

Science, Service, Stewardship



Chukchi Sea Fish and Ice Seal Surveys 2012-2013

Mike Sigler
NOAA Alaska Fisheries Science Center

**NOAA
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SERVICE**

Presentation at Interagency Arctic Research Policy
Committee Staff Meeting, April 9, 2012

Arctic Ecosystem Integrated Survey

When: August / September 2012 & 2013

Where: Northern Bering Sea / Chukchi Sea

Why: Understand the distribution of marine fishes and shellfishes, and the plankton they depend upon for food, throughout the northern Bering Sea and Chukchi Sea

Knowledge and insights gained from these studies will help us to:

- evaluate effects of climate change on marine resources in the Alaskan Arctic
- protect marine resources in the region from potential effects of oil & gas development

A collaboration between:



With funding from:

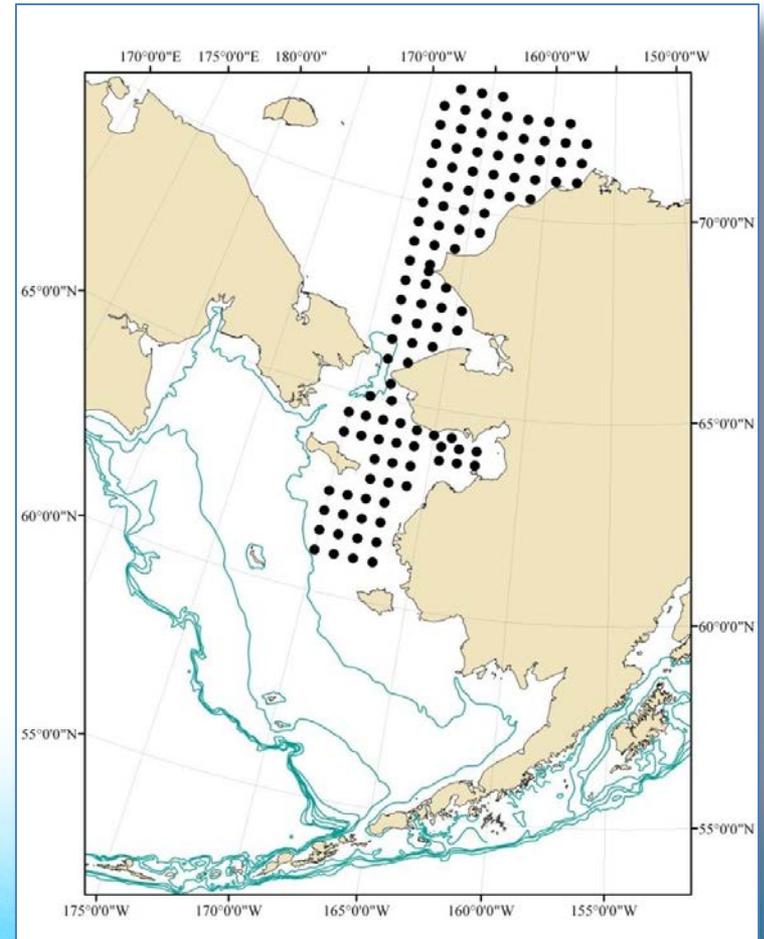


Coastal Impact Assistance Program (CIAP)



A comprehensive ecosystem survey

- Ocean circulation & physics
- Ocean chemistry
- Plankton
- Surface, mid-water, and bottom fishes
- Biology of salmon, Arctic cod, saffron cod, snow crab, capelin, and other fish & invertebrates



Range-wide ice seal abundance estimate (2012-2013)

- Location: Bering Sea, Sea of Okhotsk
- Funding Source: NOAA/BOEM
- Funding amount: \$800K
- Bearded, ribbon, and spotted seals (at primary breeding areas)
- International effort to conduct aerial surveys of ice seals to develop abundance estimates
- Collaborators: Russian government



Proposed track lines for the 2012-2013 April synoptic aerial surveys of the Bering and Okhotsk Seas



Ecology of ice-associated seals in the Bering Sea (ongoing)



