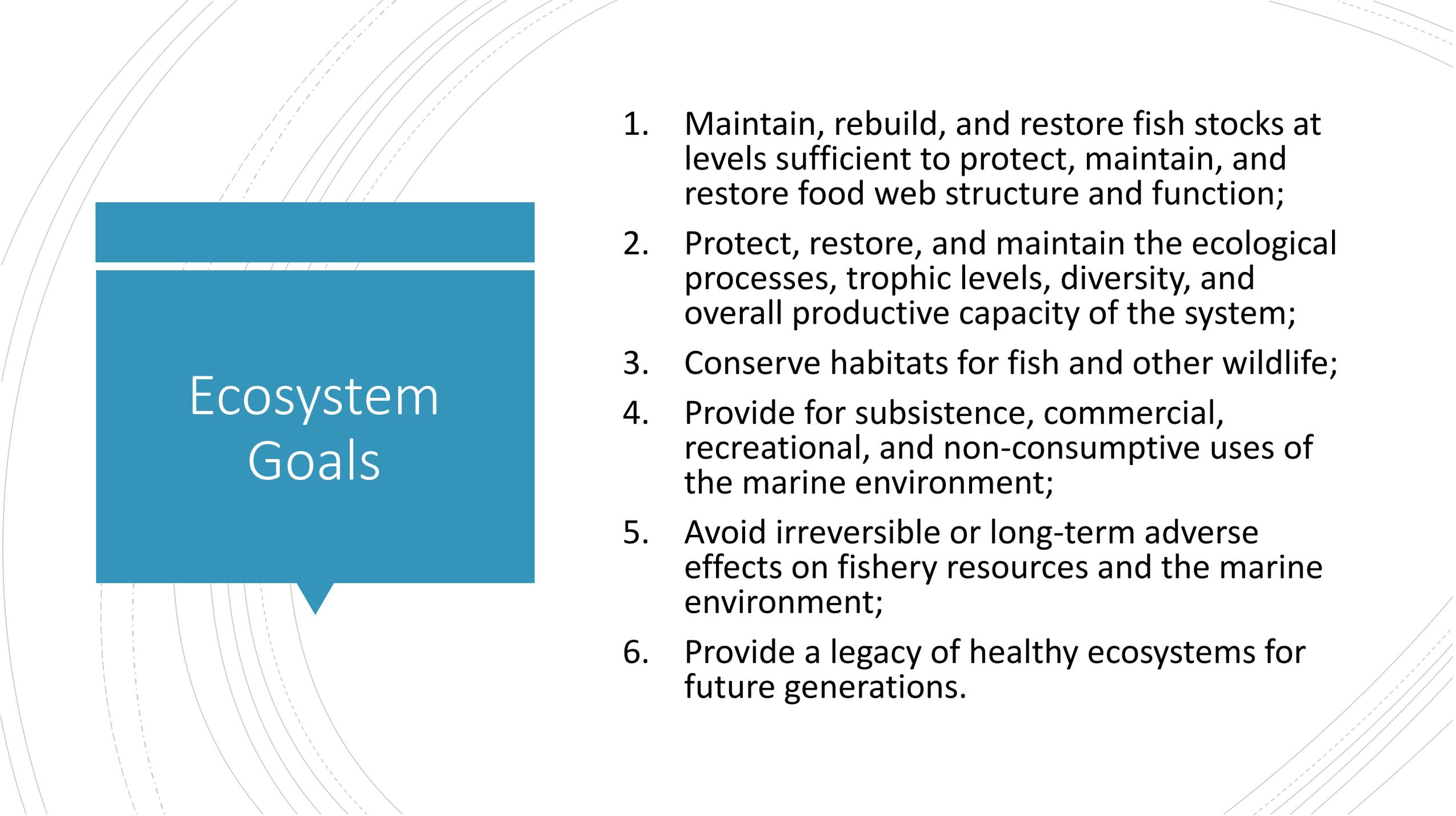
FEP explicitly includes the human dimension

- Core FEP aims to define LK and TK clearly, and work towards formalizing their use and review alongside natural and social science

Local Knowledge	Traditional Knowledge
<ul style="list-style-type: none">• Close environmental observations• Place-based• Empirical• Pragmatic• Often inter-generational	<ul style="list-style-type: none">• A living body of knowledge• Acquired through long-term sociocultural, spiritual, and environmental engagement• Defines human – animal reciprocal relationships• Defines human – human kinship and reciprocity• Embodies rules about right conduct that intertwine the pragmatic and spiritual• Transmitted inter-generationally through oral history and ritual• Rooted in time and place, while having wide applicability• Rooted in tradition, while adaptable and dynamic

Goals and objectives





Ecosystem Goals

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.

