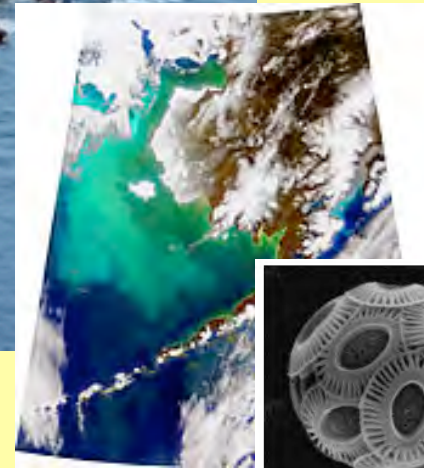
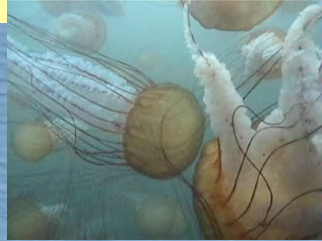
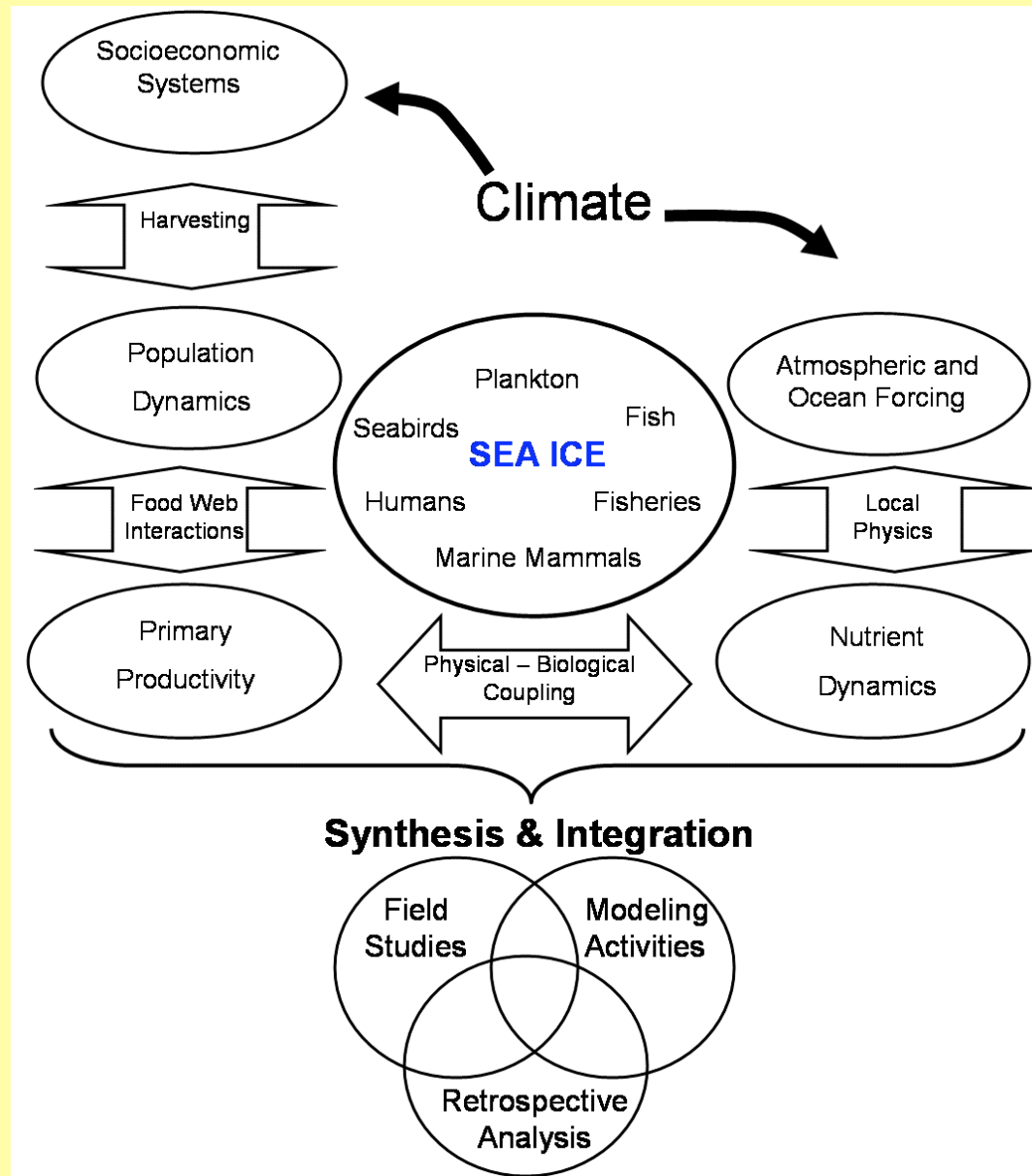


