A satellite-style map of the North Pacific Ocean region, showing the Aleutian Islands, Kamchatka Peninsula, and the Sea of Okhotsk. A large blue rectangular box is overlaid on the map, containing the title text. The text is white with a black outline. Faint labels on the map include 'Central Bering Sea', 'Eastern Bering Sea', 'Aleutian Islands Region', and 'Bogoslof'.

Fishery management responses to climate change in the North Pacific

**Diana Stram and Chris Oliver
North Pacific Fishery Management Council
Anchorage, AK**

***Effects of Climate Change on the World's Oceans
Gijon, Spain 2008***

Fishery Management Councils

- Magnuson-Stevens Fishery Conservation and Management Act of 1976
- established 8 regional fishery management Councils
- North Pacific Fishery Management Council responsible for Alaskan EEZ (3-200 miles)



What does the Council do?

Responsibilities under MSA:

1. ***Fishery Management Plans*** for fisheries under its authority
 - direct management of Federal groundfish fisheries
 - oversight of crab and scallop fisheries
 - allocative management of halibut fishery
2. Conduct ***public hearings*** to allow all interested persons to be heard regarding FMPs and their implementation
3. Review stock assessments and ***harvest specifications***

Current management activities in response to changing oceanographic conditions

- Arctic Fishery Management
- Restrictions on trawling in northern regions of Bering Sea
- Restrictions on salmon bycatch in pollock fishery
- Establishing Fishery Ecosystem Plan in the Aleutian Islands

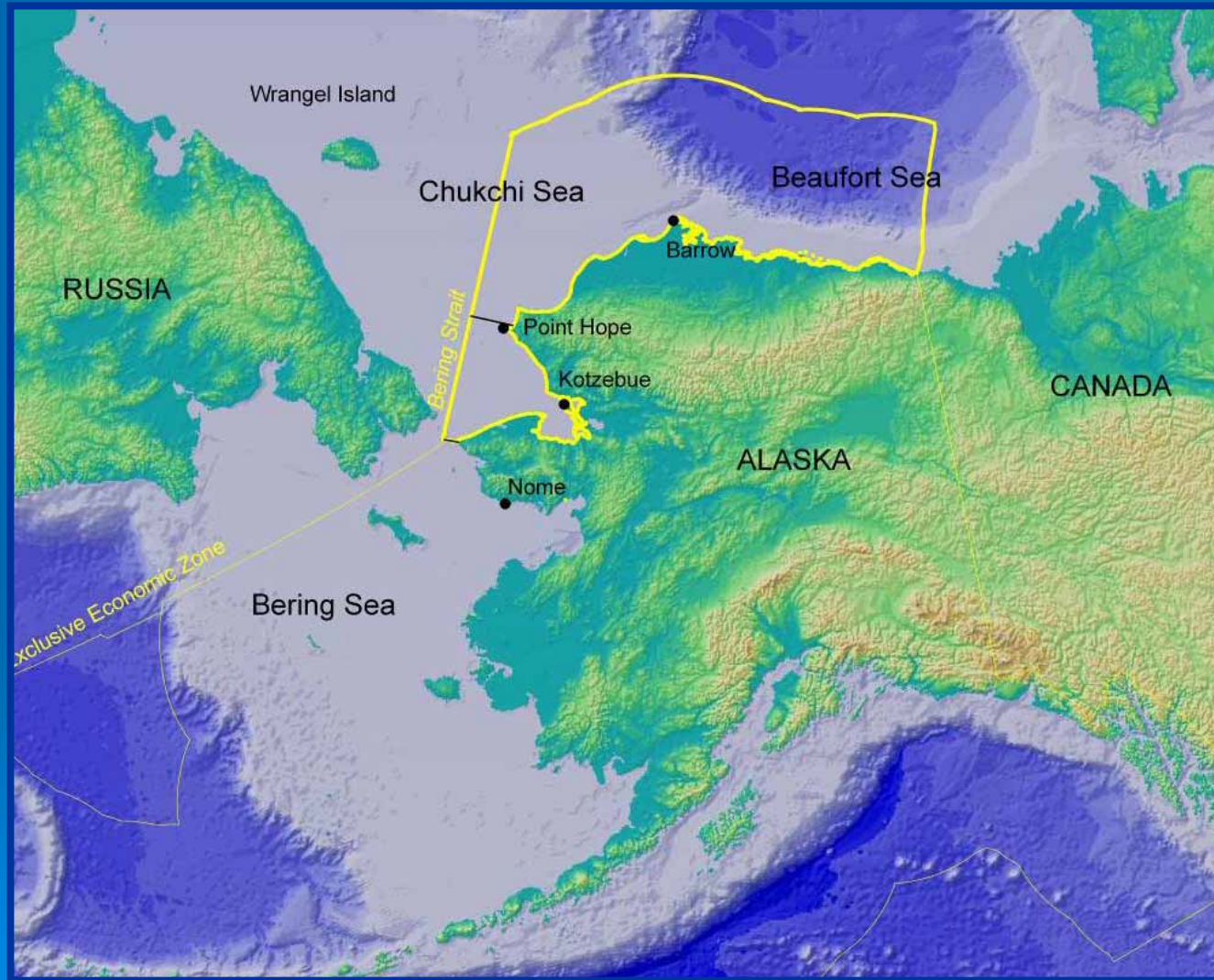
Why Council Interest in the Alaskan Arctic?