Three types of objectives

Process objectives

Council actions to improve EBFM in the Bering Sea

p 21

Research objectives

Ideas of how to fulfill the process objectives; link directly to Action Modules

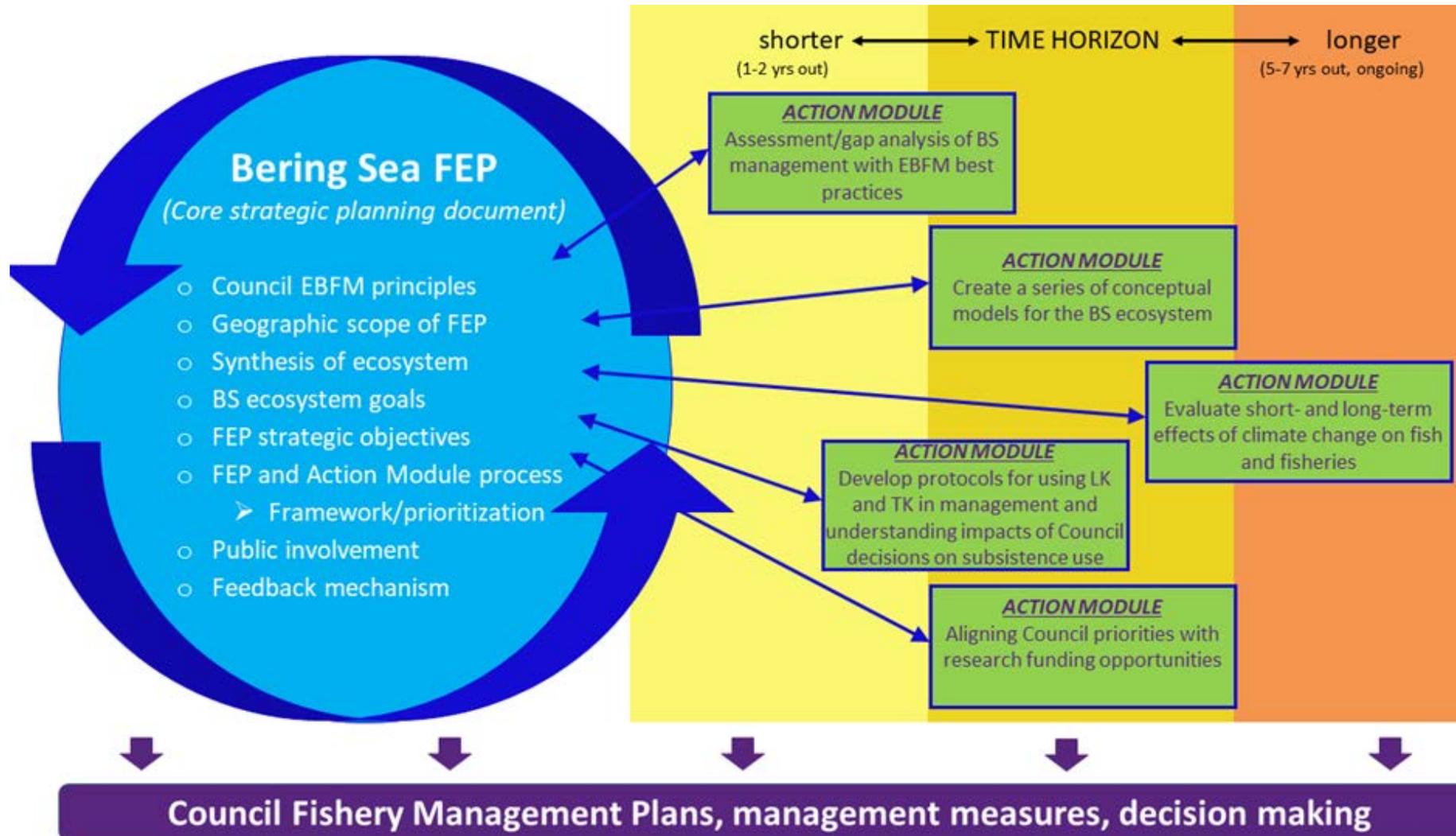
p 21-22

Ecosystem objectives

Bridge between ecosystem goals and ecosystem indicators for monitoring

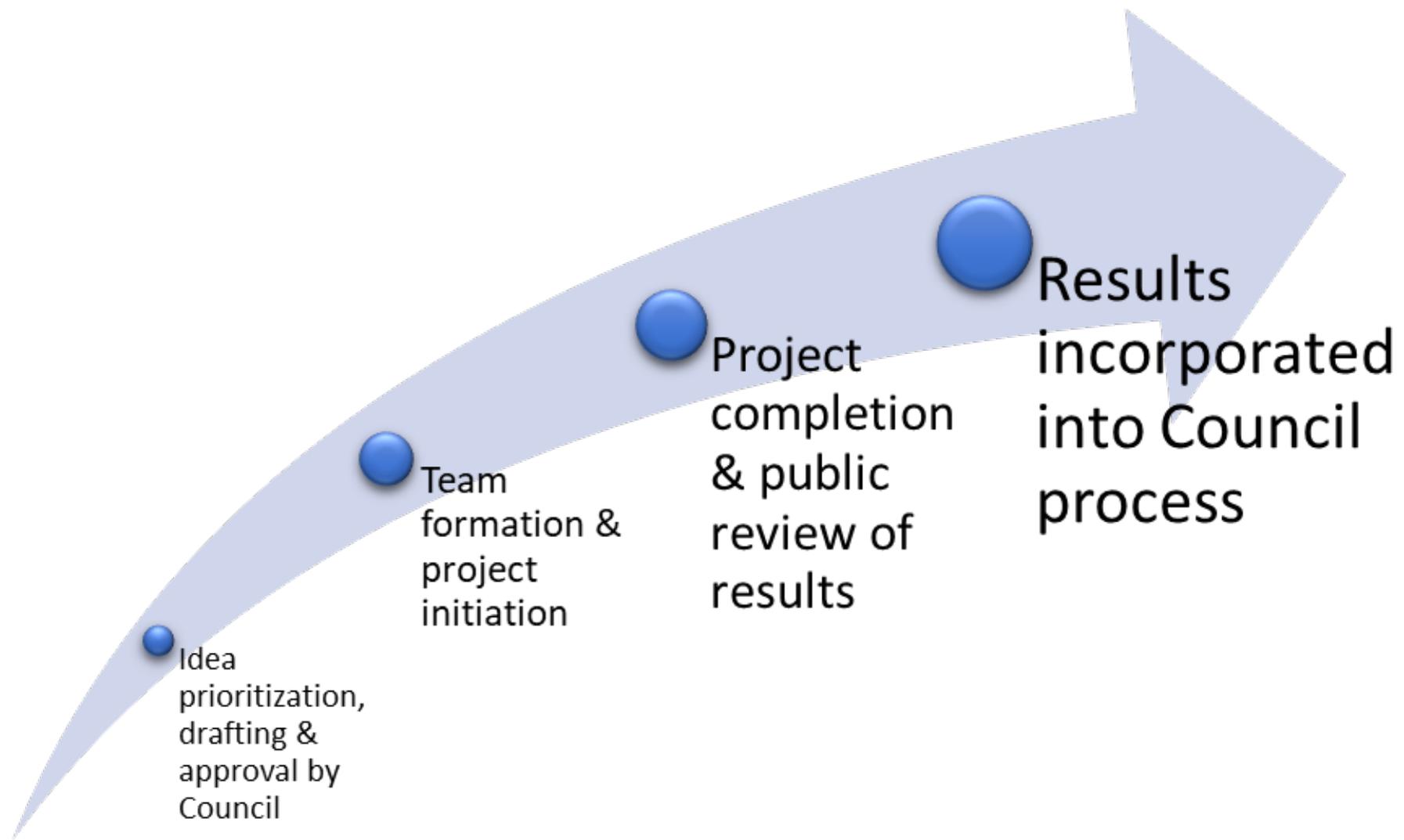
p 22-23

Structure of the Bering Sea Fishery Ecosystem Plan p 25



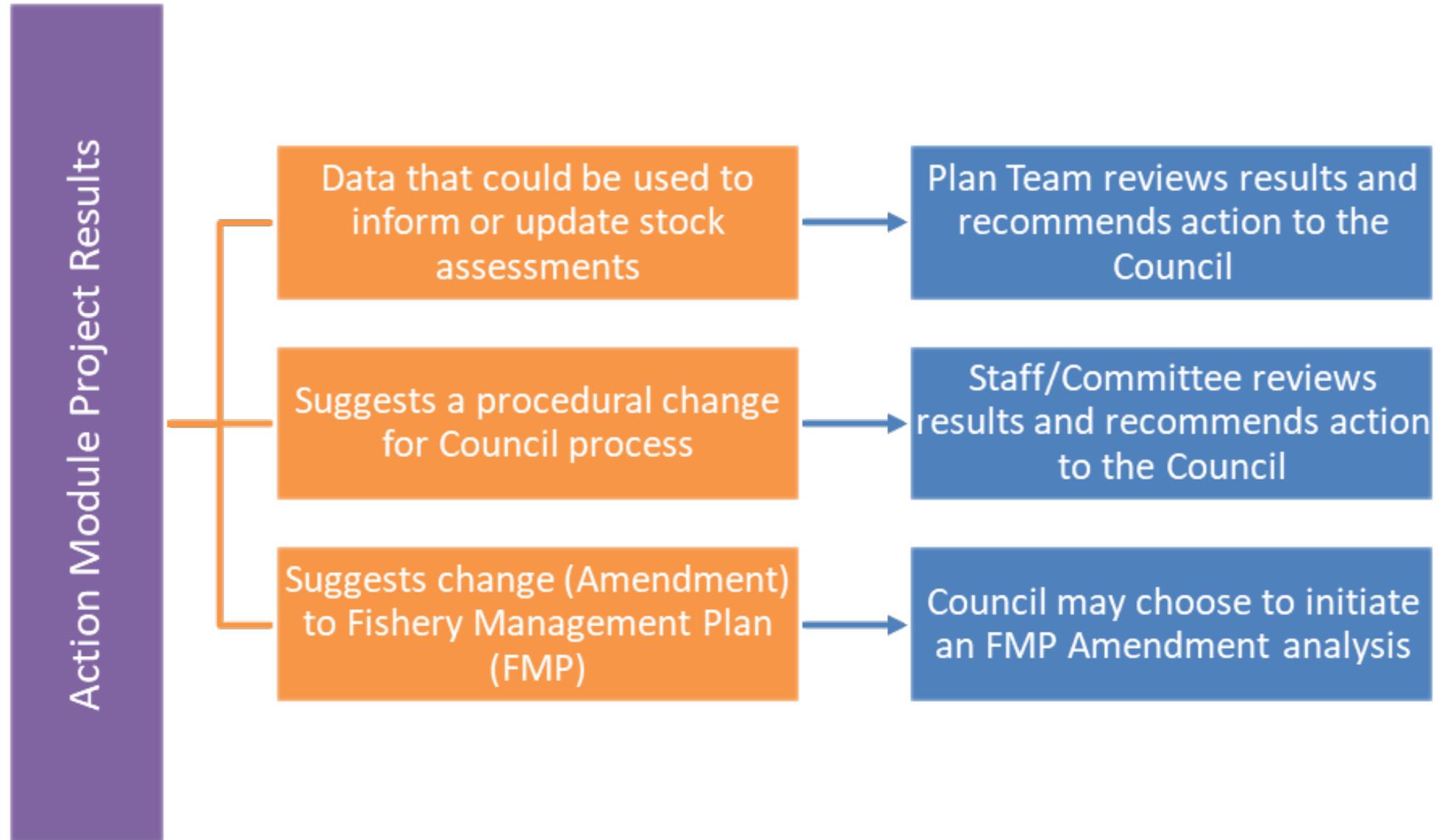
Core FEP and Action modules *p 25-30*

- Core FEP
 - Contains strategic components of FEP
 - Identifies goals and objectives
 - Describes how FEP works as a framework process
- Action modules
 - Specific analyses or research efforts approved by the Council as valuable
 - Council will initiate individual modules when resources allow
 - Each has its own scope, tasking, timeline
 - Directly linked to FEP objectives
 - Designed so that outcomes will be useful to the Council decision process



