



**NOAA
FISHERIES**

**Alaska
Fisheries
Science
Center**

North Pacific Fishery Management Council information needs

Diana Stram

Ecosystem Science Review
Juneau, Alaska
May 2-6, 2016

Ecosystem-related information that address the management needs of the Alaska Regional Office and the North Pacific Fishery Management Council

- Two categories of information that address AKRO and NPFMC information needs:
 - Stock assessment and related ecosystem information contained therein which benefit the Council
 - Explicit requests from the Council to AFSC for research or analysis to address pressing management concerns

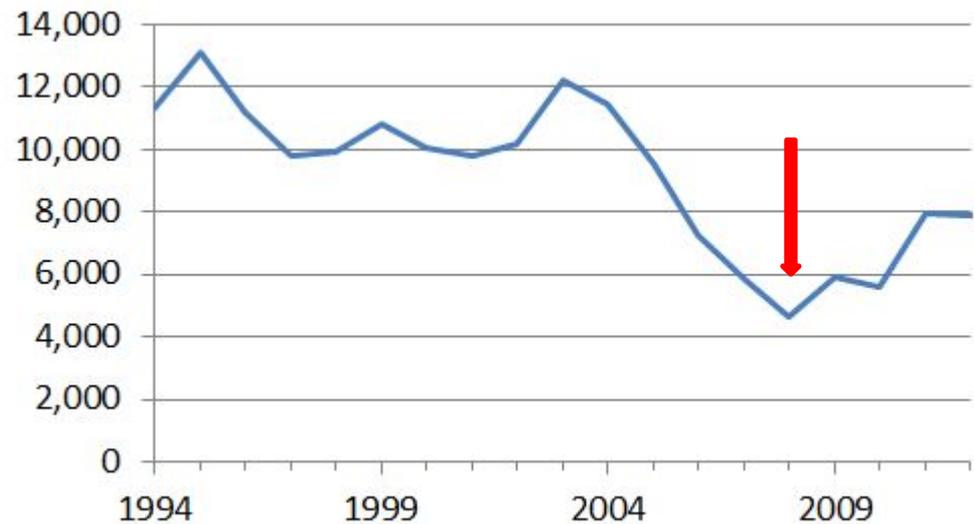
Ecosystem-related information that address management needs

● Stock assessments:

EBS pollock:

- after period of decline, quota for 2008 reduced from max permissible ABC (1.17m mt) to 1.0 m mt due to ecosystem considerations (recruitment) and uncertainty

EBS pollock:
Age-3+ Biomass (thousands t)



Other examples of ecosystem considerations embedded in assessments:

- EBS yellowfin sole temperature dependent survey Q
- GOA walleye pollock B20 threshold for Steller sea lions

Ecosystem-related information that address management needs

Table 15.14. Ecosystem effects

Ecosystem effects on Atka mackerel			
Indicator	Observation		
<i>Prey availability or abundance trends</i>			
Zooplankton	Stomach contents, surveys		
<i>Predator population trends</i>			
Marine mammals	Fur seals declining increasing slightly		
Birds	Stable, some increasing some decreasing		
Fish (Pacific cod, arrowtooth flounder)	Pacific cod and arrowtooth abundance trends are stable		
<i>Changes in habitat quality</i>			
Temperature regime	2006 AI summer bottom temperature slightly below average (excl. 2000)		
The Atka mackerel effects on ecosystem			
Indicator	Observation	Interpretation	Evaluation
<i>Fishery contribution to bycatch</i>			
Prohibited species	Stable, heavily monitored	Likely to be a minor contribution to mortality	Unknown
Forage (including herring, Atka mackerel, cod, and pollock)	Stable, heavily monitored	Bycatch levels small relative to forage biomass	Unknown
HAPC biota (seapens/whips, sponges, anemones)	Low by catch levels of seapens/whips, sponge and coral catches are variable	Unknown	Possible concern for sponges and corals
Marine mammals and birds	Very minor direct-take	Likely to be very minor contribution to mortality	No concern
Sensitive non-target species	Skate catches are variable and have averaged 87 t from 2003-2005, which is about 14% of the AI skate catch over this time period	Data limited, need species-specific catch information	Possible concern
Other non-target species	Sculpin catch is variable, large increase in bycatch in 2004	Unknown	Unknown
<i>Fishery concentration in space and time</i>	Steller sea lion protection measures spread out Atka mackerel catches in	Mixed potential impact (fur seals vs Steller sea lions). Areas outside concern	Possible concern

SAFE reports: Ecosystem

September 2010 Plan Team Draft

Ecosystem Considerations

APPENDIX C

Ecosystem Considerations for 2011

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Fishery of large fishery discard product