Heightened Interest in Arctic

- Indications of changing conditions
 - Climate warming trends
 - Retreat of sea ice
 - Commercial species extending range northwards
- Proactive step
 - Council desire to address potential future issues in the Arctic
 - Concerns due to limited knowledge about Arctic ecosystem
 - Establish a policy and process for orderly fishery development, if any occurs in the future

Arctic Fishery Management Plan



Information is Needed



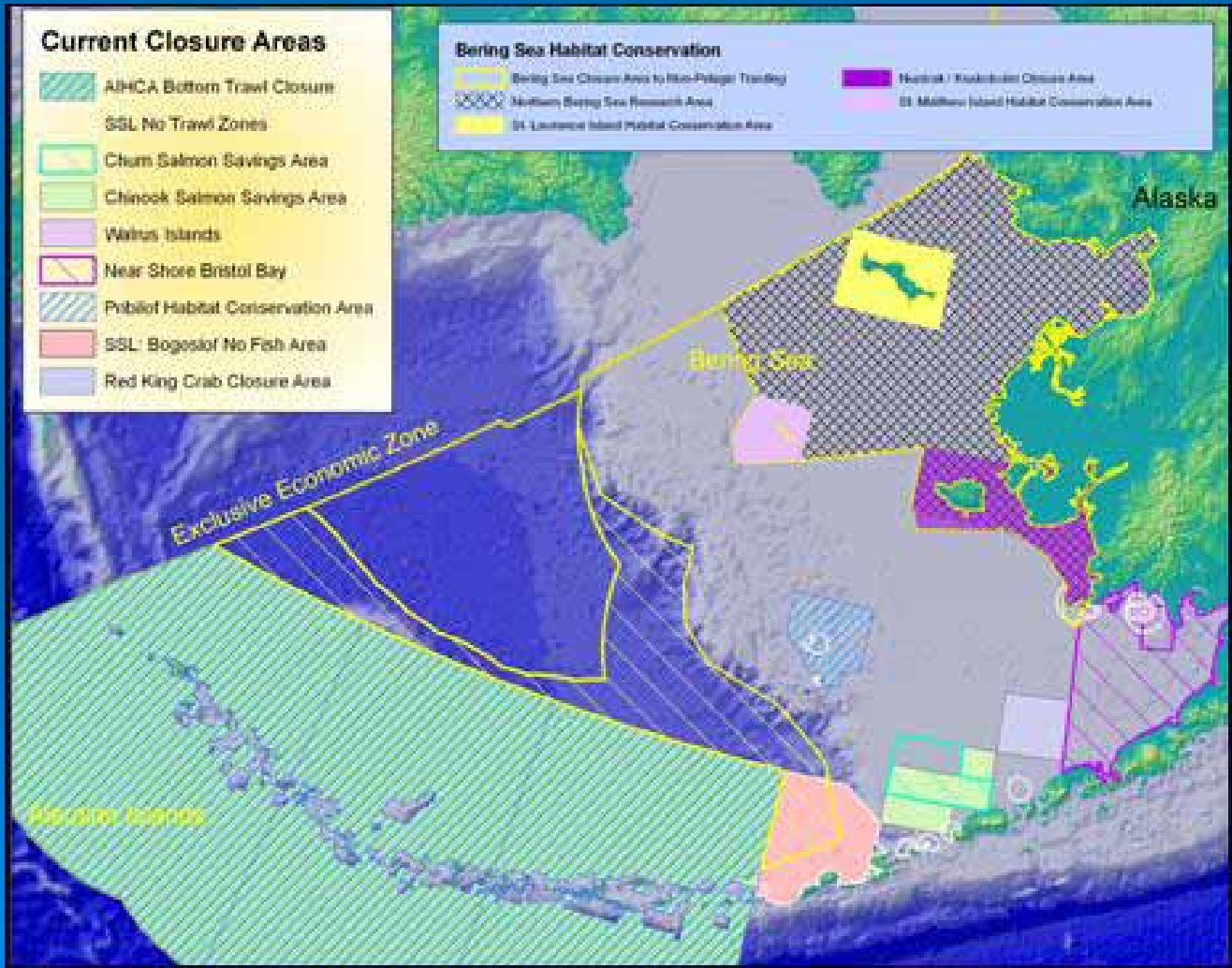
- To better describe the fishery resource(s) in Alaskan Arctic waters
- To monitor environmental change in light of warming trends
- To understand ecological processes necessary for resource management
- To inform the Council in its mandate for fishery management in U.S. EEZ waters, including the Arctic