Agencies Conducting Research in the Bering Sea

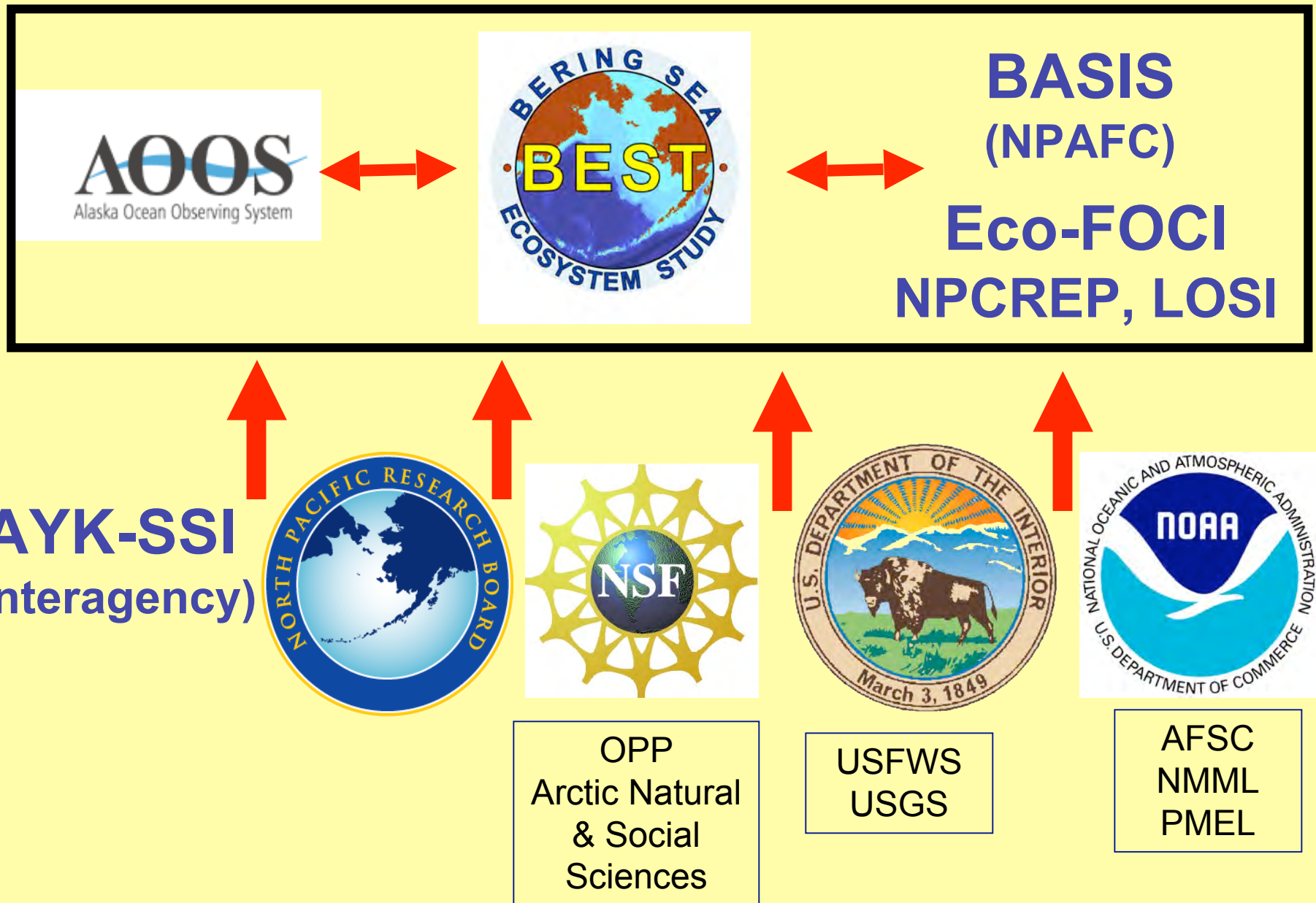


Assembling an End-to-End Program



- Atmosphere / Ocean
 - Local Physics
 - Phys - Biol Coupling
 - Food Web Interactions
 - Harvesting / Fisheries
 - Socioeconomic Aspects
-
- Modeling Activities
 - Field Research
 - Retrospective Studies

Integrated Bering Sea Ecosystem Study



Beyond the Bering Sea

*Integrated Bering Sea
Ecosystem Study*

CENSUS
OF MARINE LIFE

O B I S
OCEAN BIOGEOGRAPHIC
INFORMATION SYSTEM

Ecosystem Studies of Sub-Arctic Seas



Global Ocean Ecosystem Dynamics

CAFF

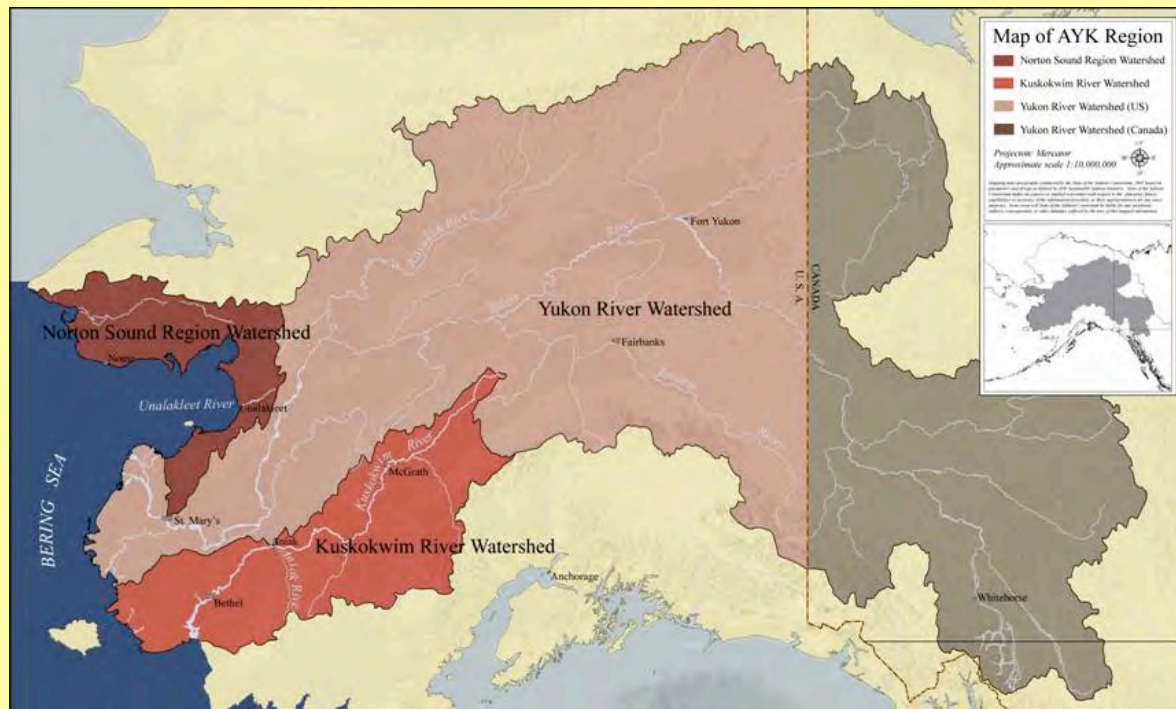
Conservation of Arctic Flora and Fauna
Working Group of the Arctic Council





Objective: “... understanding the trends and causes of variation in salmon abundance and fisheries...”