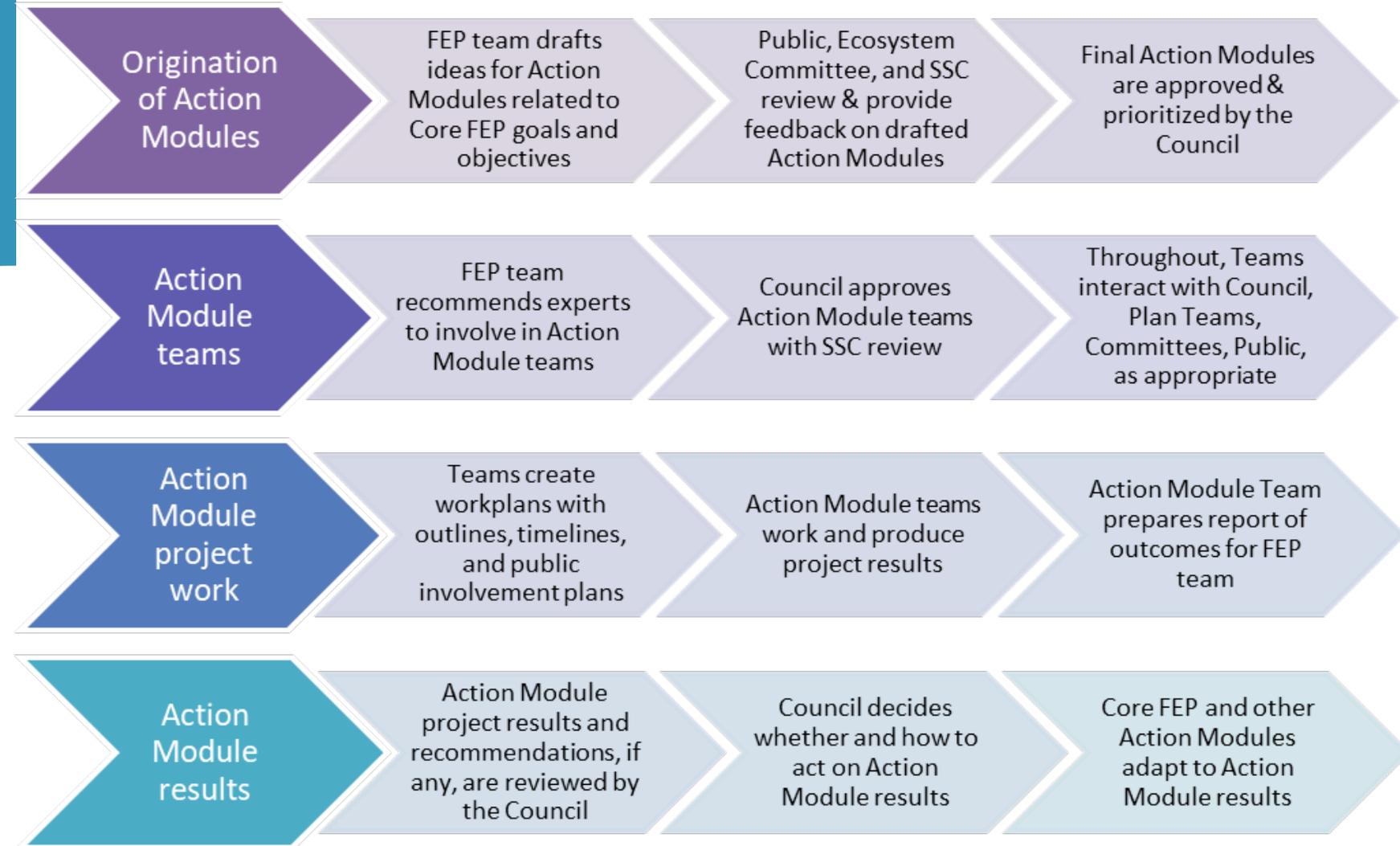
Life cycle of an action module

Elements of Action modules, and how used p 27



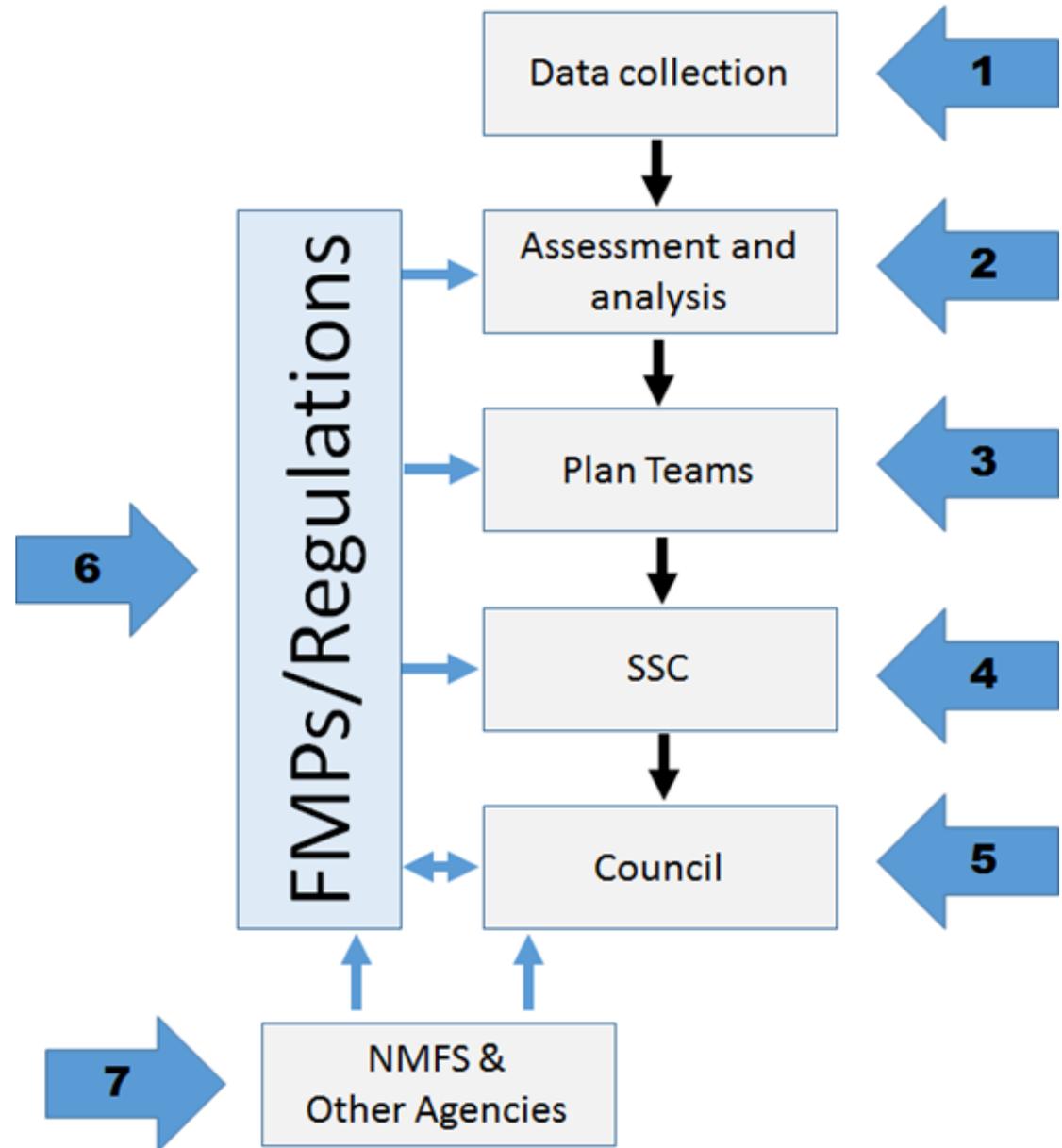
Action module feedback cycle

p 28



Potential pathways or onramps for FEP information to enter into Council process

pp 33-35

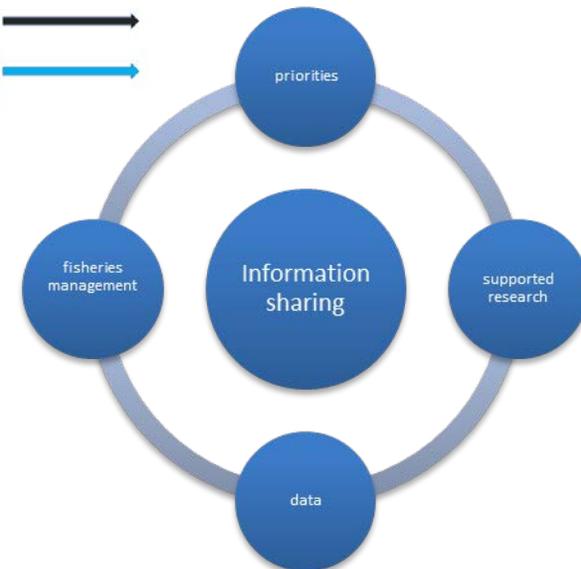
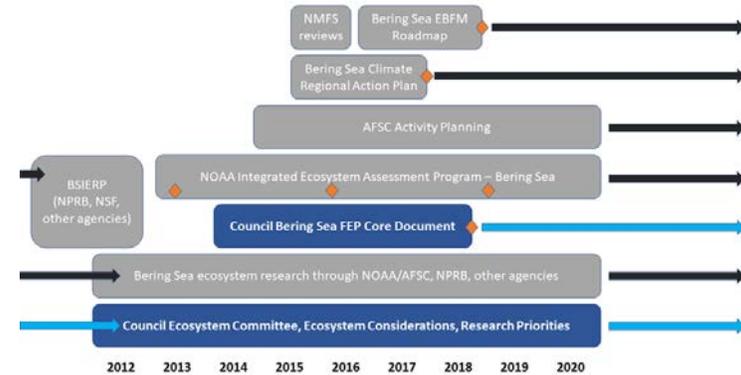


How will the FEP change the Council process?

- FEP intended to build on and utilize existing Council groups and processes
 - Council, SSC, Ecosystem Committee, Plan Teams (including Social Science Planning Team), Community Engagement Committee
 - Ecosystem Status Report, Research priorities
- Role of Bering Sea FEP team?
 - Review the annual Ecosystem Status Report. Strategic review of ecosystem products, red flags, with respect to ecosystem objectives.
 - Review ongoing Action Module work, consider how modules inform the FEP
 - Input for prioritization of ecosystem research topics
 - Provide the Council with periodic overviews of ecosystem research
 - Track how and what ecosystem products are used in the Council process

Partnerships with agencies

pp 36-43



Draft Action Modules in the FEP

*recommended by the
Ecosystem Committee*

Chapter 4, pp 44-49
Study plans, Appendix B

EBFM gap analysis

Conceptual models

Climate change

Traditional Knowledge/Subsistence

Research

Draft
**Bering Sea
Fishery Ecosystem Plan**

Action Module 1.

Assessment/gap analysis of Bering Sea management with EBFM best practices

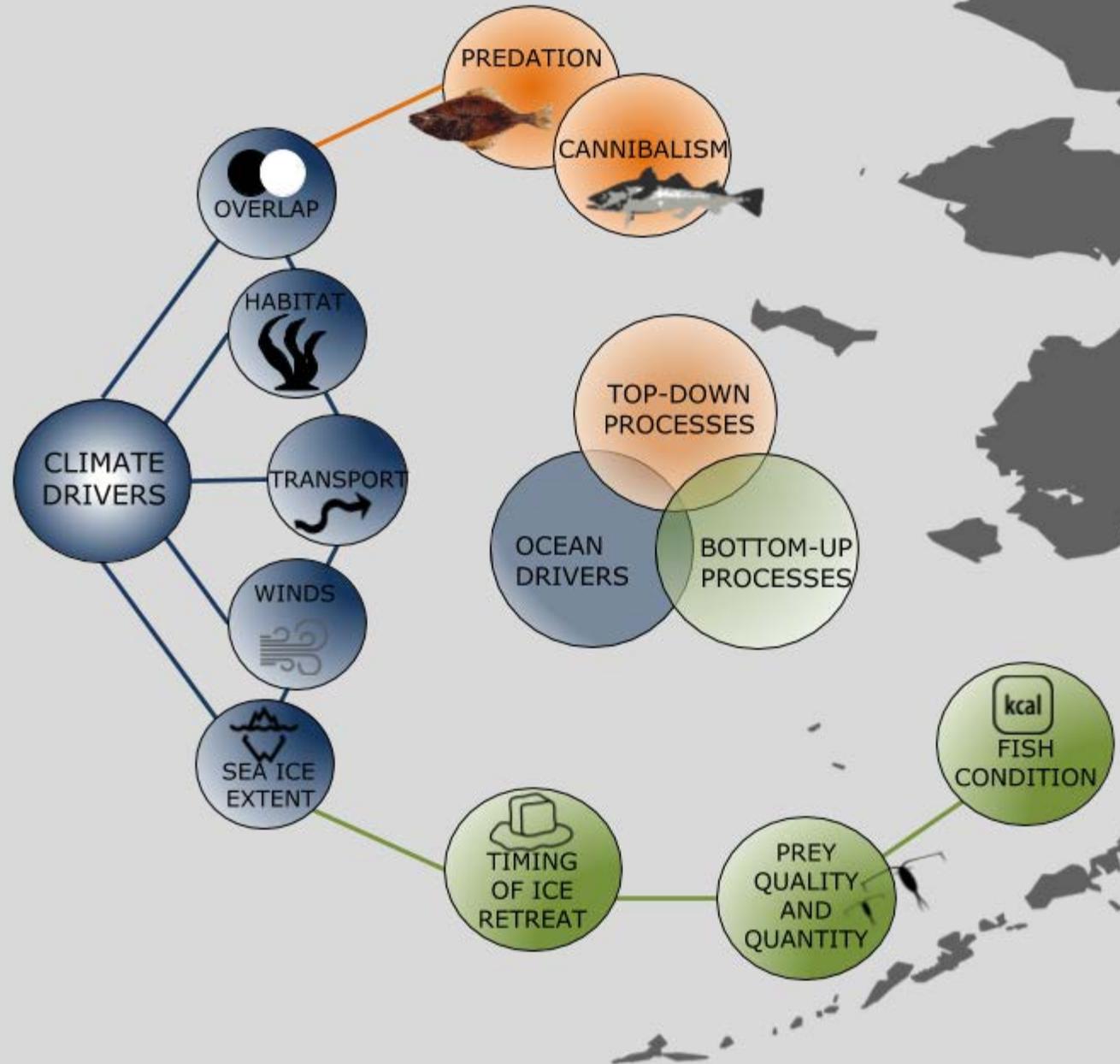
- Evaluate Council management across Council-managed fisheries
 - *In Core FEP*
- Identify areas of success, gaps indicating opportunities for improvement
- Report findings to communicate with a diverse audience of stakeholders



Action Module 2.

Create a series of conceptual models for the Bering Sea ecosystem

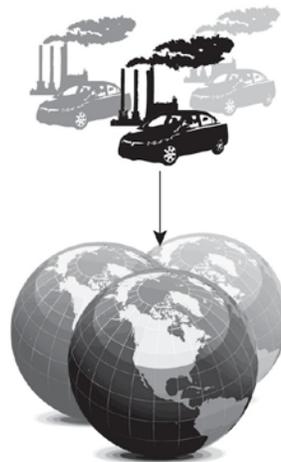
- Models will help the Council in assessing tradeoffs of management actions on different components of the ecosystem, leading to more informed decision making.
- Conceptual models may be integrated in annual SAFE reports, FMP updates, and may inform the setting of TACs.
- Development of models will require an interdisciplinary and interagency team of scientists, and a graphic designer or scientist with exceptional graphic design skills.



Alaska CLIMate Project

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 Alan Haynie (AFSC ESSR/REFM)
 Stephen Kasperski (AFSC ESSR/REFM)
 Jim Iannelli (AFSC, SSMA/REFM)
 Kerim Aydin (AFSC, REEM/REFM)
 Trond Kristiansen (IMR, Norway)
 Al Hermann (UW JISAO/PMEL)
 Wei Cheng (UW JISAO/PMEL)
 André Punt (UW SAFS)

FATE: Fisheries & the Environment
SAAM: Stock Assessment Analytical Methods
S&T: Climate Regimes & Ecosystem Productivity



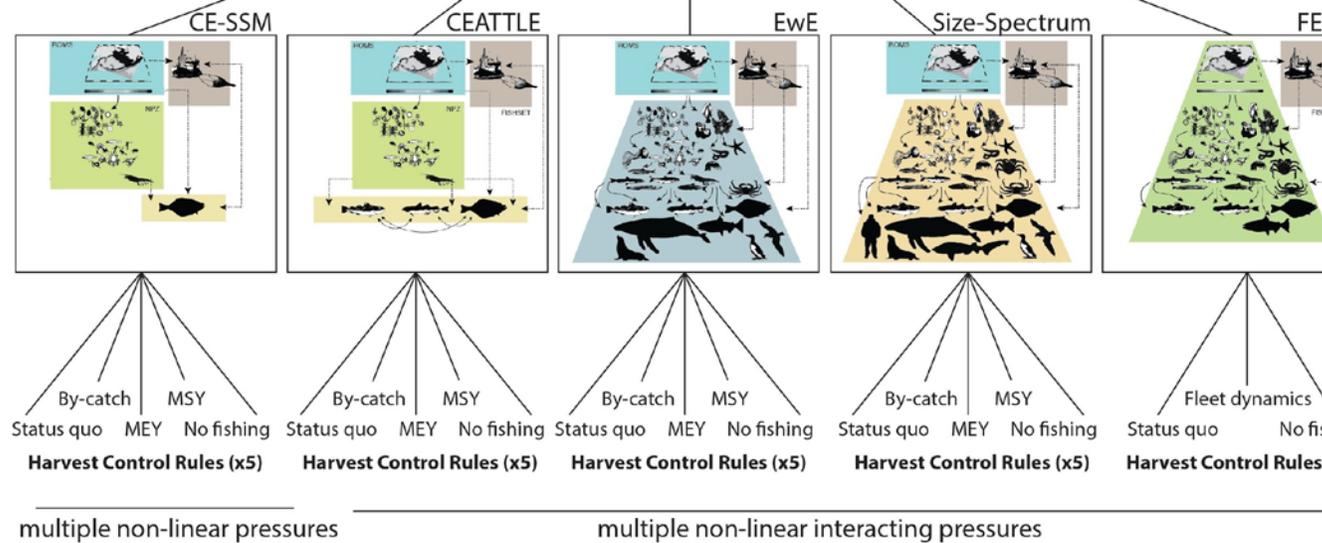
IPCC Scenarios (x3)

AR4 A1B
 AR5 RCP6.0
 AR5 RCP8.5

Global Climate Models (x 11)

ECHO-G (AR4 A1B)
 MIROC3.2 med res. (AR4 A1B)
 CGCM3-t47 (AR4 A1B)
 CCSM4-NCAR- PO (AR5 RCP 6.0 & 8.5)
 MIROCESM-C- PO (AR5 RCP 6.0 & 8.5)
 GFDL-ESM2M*- PO (AR5 RCP 6.0 & 8.5)
 GFDL-ESM2M*- PON (AR5 RCP 6.0 & 8.5)

Bering Sea Models



explicit drivers of population variability (climate & food-web); high computational demand

implicit drivers of population variability (random error); low computational demand & multiple iterations

Action Module 3.