New Fishery Management Plan for Arctic

Preferred approach:

- A single FMP for the Arctic
- Prohibit commercial fishing in Arctic, until enough is known to understand impacts
- Ecosystem-based plan, emphasizing unique habitats and resources of the Arctic

N. Bering Sea: limit bottom trawling to areas recently trawled



“freezing the footprint”

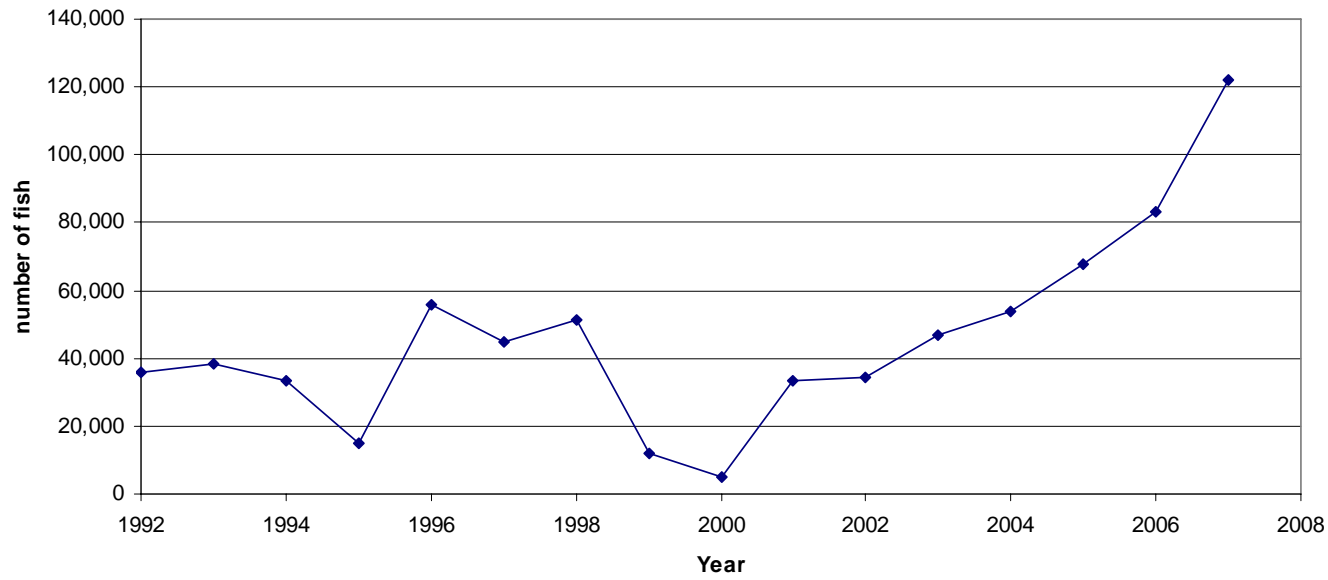
Northern Bering Sea Research Area

- Closed to bottom trawling while research plan developed
- Some areas likely to open for experimental impact assessment of trawling
- Other areas closed permanently to protect vulnerable crab habitats
 - Blue king crab habitat: populations already in decline likely tied to changing climate conditions in EBS