Current Research: 22 Active Projects (2006)



13 Population Ecology

4 Fisheries Management

2 Run Reconstruction

3 Local Traditional Knowledge

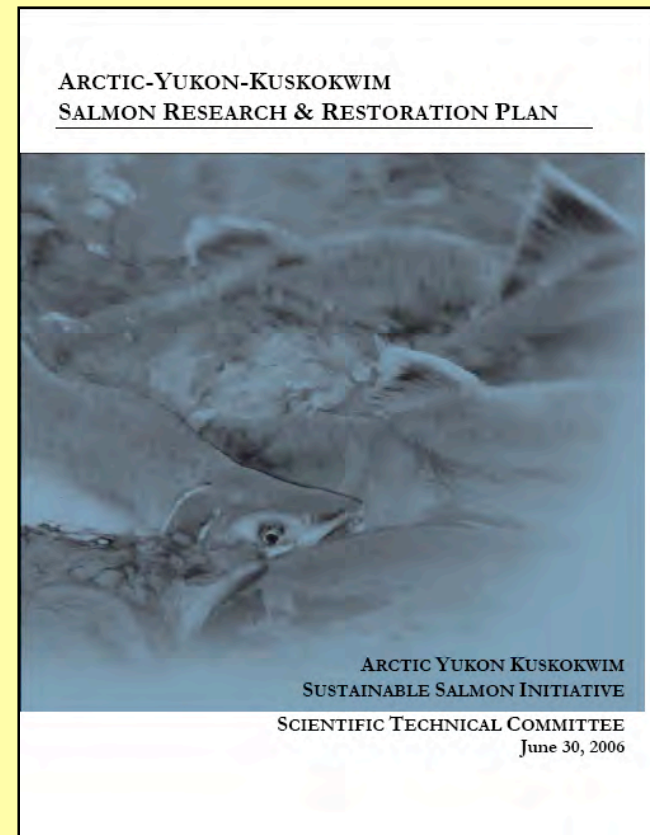
www.aykssi.org



Future Research: \$ 4.5 M RRP (2007)

The RRP is organized around a conceptual foundation, several overarching questions and three research frameworks:

- 1) Salmon Life Cycle
- 2) Human Systems
- 3) Synthesis and Prediction

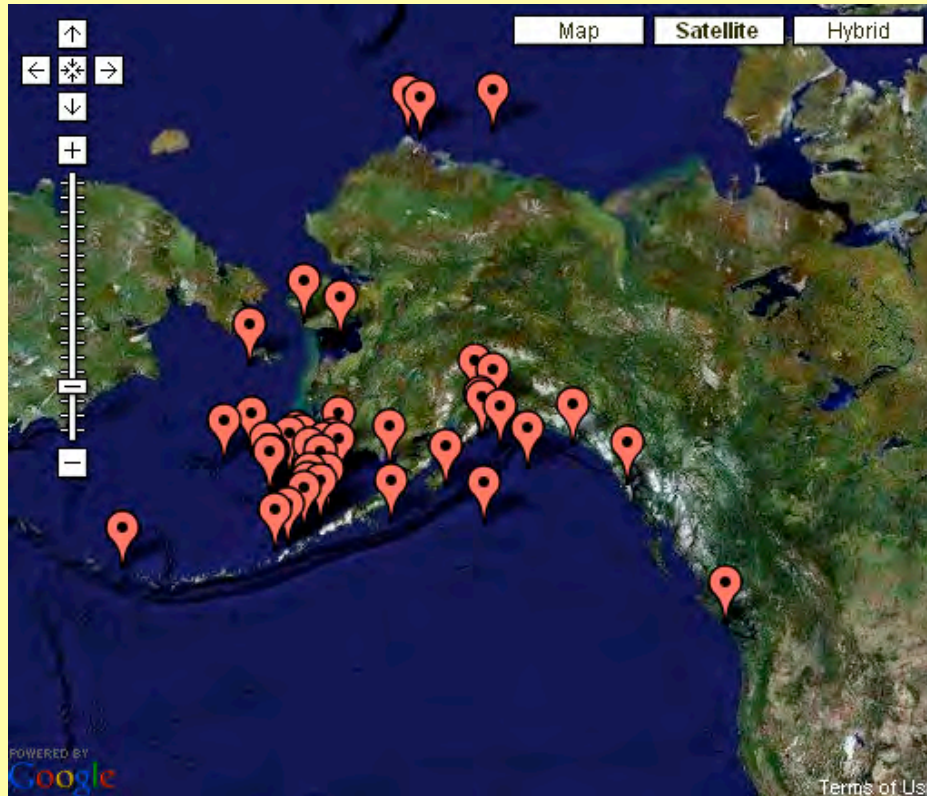


www.aykssi.org/prod



North Pacific Research Board

Current Research: 44 Active Projects (2006)



<http://project.nprb.org>

Modeling Sea Ice / Productivity

Circulation / Larval transport

Population Structure / Dynamics

(fish, squid, pinnipeds, cetaceans)

Species-specific Habitats

(skates, rockfish, pinnipeds, cetaceans)

Community Structure

(plankton / seabirds – cetaceans)

Human Communities / Health

(commercial fishing, shellfish poisoning)



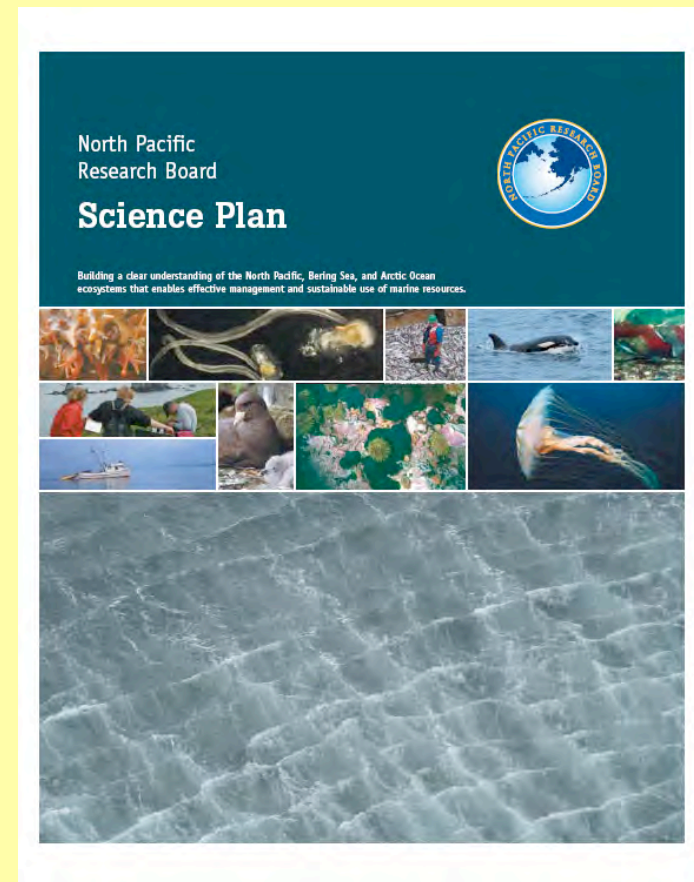
North Pacific Research Board

Future Research: ~\$15 MILLION RFP (2007)