Evaluate the short- and long-term effects of climate change on fish and fisheries

Evaluate the vulnerability of key species and fisheries to climate change, to strengthen resilience in regional fisheries management.

Methods will leverage projects at the Alaska Fisheries Science Center to:

- coordinate to synthesize results of various ongoing and completed climate change research projects;
- evaluate the scope of impacts on priority species identified in initial studies; and
- strategically reevaluate management strategies every 5-7 years.

Example work under this project includes the Council Ecosystem Workshop in Feb 2018.

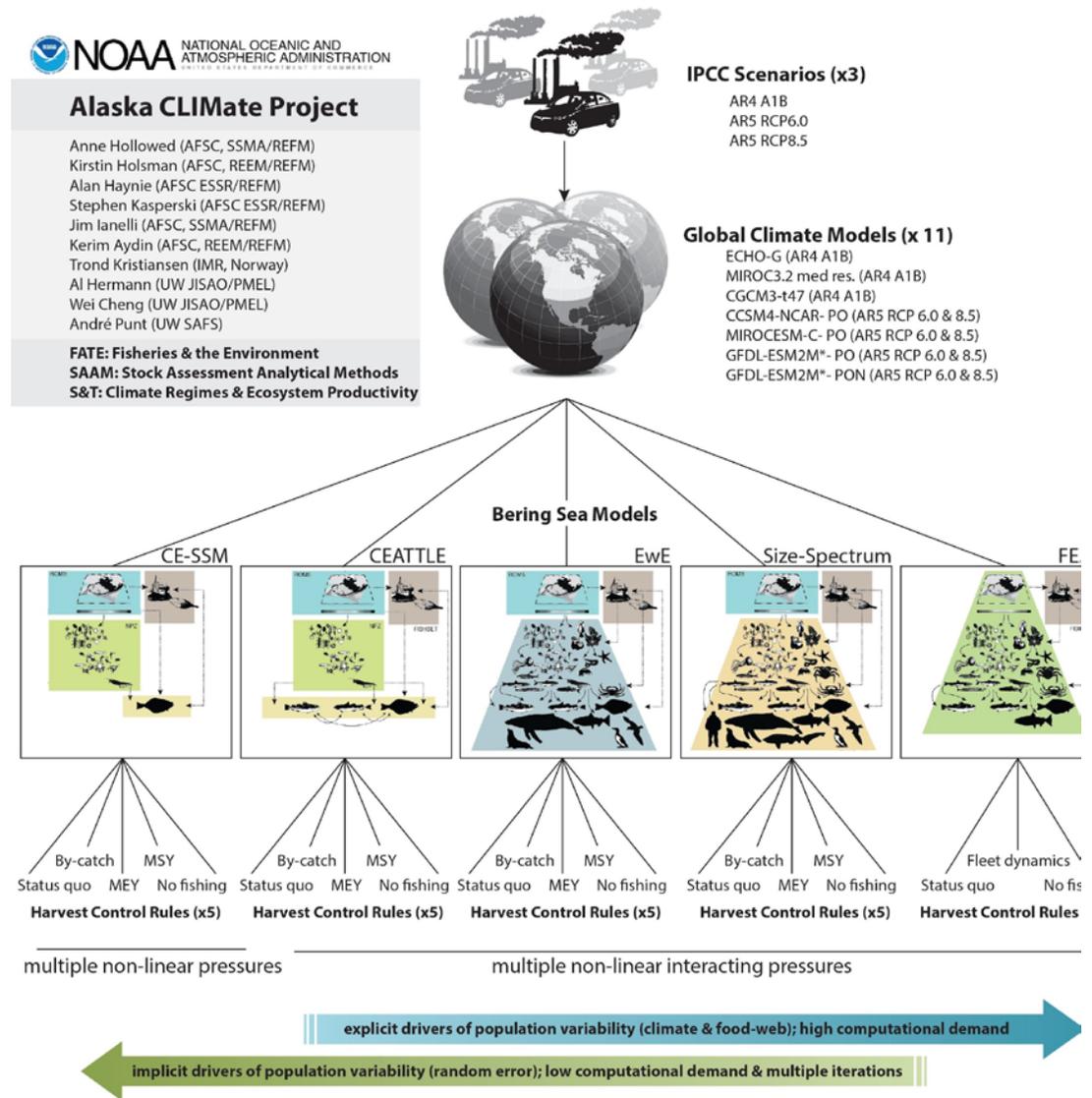
Action Module 3.

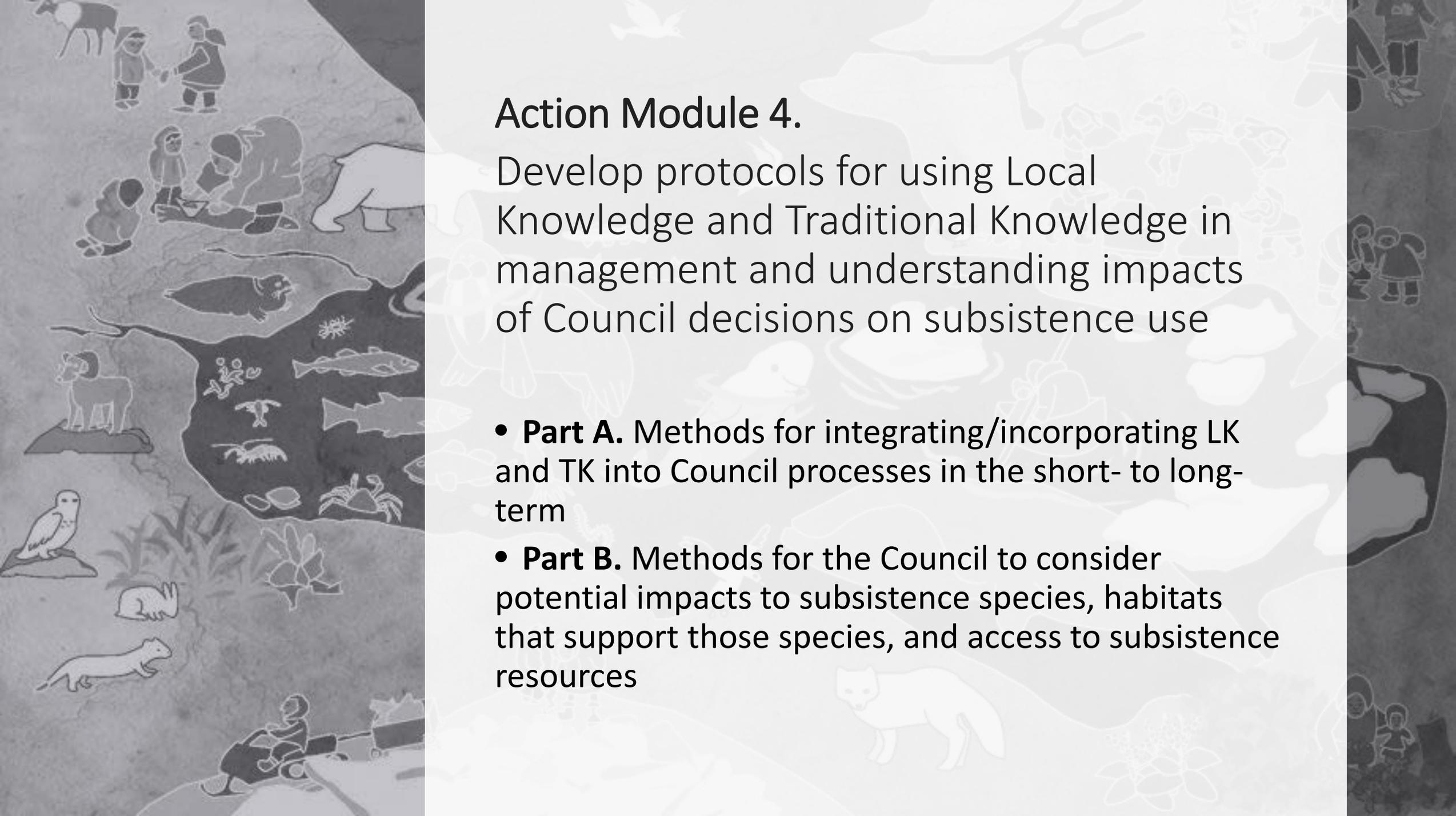
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-
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Action Module 4.

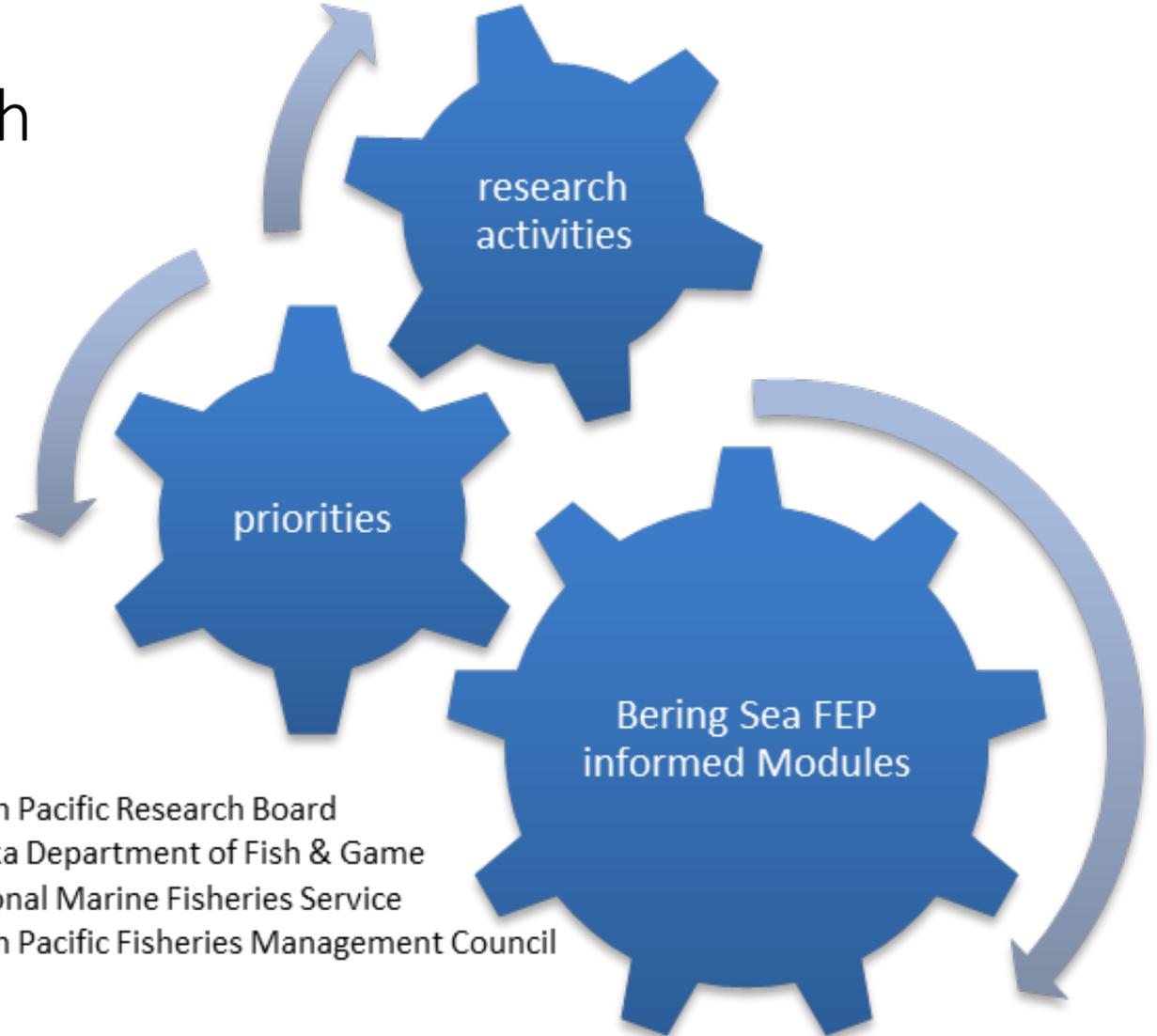
Develop protocols for using Local Knowledge and Traditional Knowledge in management and understanding impacts of Council decisions on subsistence use