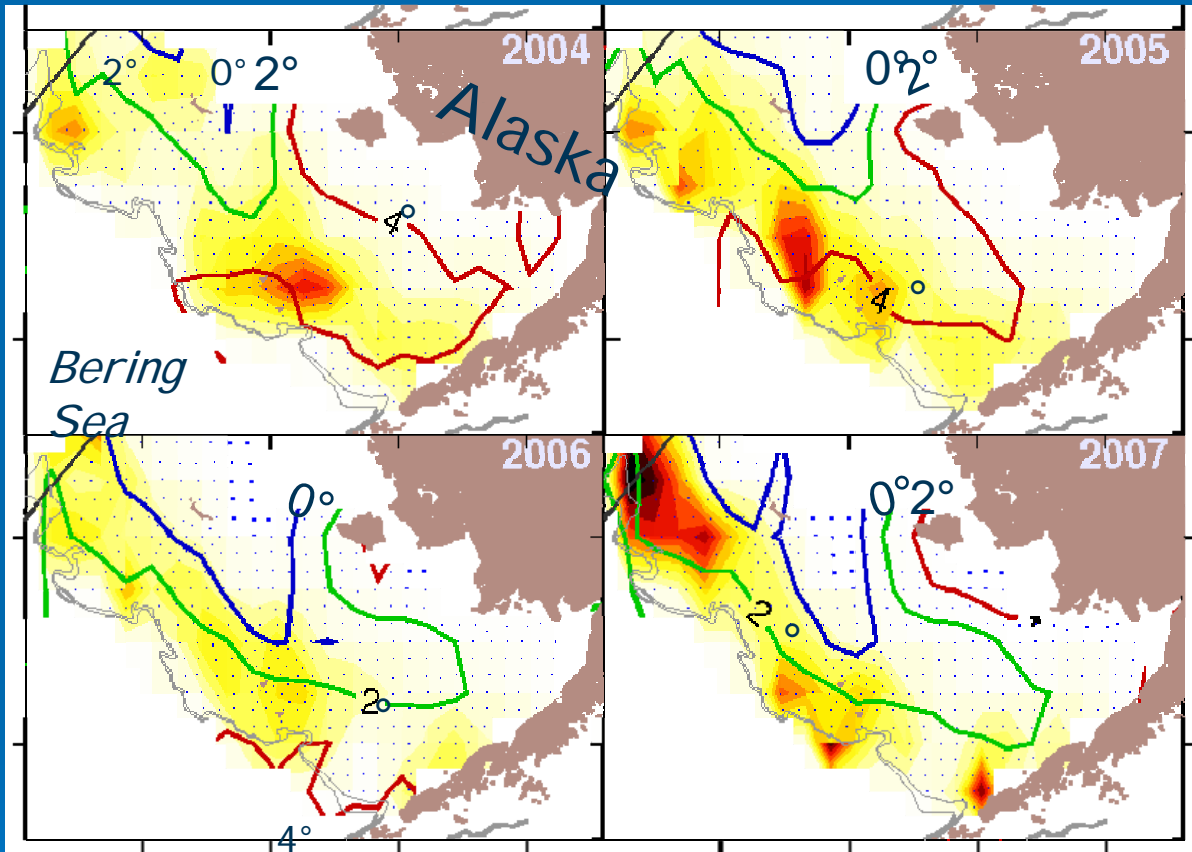
Salmon Bycatch in the Pollock Trawl Fisheries



Chinook salmon mortality in BSAI pollock fisheries



Why is bycatch increasing?



Courtesy of J. Ianelli (NOAA-AFSC)

- Either higher concentrations of salmon in recent years
- Or same or less numbers of salmon by co-occurring more with pollock