Bering Sea Integrated Ecosystem Research Program (BSIERP)

Major component of the 2007 RFP, which will be released Oct. 6, 2006

Draft program documents will be available for public review from July 21 - August 11, 2006



<http://project.nprb.org/research/index>



NOAA – Objectives

- Continue stock assessments
- Continue and expand biophysical shelf moorings
- Initiate spring biophysical survey of the Bering Sea shelf
- Conduct summer plankton surveys from groundfish charters
- Study transport of larvae on the shelf
- Explore the role of eddies in cross-shelf flux
- Build conceptual /numerical models for eastern Bering Sea
- Develop and refine ecosystem indicators
- Incorporate climate into ecosystem and population modeling
- Improve climate-ecosystem advice to NP Fish. Mgmt. Coun.
- Support the Bering Climate web site

www.beringclimate.noaa.gov



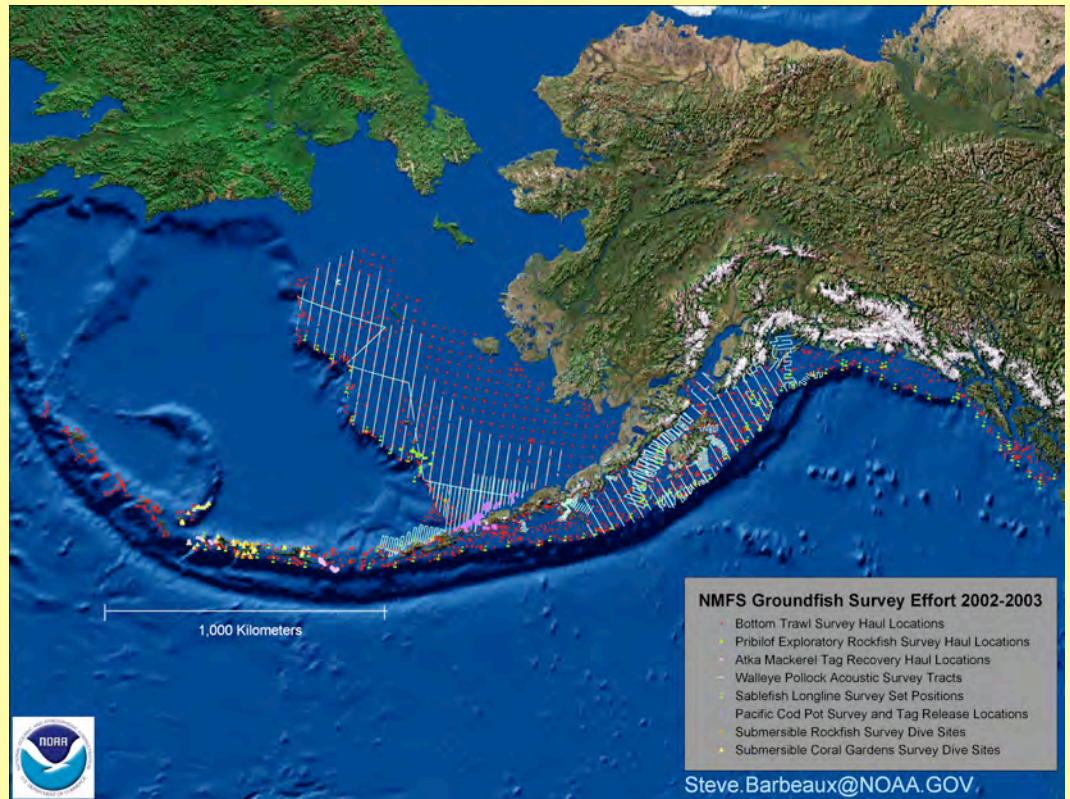
NOAA – Bering Sea Research

➤ Fishery Stock Assessments:

- REFM: Resource Ecology & Fisheries Management
- RACE: Resource Assessment & Conservation Engineering