Fishery mahri

Ecosystem considerations appendix to Stock Assessment and Fishery Evaluation documents since 1995

Ecosystem considerations in single species stock assessments since mid-2000s

Ecosystem assessment since 2005

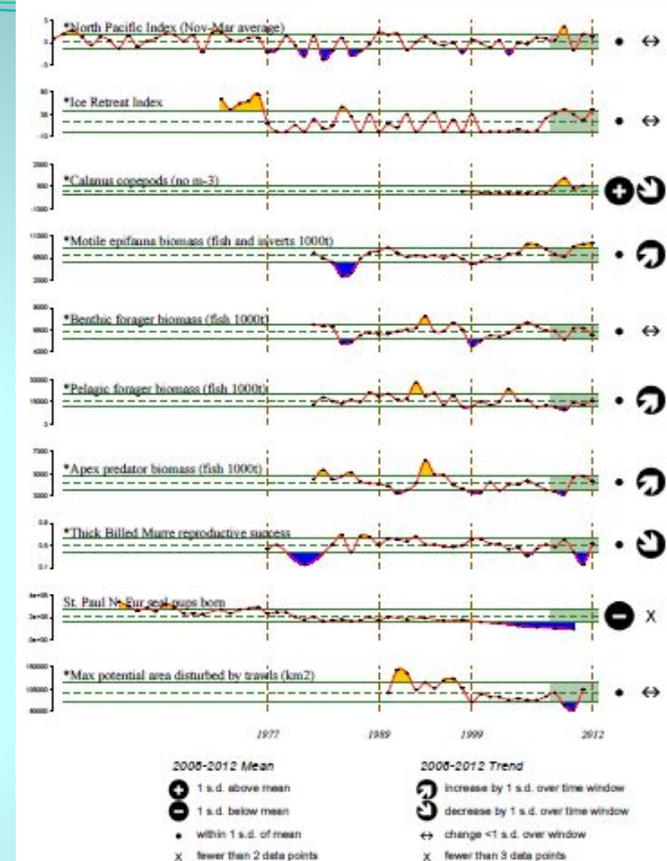
Considered prior to TAC-setting annually

in quality guidelines, recent any agency

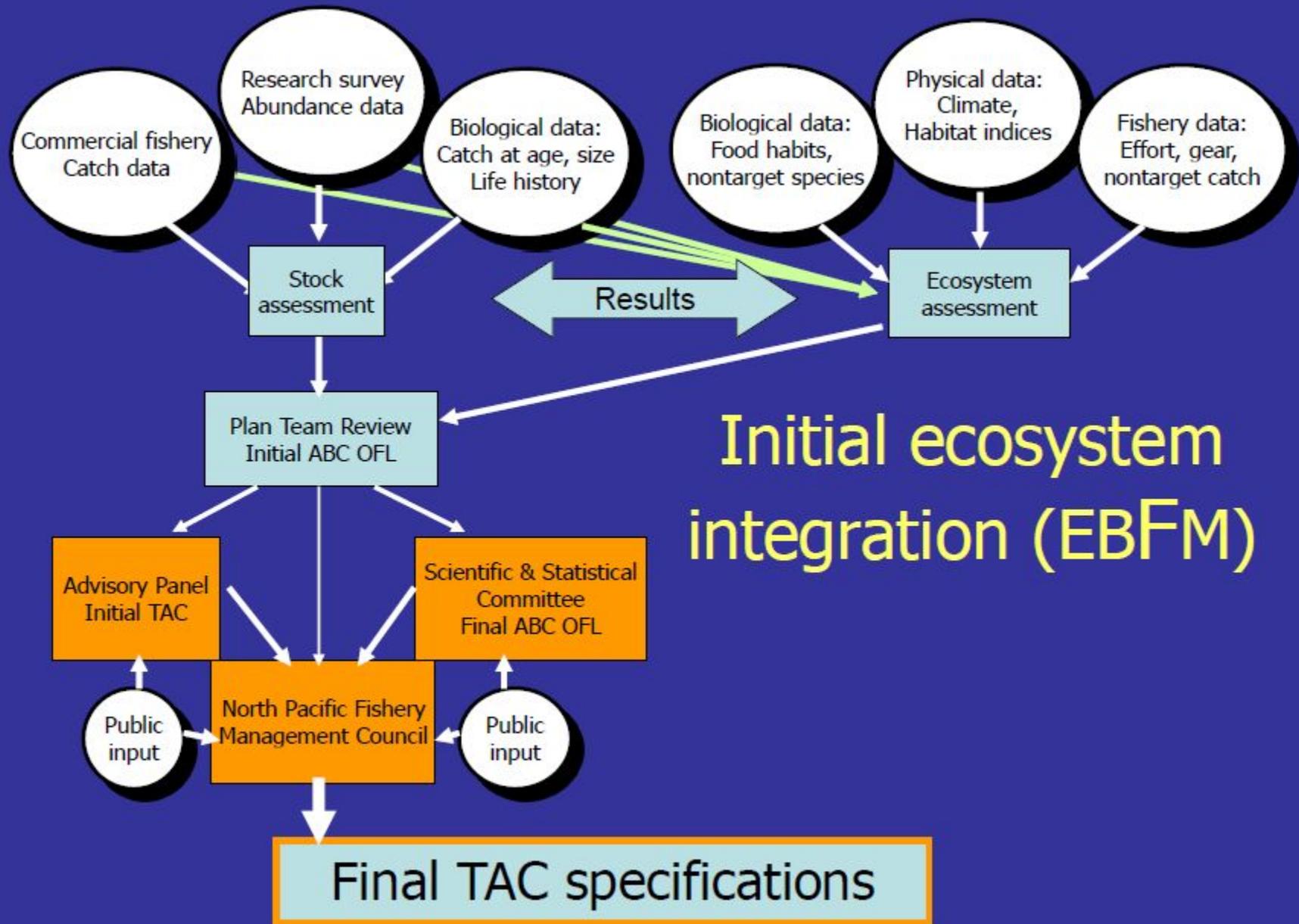
Ecosystem-related information that address management needs