- **Part A.** Methods for integrating/incorporating LK and TK into Council processes in the short- to long-term
- **Part B.** Methods for the Council to consider potential impacts to subsistence species, habitats that support those species, and access to subsistence resources

Action Module 5.

Aligning Council priorities with research funding opportunities

- Track research relevant to FEP Action Modules
- Track how prioritized research projects are used in Council management



Phases of public involvement for the FEP *p 50-53*

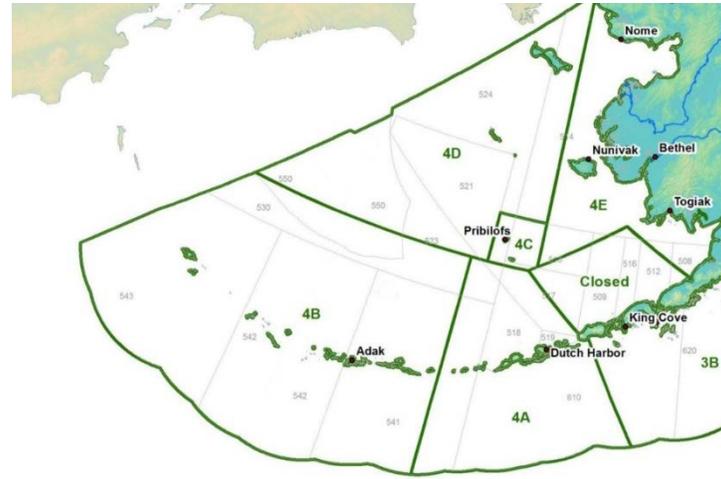
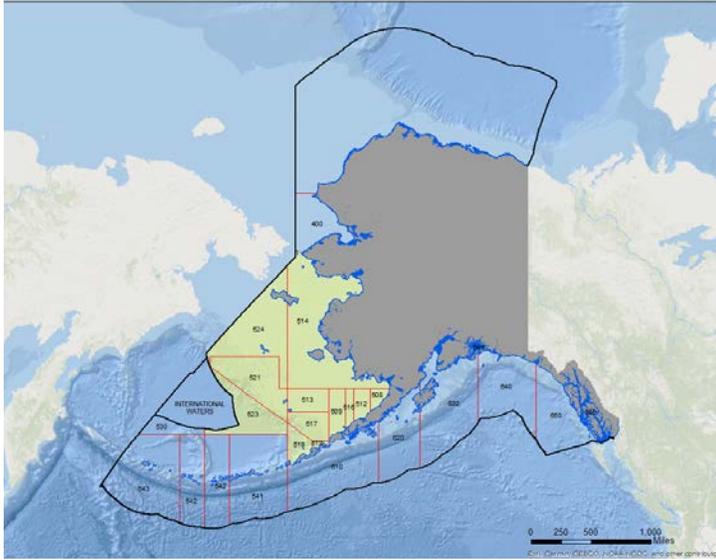
- Initial development of core FEP
 - Scoping meetings, Council testimony, ad hoc engagement opportunities, Council Ecosystem Workshop
 - Additional?
- FEP Action Modules
 - Public involvement plan for each Action Module
 - To include explicit steps for strengthening 2-way communication
 - Project teams will include external expertise as appropriate
- Ongoing Bering Sea FEP EBFM process
 - Evolving discussion, to include two-way communication, periodic reporting from FEP team to Council, development of FEP website
 - Other ideas from public in Appendix C, pp 158-159

Other content in the FEP

Synthesis of the
Bering Sea
ecosystem
(Chapter 6)

Assessment of
Council's current
EBFM practice
(Chapter 7)

- Chapter 8 – placeholder for risk analysis (future action module?)
- Chapter 9 – References and information resources

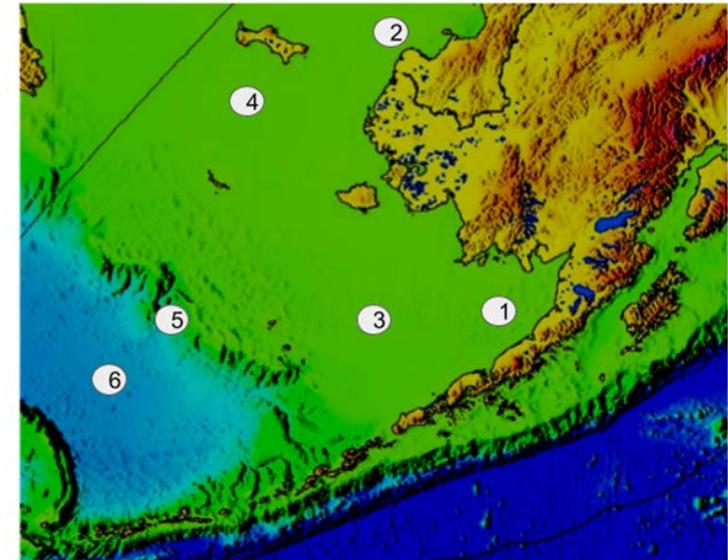
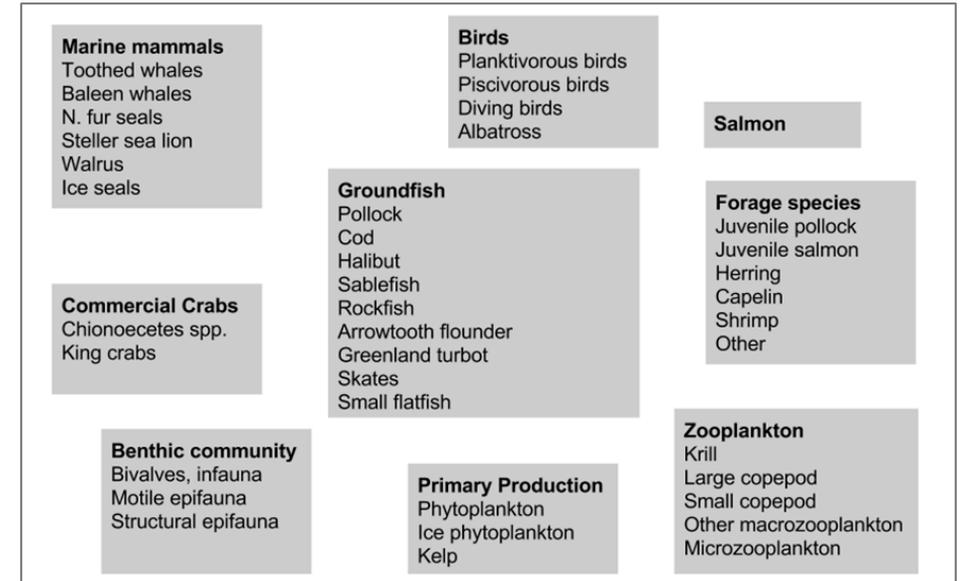


Resource, Population	Agency	Responsibility
groundfish	NPFMC/NMFS	3-200nm; population abundance; setting harvest levels, fishery management, monitoring, and enforcement
halibut	ADF&G	0-3nm
halibut	IPHC	population abundance, setting harvest levels
halibut	NPMFC/NMFS	management of fishery
crab	NPFMC/NMFS	monitor overfishing levels, allocations
crab	ADF&G	harvest levels; fishery management, monitoring, enforcement
scallop	NPMFC/NMFS	monitor overfishing levels
scallop	ADF&G	harvest levels, fishery management, monitoring, enforcement
salmon	ADF&G	population abundance, harvest levels, fishery management
salmon	NPFMC/NMFS	retention prohibited 3-200nm
herring	ADF&G	population abundance, harvest levels, fishery management
other fish	NMFS	advisory authority for habitat for all fish incl nearshore watersheds
marine mammals (except walrus and others)	NMFS	population abundance, advisory authority, protection under MMPA and ESA
walrus and others	USFWS	population abundance, advisory authority, protection under MMPA and ESA
birds	USFWS	population abundance, advisory authority, protection under MBTA
citizens of each coastal community	Municipal entity [update]	municipal responsibility
Land [update]	USFWS	protection of Alaska Maritime National Wildlife Refuge, including marine responsibility extending offshore
shipping	BLM, DNR	own some small parcels
shipping	DEC	oversight of spill response
shipping	USCG	ensure safety of vessels in US ports and waterways
oil and gas development	BOEM	3-200nm
oil and gas development	DNR or DEC	0-3nm
military activity	Alaskan Command, Pacific Command	add
formerly used defense sites	AFCEE	cleanup