Evaluate
pollock
population
distribution

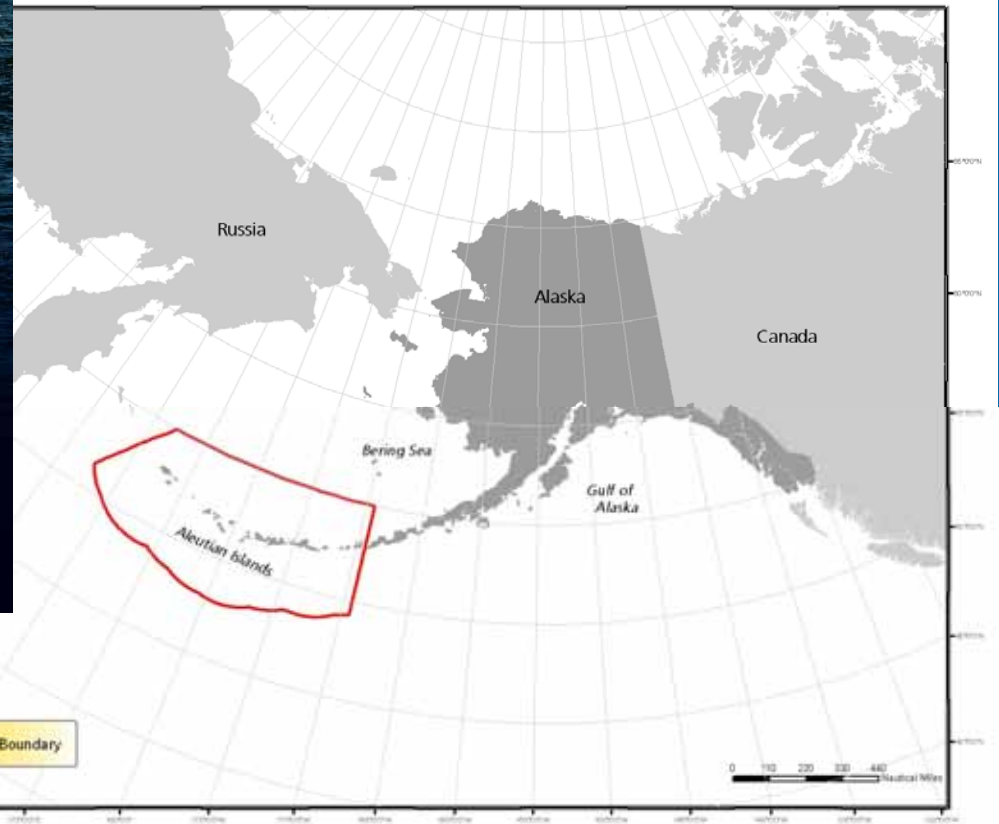
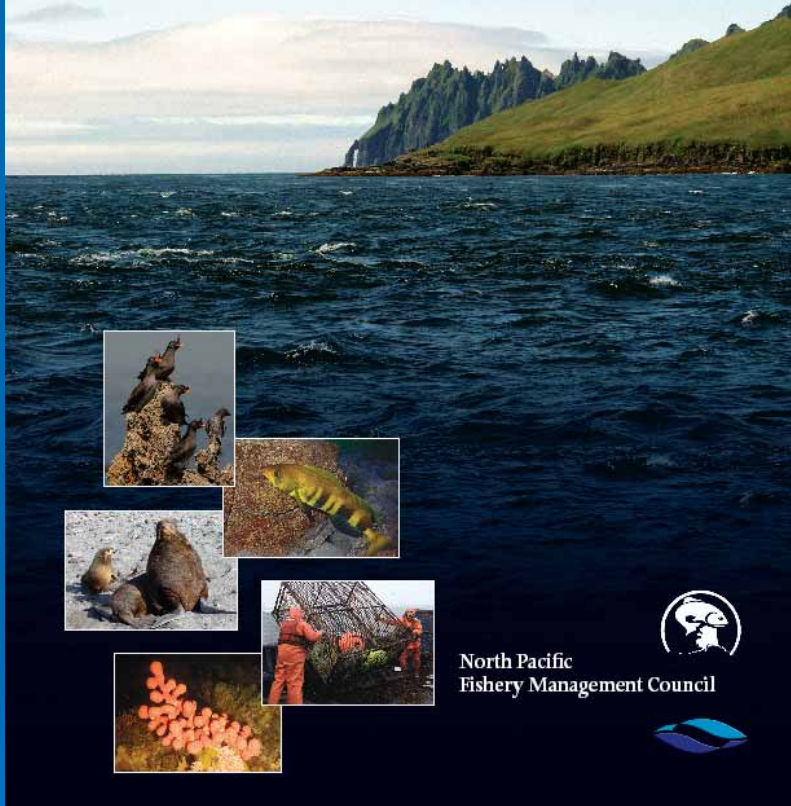
Salmon
population
distribution
(BASIS)

Chinook and chum salmon measures

- Previous time/area closures static
 - Failed to respond to shifting climate
 - Fish distributions changed
- Council response quick
 - Potential impacts on WAK salmon runs
 - International treaty
- Council considering absolute limits on pollock fishery catch of salmon species:
 - Analysis of appropriate caps considers:
 - bycatch stock of origin (genetics)
 - Adult equivalents returning to river systems
 - Assessments of run strengths by rivers