Acoustic / Trawling / Pots /
Longlines / Submersible

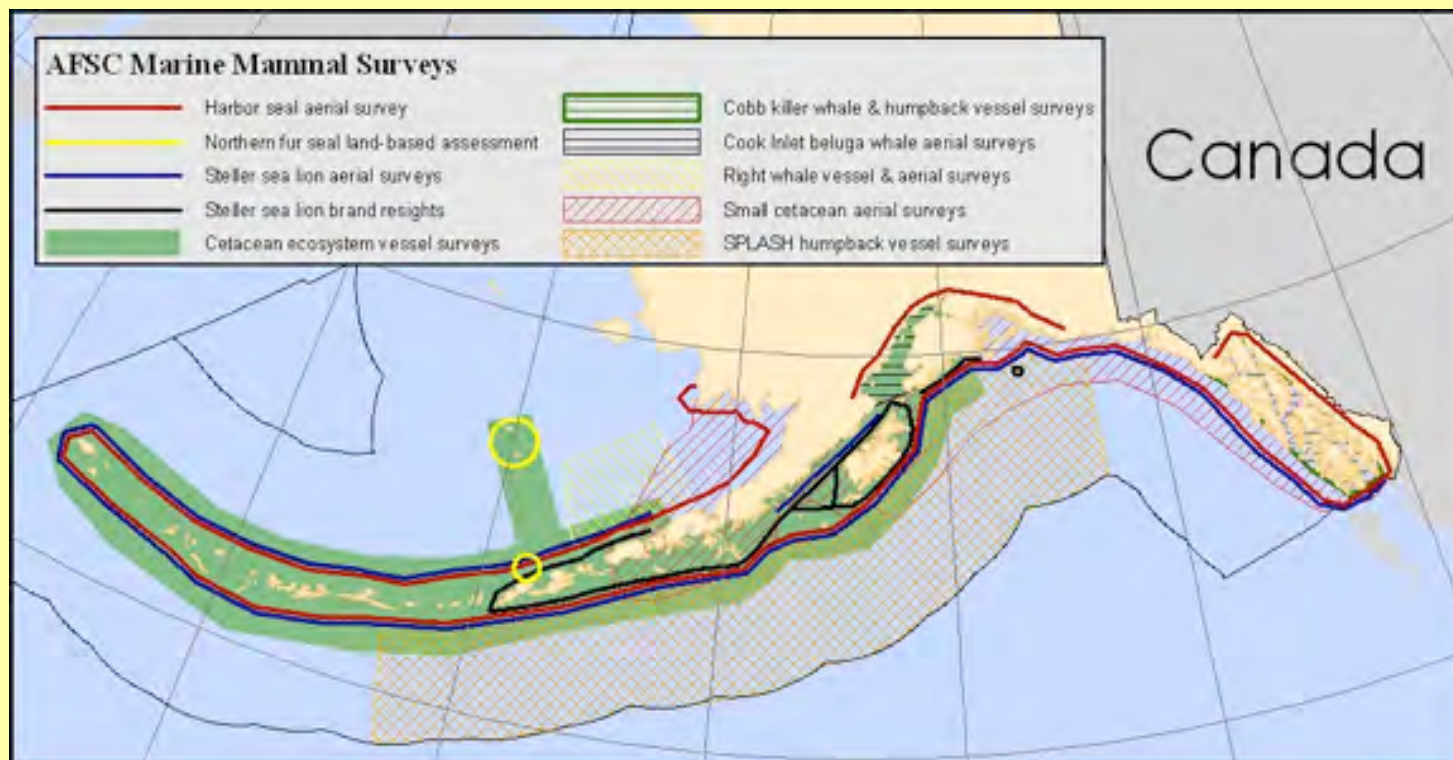




NOAA – Bering Sea Research

➤ National Marine Mammal Laboratory:

- shore-based counts and at-sea surveys
- ice-seal satellite tracking
- photo-identification and genetics

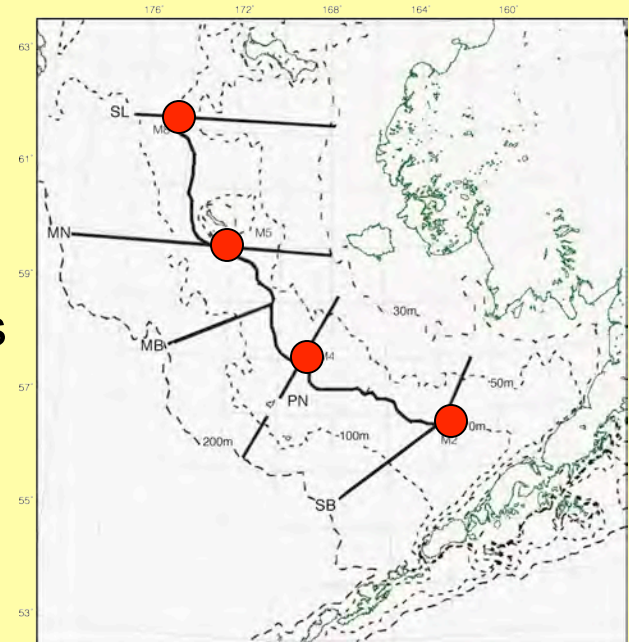




NOAA – Bering Sea Research

➤ Process-Oriented Studies:

- Eco-FOCI: Ecosystem & Fishery
- Oceanography Coordinated Investigations
- LOSI: LOss of Sea Ice



Planned Eco-FOCI activities:

- Moorings M2, M4, M5, M8
- Cross-shelf lines, extending from the inner shelf to the slope (500 m depth)

BASIS

The Bering-Aleutian Salmon International Survey



Fisheries and Oceans
Canada

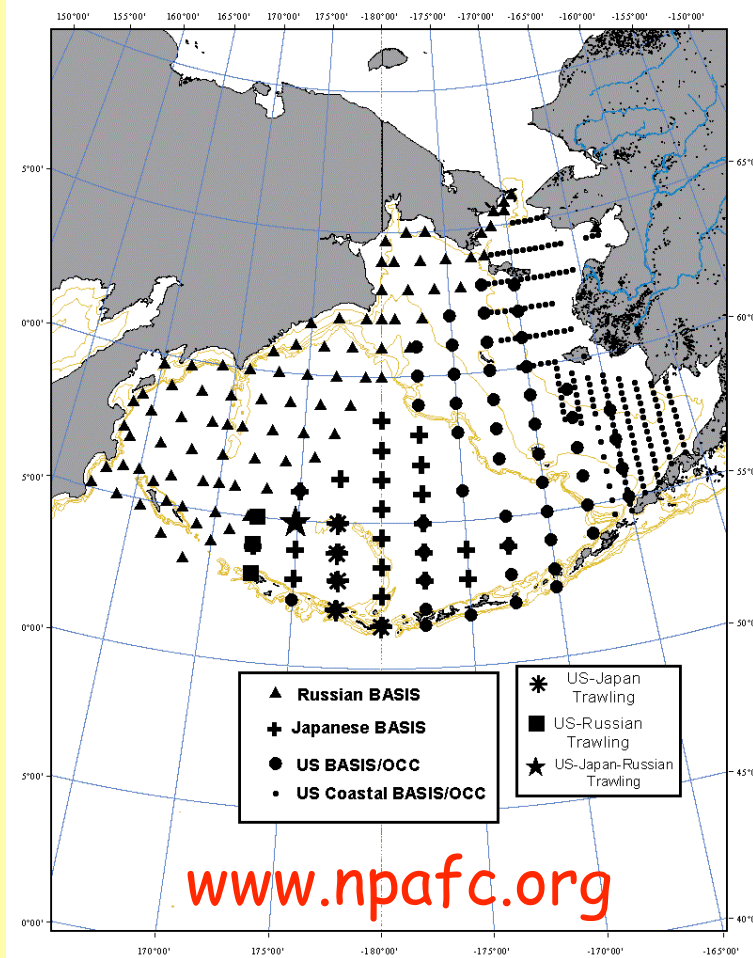


Objective: “Study aspects of ocean ecology of salmon in the Bering Sea”

Key Issues:

- **Salmon and Forage Fish**
changing ocean conditions and productivity
- **Climate Change**
sea ice loss, increase in water temperature
- **Fisheries Bycatch**
expanding salmon distribution due to warming

- Initiated by NPAFC in 2002
- Tri-national surveys: Russia, Japan, US
- Cooperative research: Canada, Korea