Eastern Bering Sea 2014 Report Card

- The North Pacific atmosphere-ocean system during 2013-2014 featured the development of strongly positive SST anomalies south of Alaska. This warming was caused by unusually quiet weather conditions during the winter of 2013-14 in association with a weak Aleutian low (positive NPI), and abnormally high SLP off the coast of the Pacific Northwest.
- The eastern Bering Sea experienced warmer air temperatures and less sea ice that were related to the broader North Pacific conditions. Dates of sea ice retreat, summer surface and bottom temperatures, and the extent of the cold pool were similar to those of the warm years of 2003-2006.
- The summer acoustically-determined time series of euphausiids continues to decrease from its peak in 2009. This suggests that prey availability for planktivorous fish, seabirds, and mammals was low in 2014.
- Survey biomass of mottled opifera has been above its long-term mean since 2010, although the trend has stabilized. However, the trend of the last 30 years shows a decrease in crustaceans (especially commercial crabs) and a long-term increase in echinoderms, including brittle stars, sea stars, and sea urchins. It is not known the extent to which this reflects changes in survey methodology rather than actual trends.
- Survey biomass of benthic foragers has remained stable since 1982, with interannual variability driven by short-term fluctuations in yellowfin and rock sole abundances.
- Survey biomass of pelagic foragers has increased steadily since 2009 and is currently above its 30-year mean. While this is primarily driven by the increase in walleye pollock from its historical low in the survey in 2009, it is also a result of increases in capelin from 2009-2013, perhaps due to cold conditions prevalent in recent years.
- Fish apex predator survey biomass is currently above its 30-year mean, although the increasing trend seen in recent years has leveled off. The increase since 2009 back towards the mean is driven primarily by the increase in Pacific cod from low levels in the early 2000s. Arrowtooth flounder, while still above its long-term mean, has declined nearly 50% in the survey from early 2000s highs, although this may be due to a distributional shift in response to colder water over the last few years, rather than a population decline.
- The multivariate seabird breeding index is above the long term mean, indicating that seabirds bred earlier and more successfully in 2014. This suggests that foraging conditions were favorable for piscivorous seabirds.
- Northern fur seal pup production for St. Paul Island remained low in 2014, with fewer pups produced than the last survey in 2012.



- Ecosystem assessment reports cards EBS, Aleutian Island and now GOA
- Under development per Council request: Halibut report card, BSAI crab report card, Arctic



Ecosystem-related information that address management needs

- AFSC assistance with Council requests and analyses
 - Arctic FMP
 - Surveys specific to a Council management objective
 - Fishery Ecosystem Plans
 - Stock composition estimates for salmon bycatch

Ecosystem-related information that address management needs

Arctic Fishery Management Plan: Final



- Detailed fishery management
 - Categories include target and ecosystem component species
 - AFSC developed reference points for three main arctic species
 - OY reduced to 0 (cost, ecosystem)

The New York Times

Energy & Environment

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U.S. Bans Commercial Fishing in Warming Arctic

By ALLISON WINTER of **Greenwire**
Published: August 21, 2009

The Obama administration approved a management plan yesterday for Arctic fisheries that prevents the expansion of commercial fishing into vast swaths of sea whose ice is being melted by rising temperatures.