Fishery Ecosystem Plan for the Aleutian Islands

Overview of the
Aleutian Islands
Fishery Ecosystem Plan

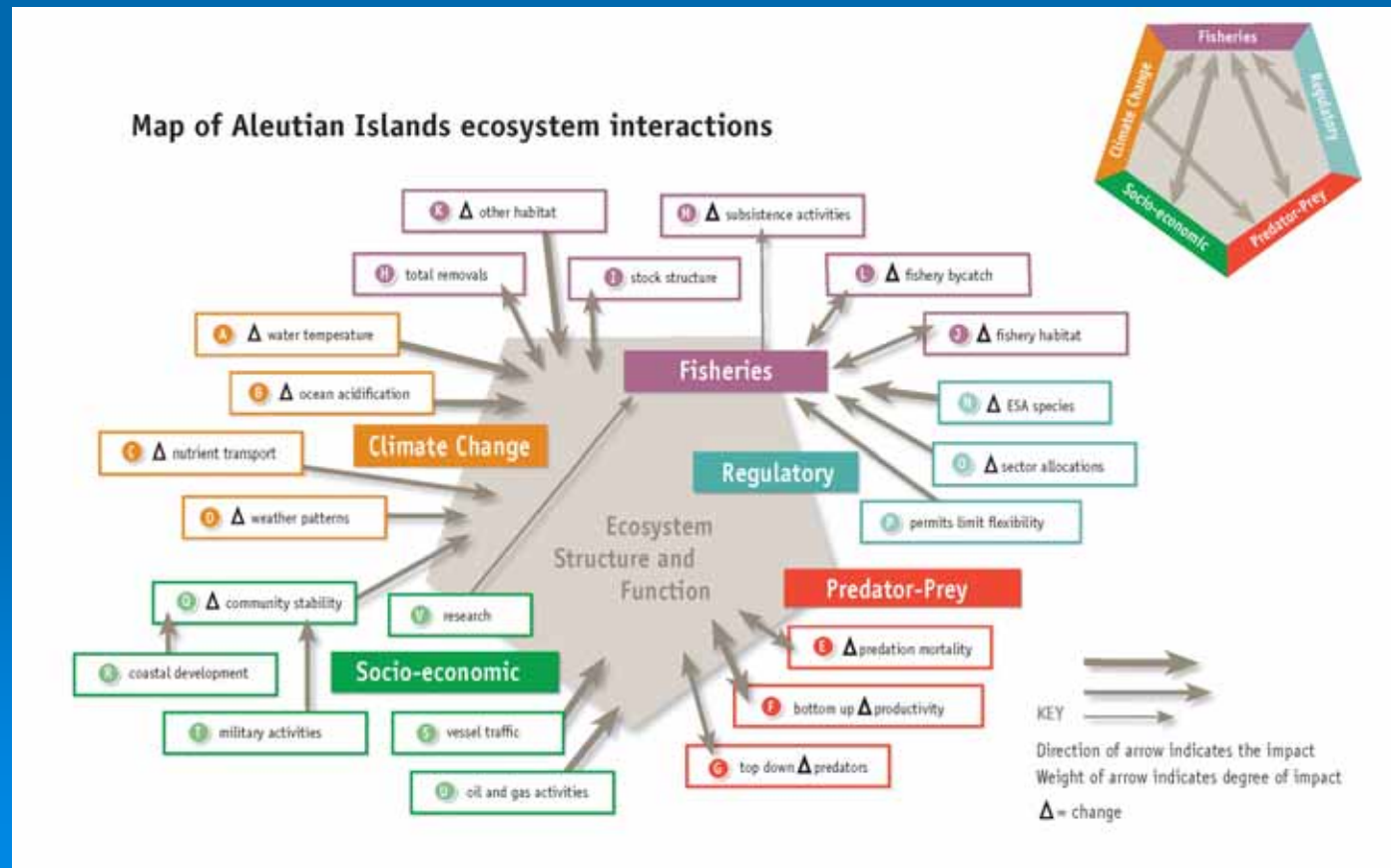


What is a Fishery Ecosystem Plan?

- Applies across fisheries (groundfish, crab, scallop, State fisheries)
- Provides NPFMC with an understanding of the ecosystem context in order to set policy and develop management options
- focus on ecosystem processes: interactions among physical, biological, socioeconomic components

Qualitative Risk Assessment

- takes into account degree to which interactions are or are not considered in management
- identification of appropriate indicators for monitoring



Climate change and future fishery management in the North Pacific

- New Arctic FMP – precautionary policy until information is available to consider fishery development
- Fishing grounds shifting – freeze the footprint until better information is available
- Bycatch patterns changing – Council reaction must be quick to resolve legal, institutional, and international issues
- Ecosystem-based management – a new approach in the Aleutian Islands