BASIS

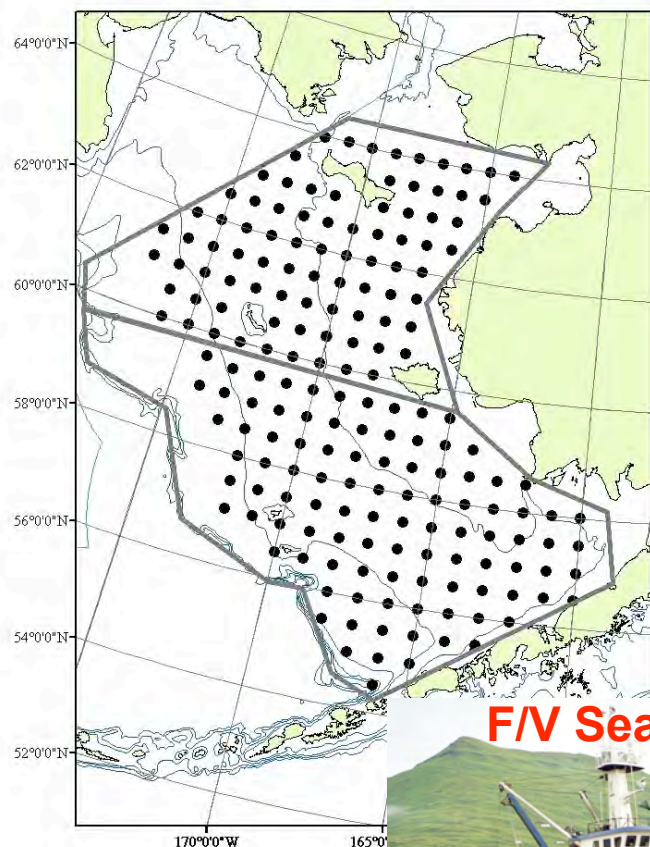
The Bering-Aleutian Salmon International Survey



Fisheries and Oceans
Canada



US BASIS Stations



F/V Sea Storm



August – October (60 days)

- Physical / Biological Oceanography
- Distribution in relation to ocean conditions: physics and prey
- Critical size and marine survival
- Spatially Explicit Habitat Quality
- Trophic Interactions

BASIS Working Group Points of Contact

Chairman: Jack Helle

Auke Bay Laboratory, NMFS, Juneau, AK

email: jack.helle@noaa.gov



Alaska Fisheries Science Center

NATIONAL MARINE FISHERIES SERVICE



Alaska Ocean Observing System

Objective:

Develop a Regional Observing System within the Integrated Ocean Observing System

Key Issues:

- Improve prediction of climate change impacts
- Improve safety and efficiency of marine ops.
- More efficiently protect and restore healthy coastal ecosystems
- Sustain marine resources
- Mitigate effects of natural hazards
- Reduce public health risks
- Improve national security

(Adapted From: An Integrated and Sustained Ocean Observing System, Ocean.US 2002)



www.aoot.org



Alaska Ocean Observing System

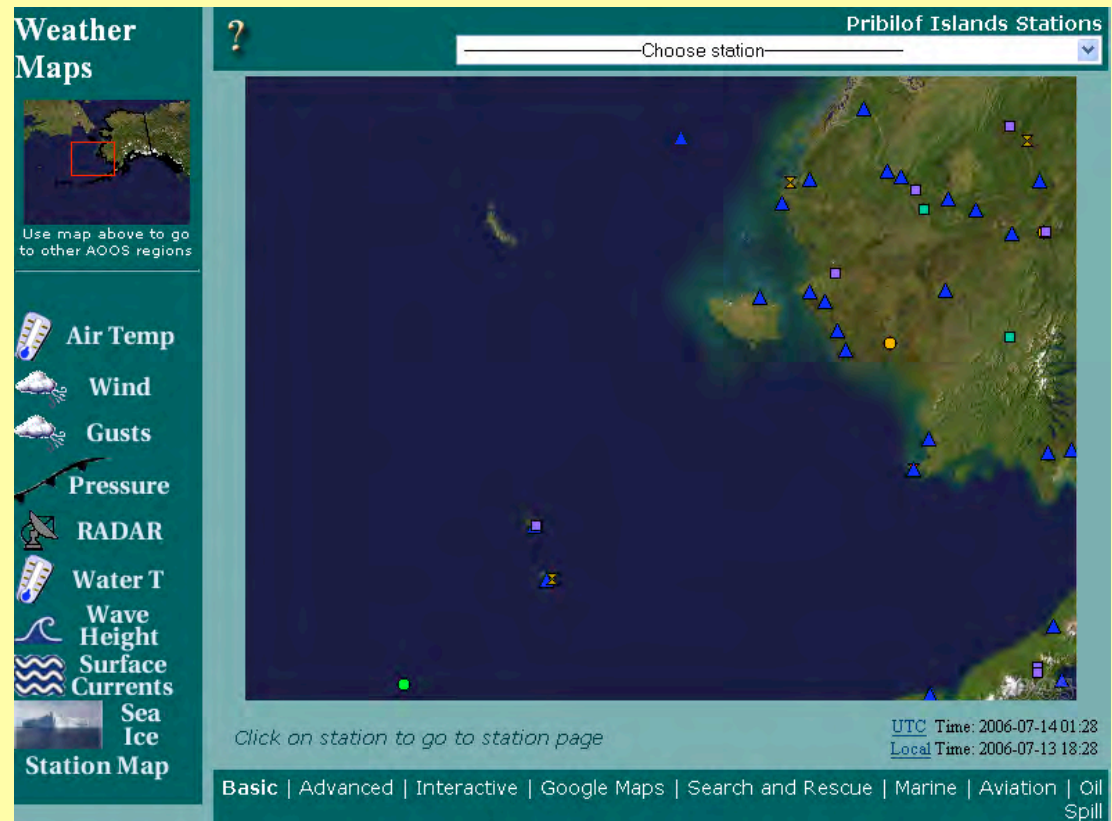
Components:

weather, moorings, cruises

Real Time Data

Historical Data

Forecasts



www.aoot.org

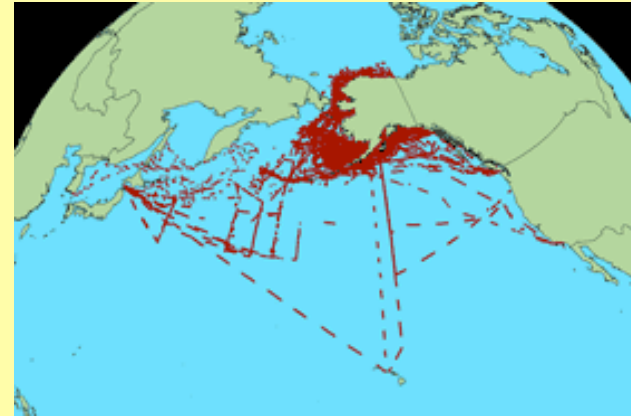


U.S. Fish and Wildlife Service

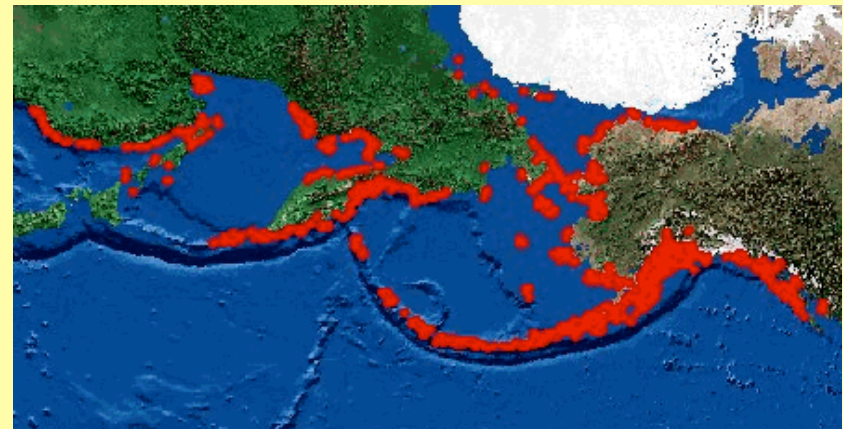
Objective: Monitoring of
Natural Resources
Alaska Maritime Refuge



- Seabird colonies
- Marine mammal rookeries
- Sea otters
- Seabirds at-sea
- Marine mammals at-sea
- Fish
- Invertebrates



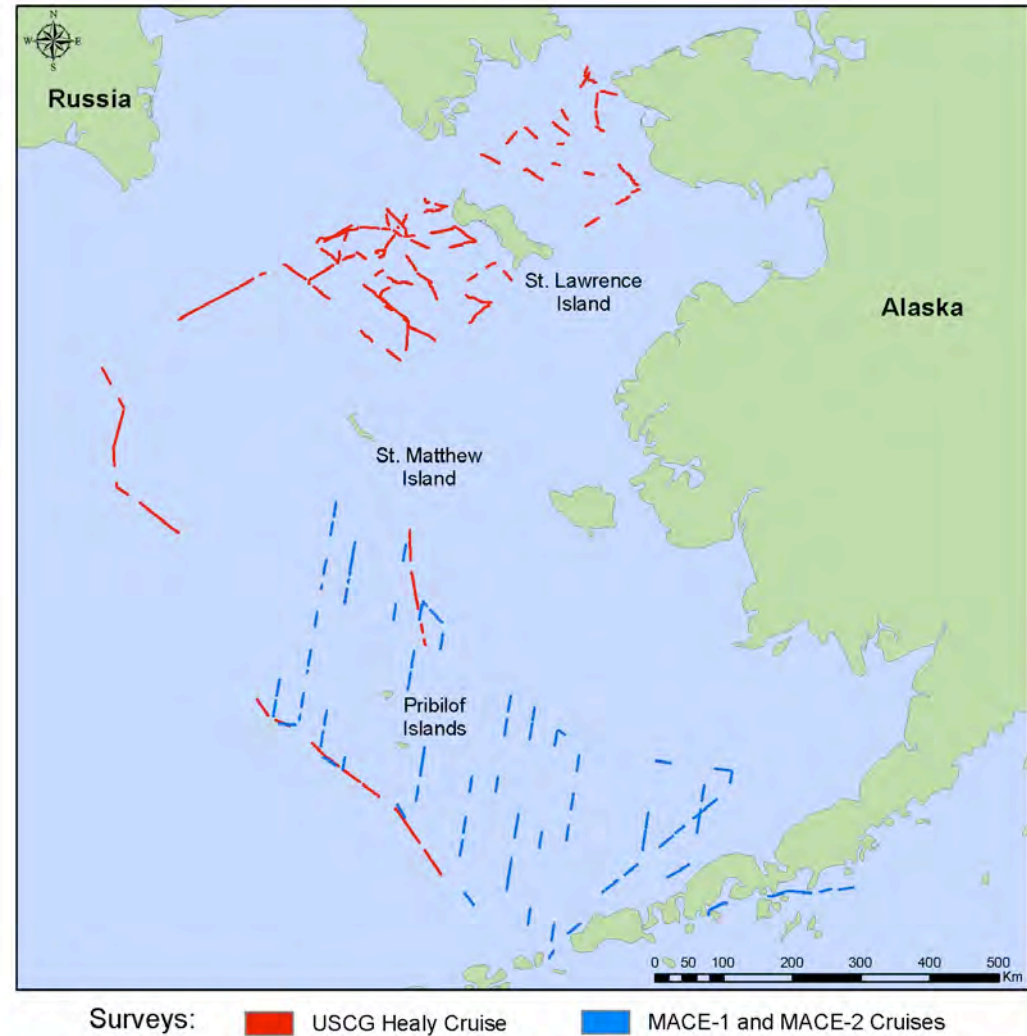
NORTH PACIFIC SEABIRD COLONY DATABASE





U.S. Fish and Wildlife Service

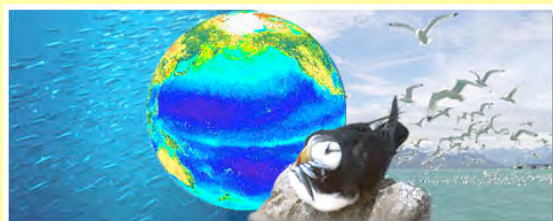
Host project	Lead	Dates	Area
Shelf-Basin Interactions	Grebmeier U.TN.	May 5-Jun 4	N Bering Sea
AK Maritime Natl. Wildl. Refuge - operations	USFWS & USGS	Jun 11-Jul 31	Aleutians - AK Penin.
Mid-water Assessment & Conservation Engineering	NOAA	Jun 3-Jul 31	Bering Sea shelf
Bering-Aleutian Salmon International Survey	NOAA	Jul 27-Sep 3	Bering Sea shelf
Fisheries-Oceanography Coordination Investigation	NOAA	Sep 9-Oct 10	Bering Sea shelf