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PRINT

Ecosystem-related information that address management needs

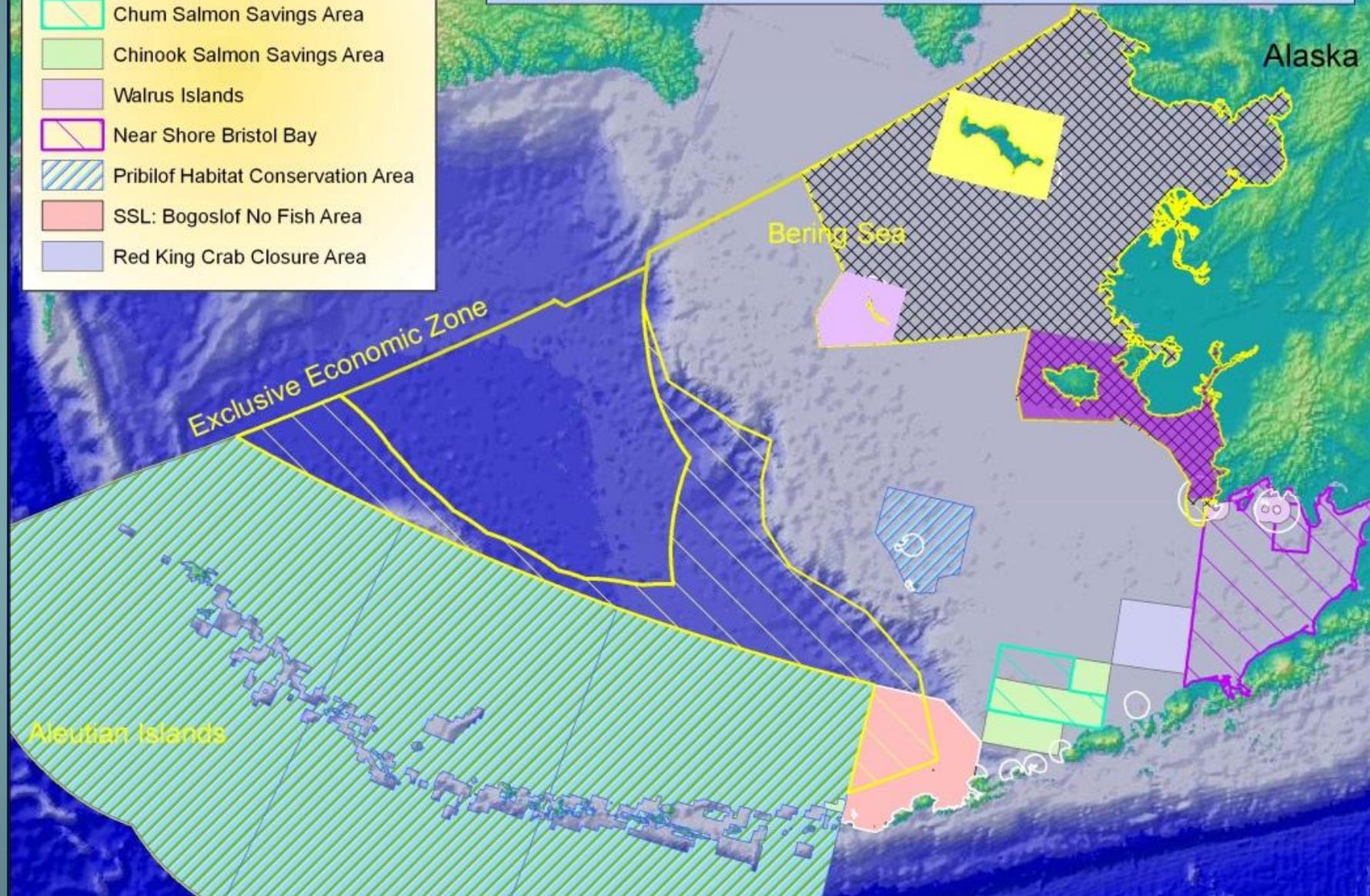
- Additional NOAA surveys: per Council request for additional information for management:
- NBSRA
 - Led to conclusion that limited fishing impacts/interest
- Corals
 - Major management focus on fishing effects on corals in canyons
 - NOAA surveys critical to Council considerations of impacts of fishing pressure

Current Closure Areas

-  AIHCA Bottom Trawl Closure
-  SSL No Trawl Zones
-  Chum Salmon Savings Area
-  Chinook Salmon Savings Area
-  Walrus Islands
-  Near Shore Bristol Bay
-  Pribilof Habitat Conservation Area
-  SSL: Bogoslof No Fish Area
-  Red King Crab Closure Area