FEP Boundary and Jurisdictions

Ecological and Oceanographic Characteristics

pp 60-63

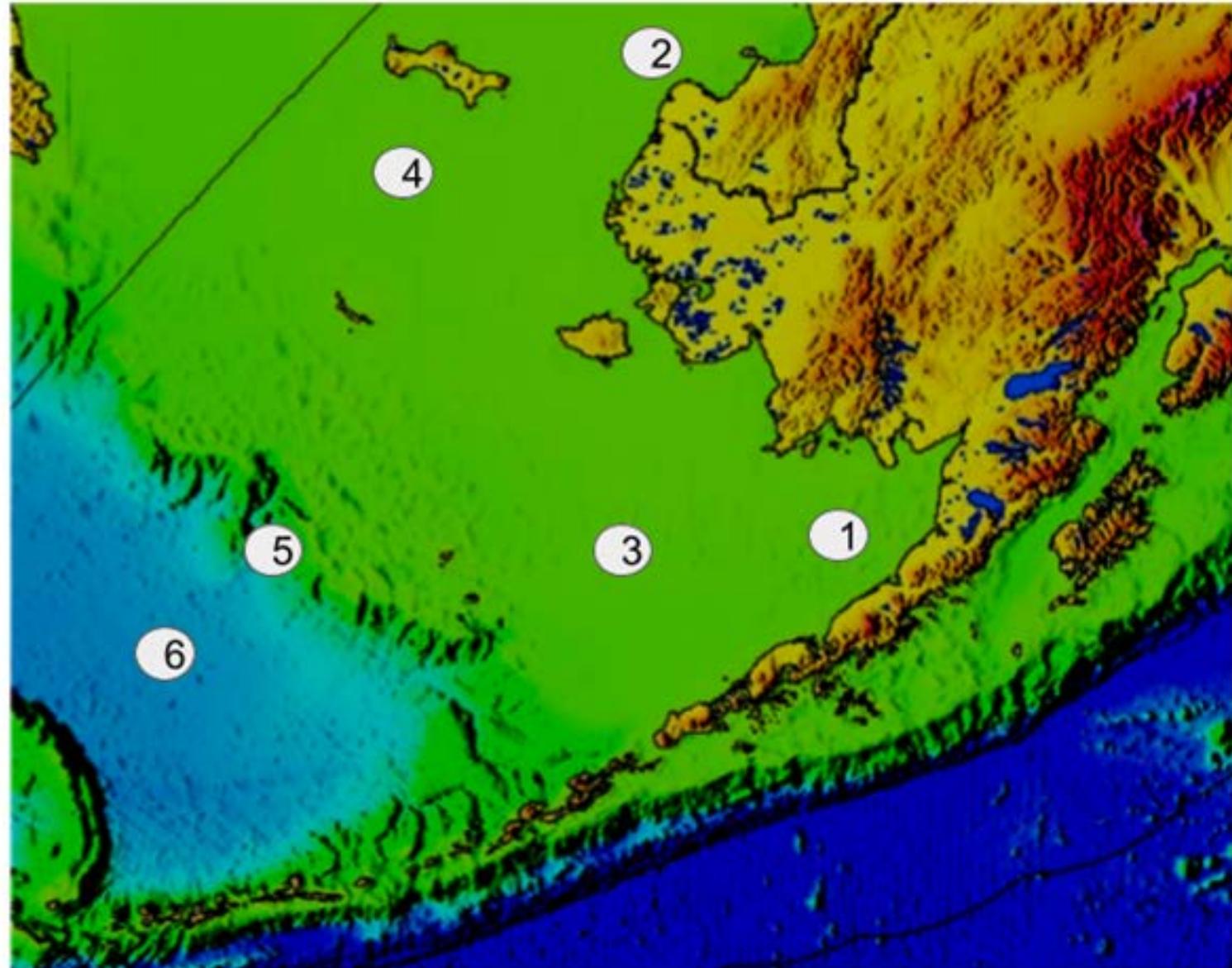


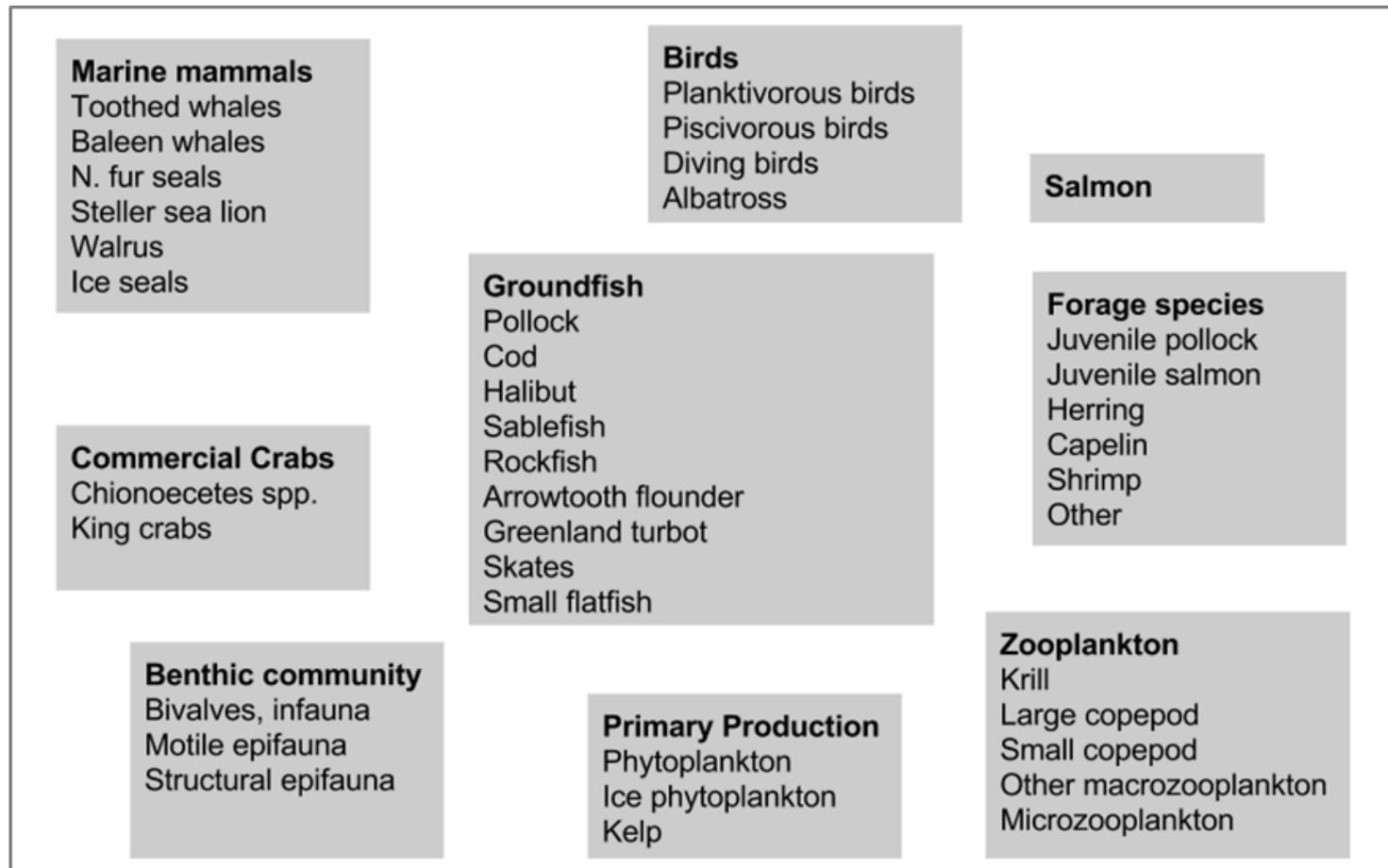
Define broad zones based on geography and climatology

Arctic versus subarctic weather patterns

Ice cover

Depth



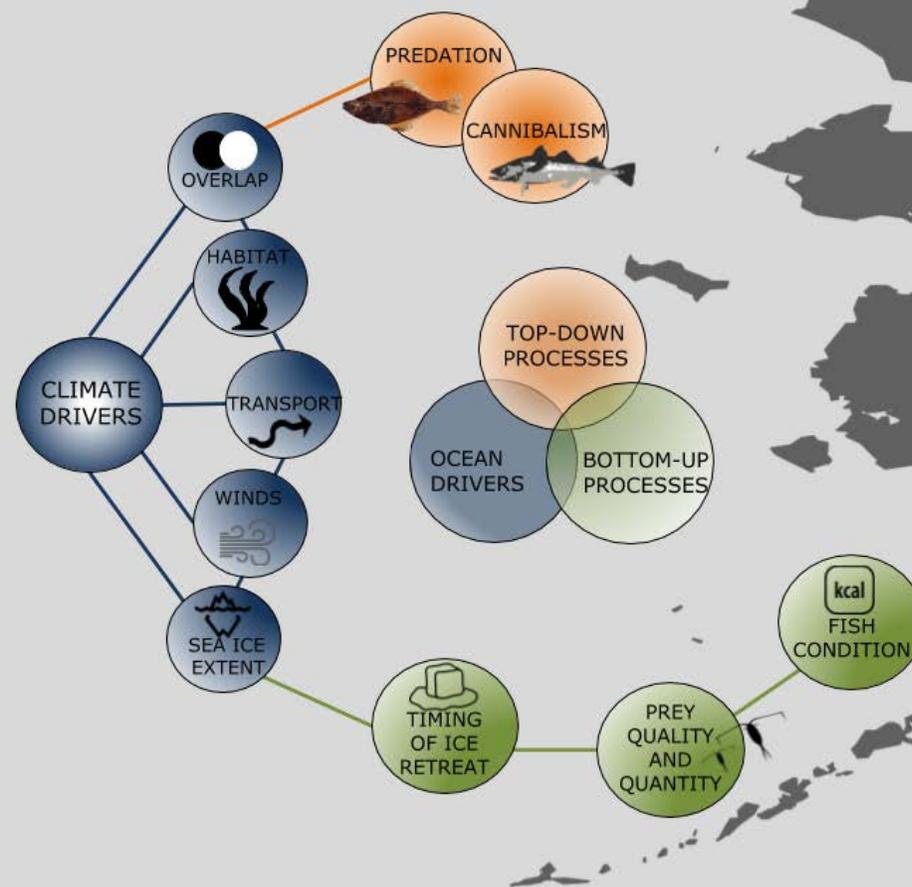


Define broad species groupings based on ecological and management roles

Action Module (~1 year)

Develop Conceptual models for functional groups, zones, key species, linking drivers and pressures

Juvenile pollock example – Action module



- Will promote:
 - Directional (“good/bad”) status indicators tuned to ecosystem components via conceptual models, and indicator thresholds.
 - Gap analysis and research prioritization.

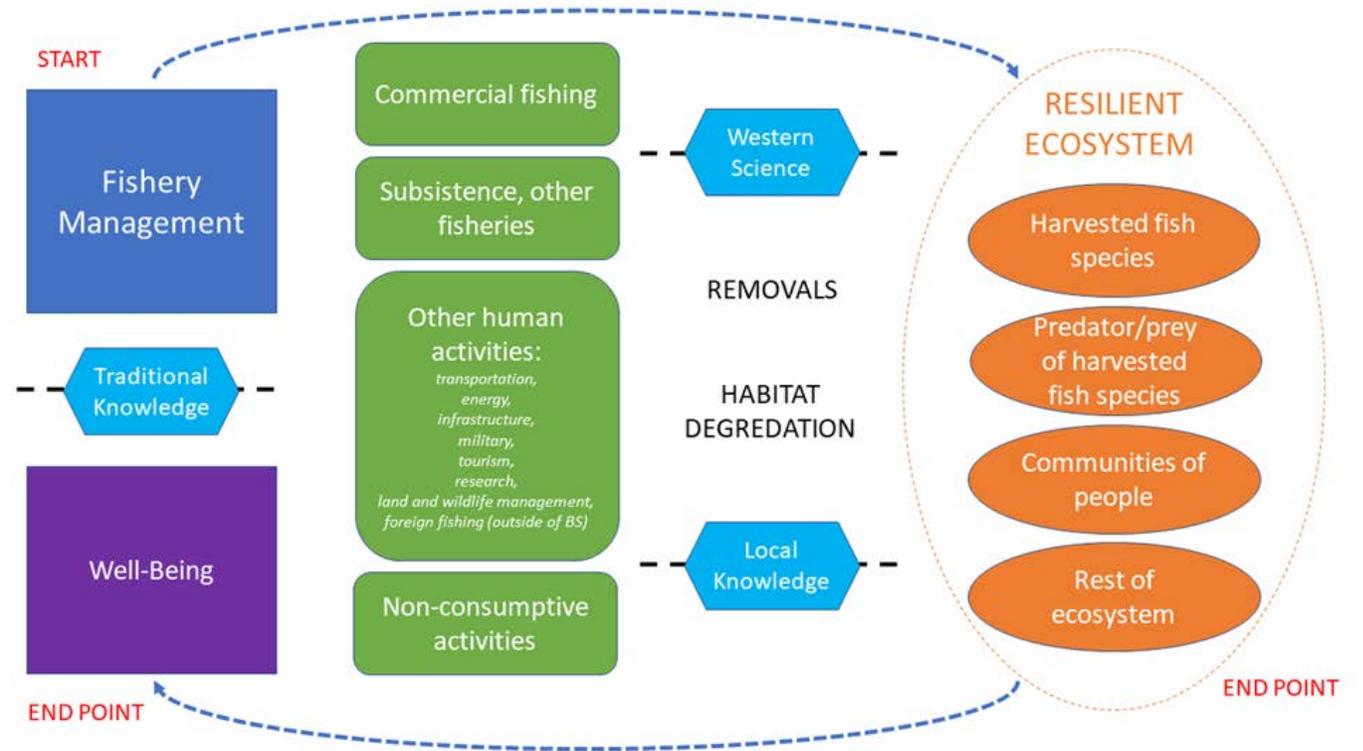
Action Module (~1 year)