(Figure courtesy Kathy Kuletz & David Irons)



U.S. Geological Service



Vision:

To provide scientific leadership and accurate, objective, and timely data, information, and research findings to address important natural resource issues and natural hazards assessments in Alaska and circumpolar regions

Ecosystems & Habitats

- [Coastal and Marine](#)

Fish & Fisheries

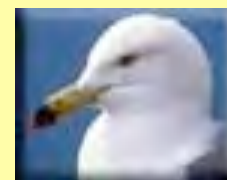
- [Fisheries Projects](#)



Mammals



- [Polar Bears](#)
- [Sea Otters](#)
- [Walrus](#)



Birds

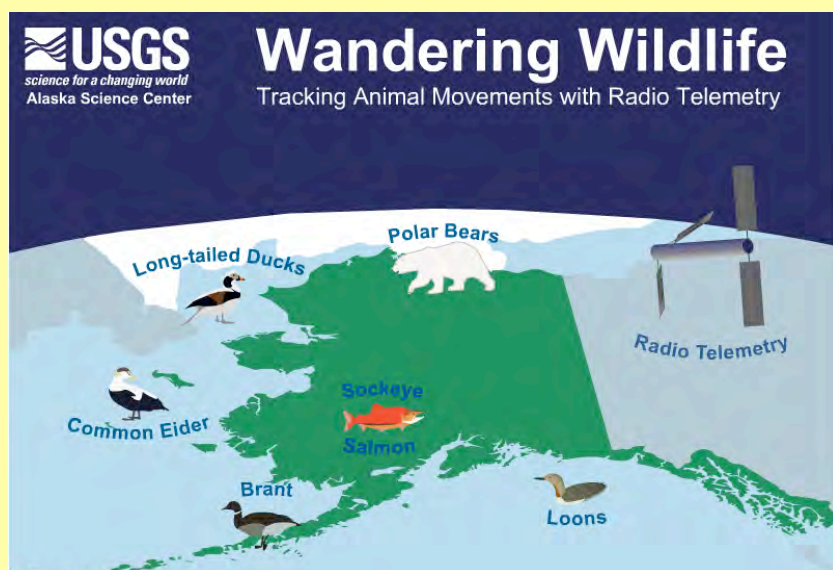
- [Seabirds](#)
- [Waterfowl](#)
- [Seaducks](#)
- [Shorebirds](#)
- [Loons](#)

[**alaska.usgs.gov/science/biology**](http://alaska.usgs.gov/science/biology)



U.S. Geological Service

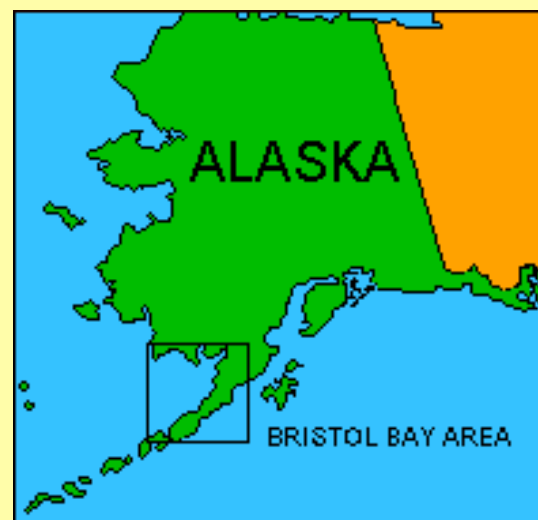
Alaska Science Center



alaska.usgs.gov/science/biology

- To identify the movements and habitats of marine organisms
- **Birds:** Loons, eider, brant, ducks
- **Mammals:** Walrus, polar bears

Global Change Research in Biology



geochange.er.usgs.gov

- To measure patterns of Bristol Bay sockeye growth in marine and freshwater environments and identify linkages between growth rates and climatic conditions



Alaska Department Fish and Game - Wildlife Conservation and Fisheries -

Objective:

To protect, maintain and improve the fish, game and aquatic plant resources of Alaska, and manage their use and development for the maximum benefit of the people of Alaska

Priorities:

- Optimize economic benefits from fish and wildlife resources.
- Enhance public participation in management
- Increase public knowledge about fish and wildlife populations



www.adfg.state.ak.us



Alaska Department Fish and Game

- Subsistence -

Objective:

To scientifically, quantify, evaluate and report information about customary and traditional uses of Alaska's Fish and wildlife resources.

Priorities:

- Research, quantify, and disseminate information to the public about customary and traditional uses by Alaskans of fish and wildlife resources
- Provide scientifically-based information for evaluating opportunities for customary and traditional resource uses

Studies

- wild resource harvest / use
- seasonality of harvesting
- methods of harvesting
- methods of and processing
- harvest levels
- sharing / trading foods
- geographic areas used
- cultural and economic values
- groups sharing resources
- trends in resource use patterns



Climate Change and the Bering Sea Ecosystem: An Integrated, Interagency / Multi-Institutional Approach

Bering Sea Inter-Agency Working Group (BIAWG)

Alaska Ocean Observing System
Bering Ecosystem Study
NOAA Alaska Fisheries Science Center
NOAA Pacific Marine Environmental Lab.
North Pacific Research Board
U.S. Arctic Research Commission
U.S. Fish and Wildlife Service
U.S. Geological Survey
University of Alaska Fairbanks

- *Workshop: April 2005*
- *White Paper: February 2006*

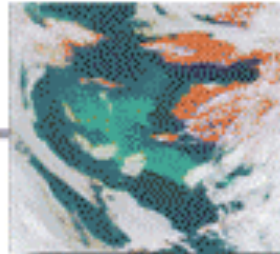
Climate Change and the Bering Sea Ecosystem:
An Integrated, Interagency / Multi-Institutional Approach

Workshop held 8 April 2005
Seattle, WA



February 2006

BEST



Bering Ecosystem Study Program

BEST Information Sources

- **Web Site:**
<http://www.arcus.org/Bering/index.html>
- **Science Plan, available in Hard Copy at:**
Arctic Research Consortium of the U.S. (ARCUS)
3535 College Road, Suite 101, Fairbanks, AK 99709
Phone: 907-474-1600; Fax: 907-474-1604
- **Planning Group. c/o George L. Hunt, Jr.**
School of Aquatic & Fishery Sciences
University of Washington, Seattle
Email: geohunt2@u.washington.edu