Bering Sea Habitat Conservation

-  Bering Sea Closure Area to Non-Pelagic Trawling
-  Northern Bering Sea Research Area
-  St. Lawrence Island Habitat Conservation Area
-  Nunivak / Kuskokwim Closure Area
-  St. Matthew Island Habitat Conservation Area

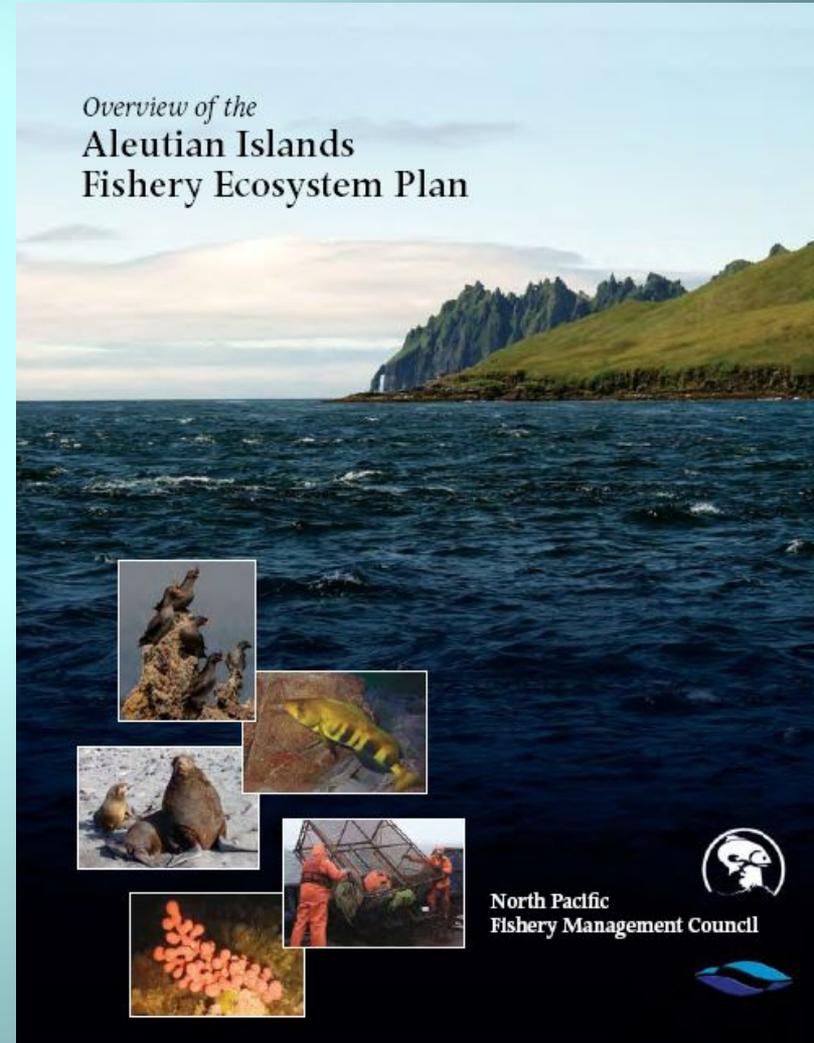


Ecosystem-related information that address management needs

Fishery Ecosystem Plan:

- AFSC scientists major developer of information and synthesis for FEP
- Evaluation ecosystem level interactions:
 - Oceanography
 - Fisheries
 - Marine mammals and seabirds
 - Traditional knowledge
 - Shipping and other anthropogenic, non-fishing activities

Bering Sea FEP under development



Ecosystem-related information that address management needs

- Strengths to FEP
 - Key finding that interactions and relationships within the AI are distinct from Bering Sea and GOA
 - Information used in discussions of area-specific stock assessment, analyses and recently SSL EIS
 - Began the process of AI ecosystem assessment and selection of key indicators
 - Creation of Alaska Marine Ecosystem Forum
- Limitations to FEP
 - No direct management outcomes included
 - Information employed in ad hoc manner
 - Need clear pathway for information to feed into Council process

Ecosystem-related information that address management needs

- AFSC geneticists have provided stock of origin estimates for Chinook and chum salmon bycaught in
 - Bering Sea pollock fishery,
GOA: pollock fishery, flatfish fisheries and rockfish fisheries
- Direct response to Council requests for annual representative stock composition estimates
- Directly related to ecosystem changes as changes in salmon oceanic abundance, and co-location with target species impacts fishing operations