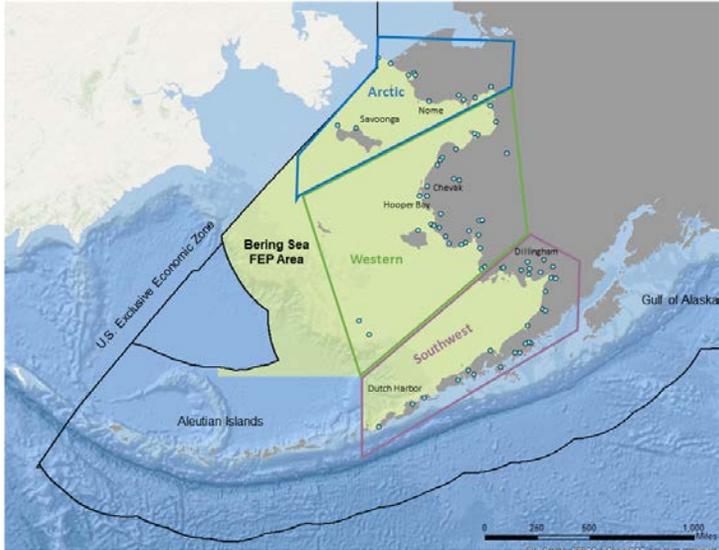
Develop Conceptual
models for each zone,
grouping, linking
drivers and pressures

- Originally planned as part of core FEP.
- Initial feedback was for greater stakeholder input, with special emphasis of including LTK as “core knowledge” rather than “add-on” – currently scoping methods.
- Additional feedback was for “user-friendly” (diagrammatic, graphical) and “living”.
- Greater scope is part of Action Module.

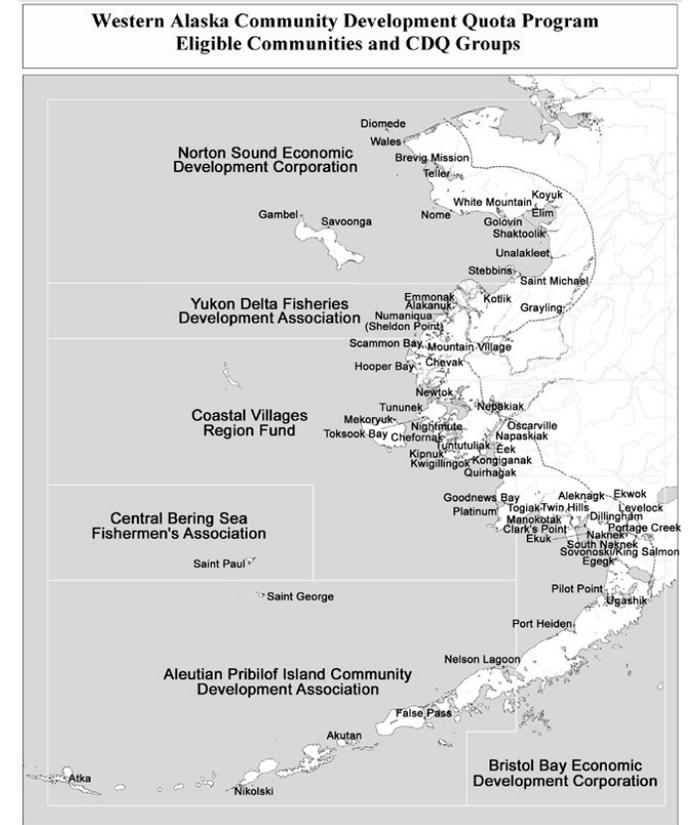
Human Networks

pp 64-85



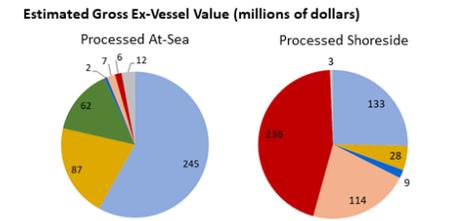
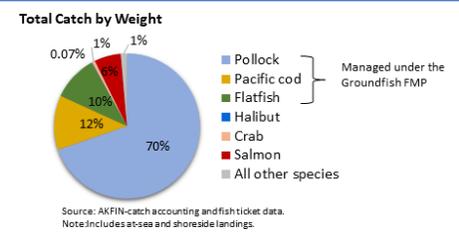
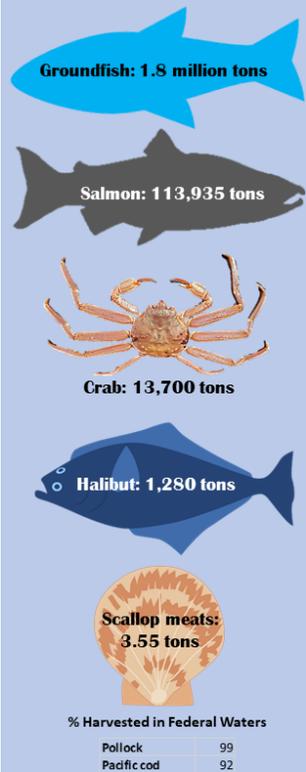


Arctic	Western	Southwest
Brevig Mission	Alakanuk	Akutan
Diomede/Inalik	Chefornak	Aleknagik
Elim	Chevak	Chignik
Gambell	Eek	Chignik Lagoon
Golovin	Emmonak	Chignik Lake
Koyuk	Goodnews Bay	Clark's Point
Nome	Grayling	Cold Bay
Port Clarence	Hooper Bay	Dillingham
Savoonga	Kipnuk	Egegik
Teller	Kongiganak	Ekwok
Wales	Kotlik	False pass
White Mountain	Kwigillingok	Ivanof Bay
	Mekoryuk	King cove
	Mountain Village	King Salmon/Savohoski
	Napakiak	Levelock
	Napaskiak	
	Newtok/Metarvik	
	Nightmute	Manokotak
	Nunam Iqua	Naknek
	Oscarville	Nelson Lagoon
	Pitkas Point	Nikolski
	Platinum	Perryville
	Quinhagak	Pilot Point
	Scammon Bay	Port Heiden/Meschick
	Shaktoolik	Portage Creek
	St George	Sand point
	St Michael	South Naknek
	St Paul	Togiak
	Stebbins	Twin Hills
	Toksook Bay	Ugashik
	Tuntutuliak	Unalaska/Dutch
	Tununak	
	Unalakleet	



Communities

Caught and Processed in the Bering Sea 2017



% Harvested in Federal Waters

Pollock	99
Pacific cod	92

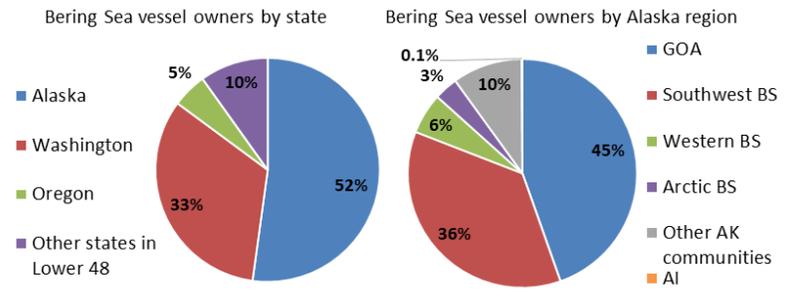
Alaska's seafood exports in 2011:



Alaska Department of Commerce, Community, and Economic Development

Vessels and Processors in Commercial Bering Sea Fisheries

Over 2,000 vessels participated in Bering Sea fisheries in 2017*

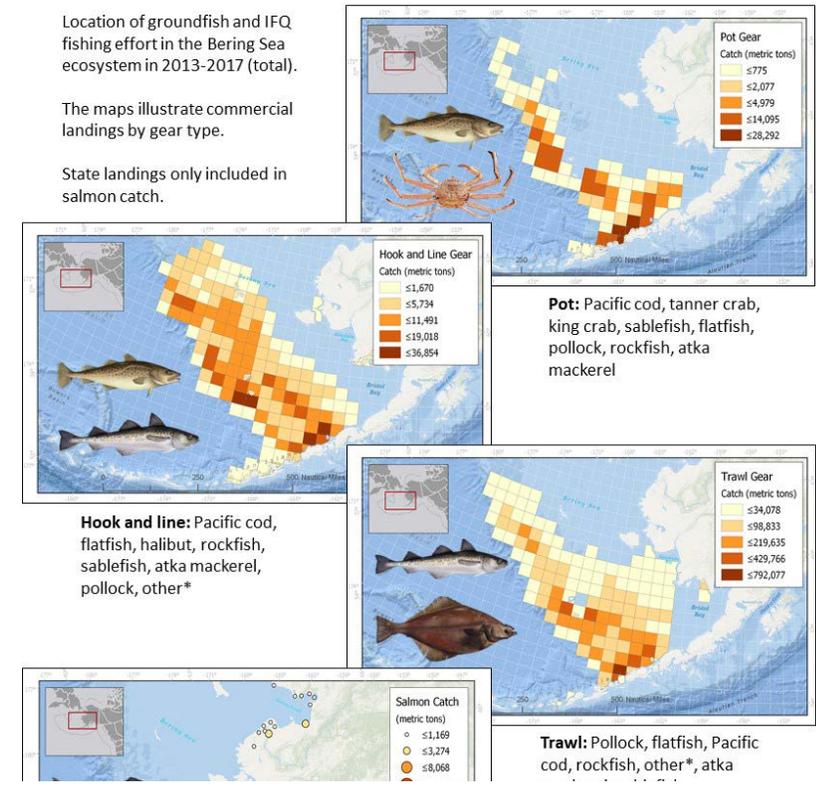


Commercial Fishing in the Bering Sea by Gear Type, 2013-2017

Location of groundfish and IFQ fishing effort in the Bering Sea ecosystem in 2013-2017 (total).

The maps illustrate commercial landings by gear type.

State landings only included in salmon catch.



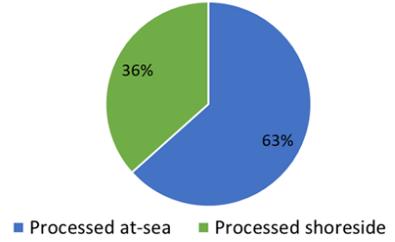
Pot: Pacific cod, tanner crab, king crab, sablefish, flatfish, pollock, rockfish, atka mackerel

Hook and line: Pacific cod, flatfish, halibut, rockfish, sablefish, atka mackerel, pollock, other*

Trawl: Pollock, flatfish, Pacific cod, rockfish, other*, atka

Vessels and Processors in Commercial Bering Sea Fisheries

By value, at-sea processors processed 63% of all BS seafood in 2017



This includes:

- 94% of BS flatfish
- 92% of BS rockfish
- 81% of BS Pacific cod
- 60% of BS pollock

Commercial fisheries

Pages 66-73

Sustaining Subsistence, Life & Culture as the Climate Changes

Climate change is here today and accelerating, transforming the land, waters, plants and animals of western arctic Alaska. Communities, tribal organizations, land managers, researchers and agencies will need to work together to respond to these serious challenges and where possible, explore new opportunities.

More Than Just Food: Family, Fitness, Identity, Community, Memory, Spirit
 In a world of rapid change, the heart of western arctic Alaska, the Inupiat, Yupik, and Gwich'in, are resilient. They are the people who have lived here for thousands of years. For us, it's like someone moved the calendar by a month and nobody told us. We wonder what it must be like for the animals, plants and fish.

What's a Walrus Worth?
 About 500 pounds of walrus oil, high quality meat.
 In Alaska, walrus is a delicacy. Walrus blubber is a delicacy. Walrus tusk is a delicacy. Walrus tusk is a delicacy. Walrus tusk is a delicacy.

PROVIDING FOOD
 The abundance of available wild food resources is declining. The abundance of available wild food resources is declining. The abundance of available wild food resources is declining.

LIVING WITH RISING WATERS
 Rising sea levels are a threat to coastal communities. Rising sea levels are a threat to coastal communities. Rising sea levels are a threat to coastal communities.

WORKING TOGETHER TO TRACK CHANGE
 Communities are working together to track climate change. Communities are working together to track climate change. Communities are working together to track climate change.

The Ocean is Our Grocery Store & It's Changing in Ways We've Never Seen

The Bering Sea Bering Sea and Chukchi Sea form one of the richest food sources and biologically productive ocean systems on the planet. The same unique characteristics that support this area's productivity are also the same characteristics that make them highly vulnerable to the impacts of climate change.

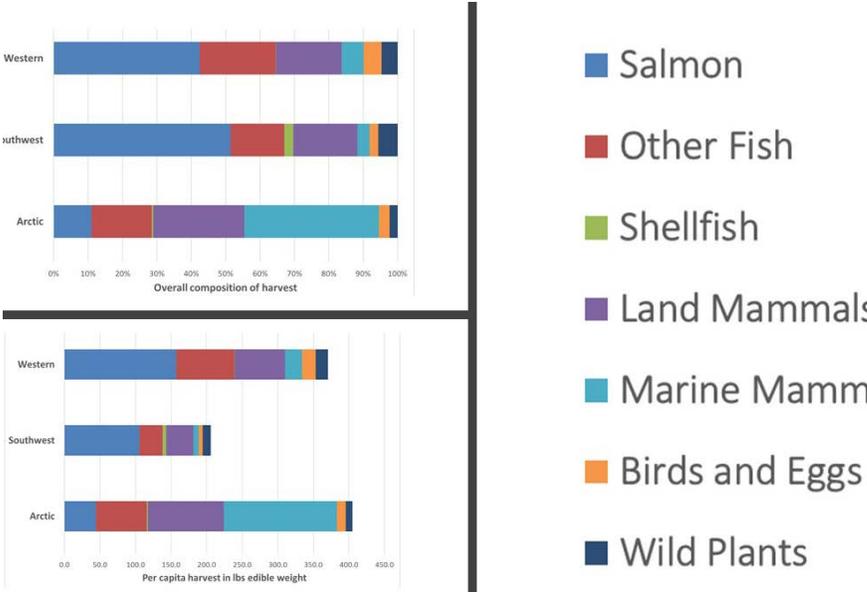
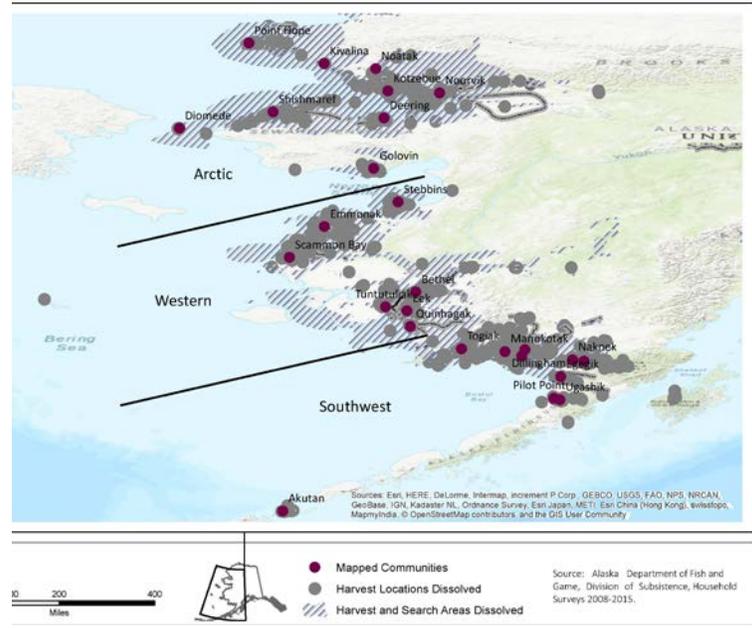
How is Climate Changing Impacting Marine Ecosystems? And How Might We Respond? Three Examples:

NEW PATHS FOR WHALES & MARINE SHIPPING?
 Climate change is altering whale migration routes and forcing them to travel further from their traditional feeding grounds. This is forcing them to travel further from their traditional feeding grounds. This is forcing them to travel further from their traditional feeding grounds.

WALRUS, EIDERES & MELTING SEAS?
 Melting sea ice is forcing walrus and eider to travel further from their traditional feeding grounds. Melting sea ice is forcing walrus and eider to travel further from their traditional feeding grounds.

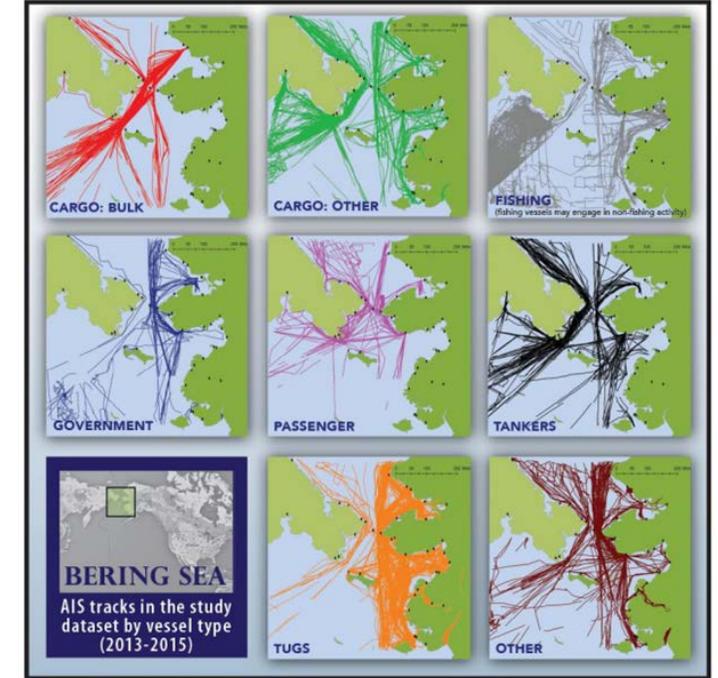
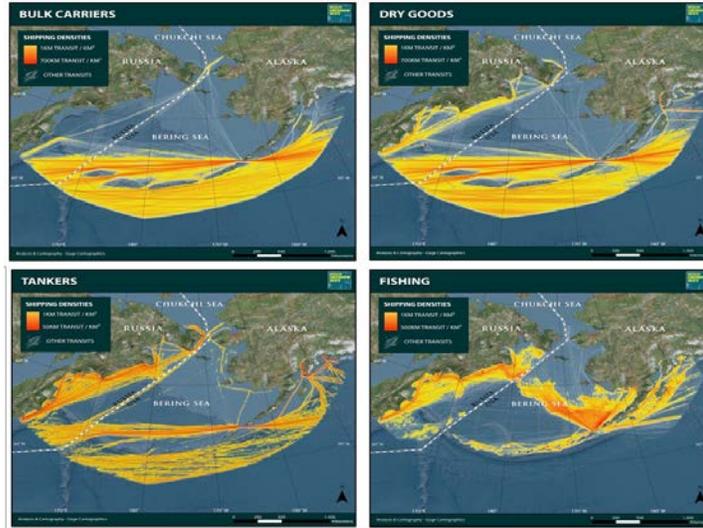
SALMON, COD, POLLOCK IN A CHANGING OCEAN?
 Changing ocean temperatures and currents are forcing salmon, cod, and pollock to travel further from their traditional feeding grounds. Changing ocean temperatures and currents are forcing salmon, cod, and pollock to travel further from their traditional feeding grounds.

Complex Ecosystem Building Blocks are Vulnerable to Climate Change
 The abundant life in the Bering Sea region emerges from a complex web of physical, chemical, and biological building blocks. Climate change is altering the structure of this system. This is forcing them to travel further from their traditional feeding grounds.



Subsistence

pp 74-79

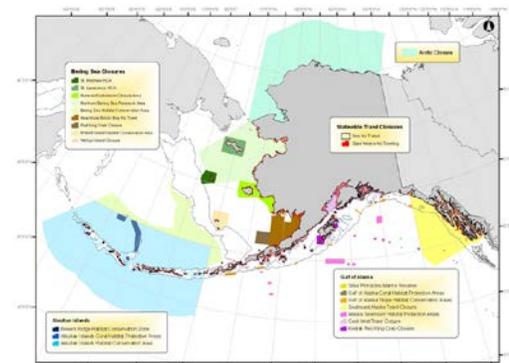
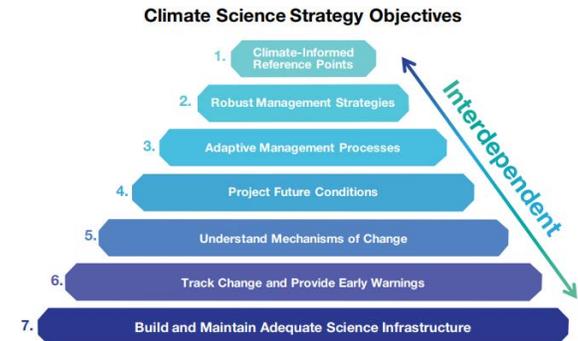
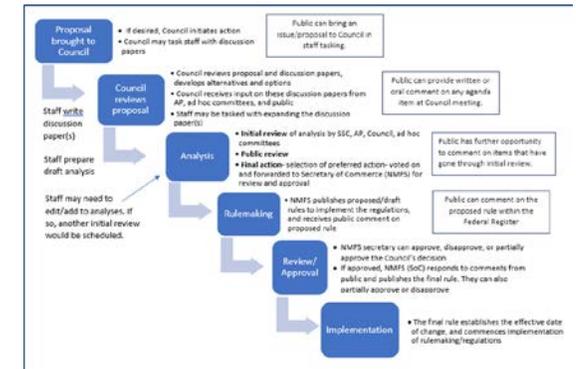


Non-fishing activities

- pp 82-86

Assessment of Council's current EBFM

- Chapter 7, pp 88-112
- Evaluates Council's:
 - Management policies and process
 - Species conservation measures
 - Measures to reduce bycatch, habitat/ marine mammal/ seabird interaction from fishing
 - Measures and processes to preserve viable communities, stakeholder participation
 - Considerations for monitoring and adaptive planning for changing conditions



What is the Council's action here today, and at final action?

Initial Review

- Review draft FEP
 - Request changes from FEP team
 - Receive feedback from public

Final Action

- Adopt FEP
- Adopt list of action modules
- Initiate action on some modules