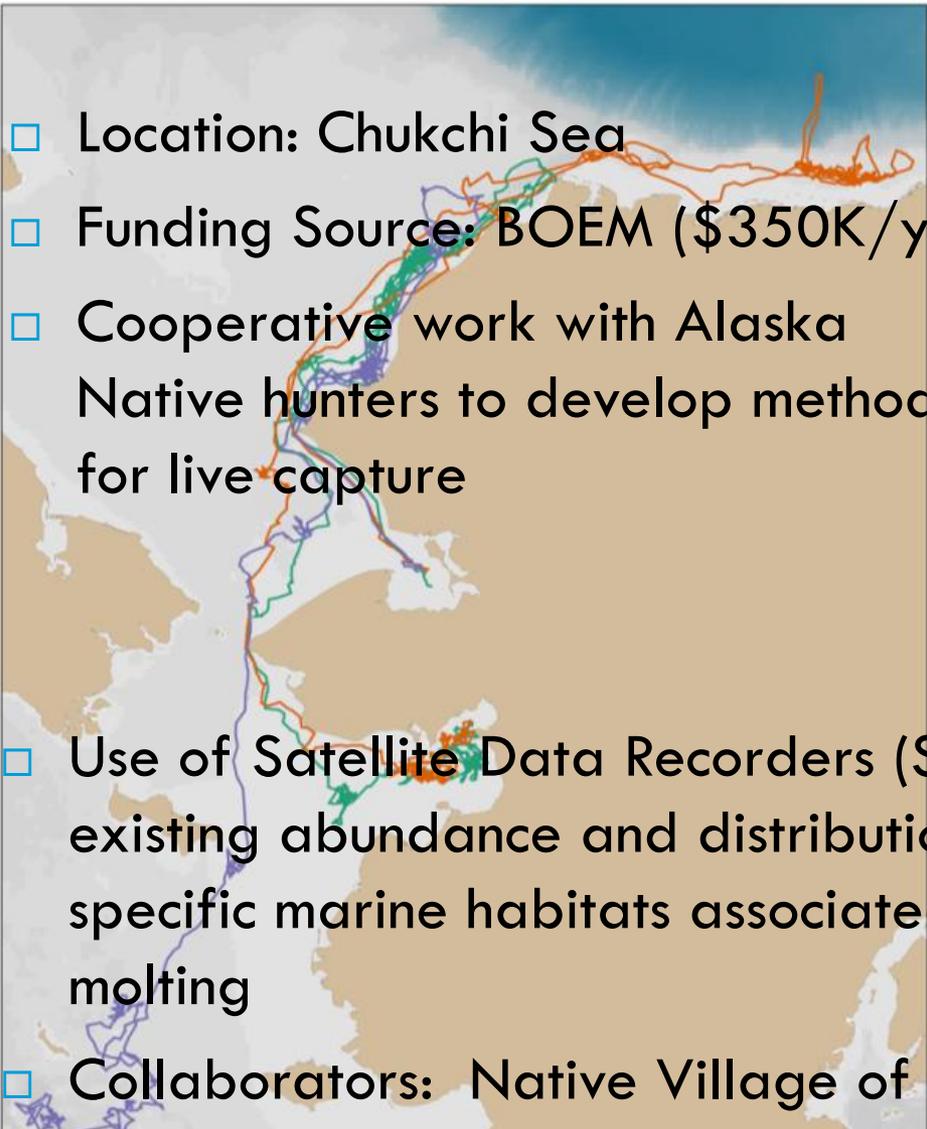
- Location: Northern and western Alaska
- Funding: AFSC/NMFS/NOAA
- Funding Amount: ~\$300 K
- Spotted, ribbon, bearded, and ringed seals
- Use of distribution surveys and satellite tags to investigate abundance, migration, and habitat requirements

Bearded seals in the Chukchi Sea



2009 Movements

- Location: Chukchi Sea
- Funding Source: BOEM (\$350K/yr)
- Cooperative work with Alaska Native hunters to develop methods for live capture
- Use of Satellite Data Recorders (SDRs) to gather information on existing abundance and distribution, diving/foraging behavior and specific marine habitats associated with breeding, pup rearing and molting
- Collaborators: Native Village of Kotzebue, North Slope Borough

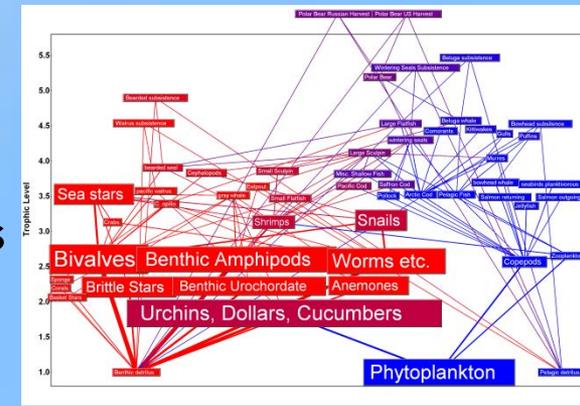


2009 Foraging/Resting



Development of baseline food web models for the Chukchi and Beaufort Seas (ongoing)

- Location: Chukchi and Beaufort Seas
- Principle Investigator: Kerim Aydin
- Funding Source: AFSC
- Funding amount: \$100K (FY10 - FY11)
- A baseline food web model for the Chukchi Sea has been created and initial model balancing has begun. Preliminary results found at:
<http://www.afsc.noaa.gov/REFM/REEM/REEMPosters.php>
- A of review food web literature is ongoing for the Beaufort and Chukchi ecosystems, including data on production, benthos, fish, and upper trophic levels (mammals and birds).
- Collaborators: University of Washington, North Slope Borough, MMS



Preliminary food web model arranged from top to bottom by trophic level. Biomass proportional to box size.



Other slides for questions or as time allows



Integrated Ecosystem Research in the Bering Sea

Bering Ecosystem Study
(BEST)

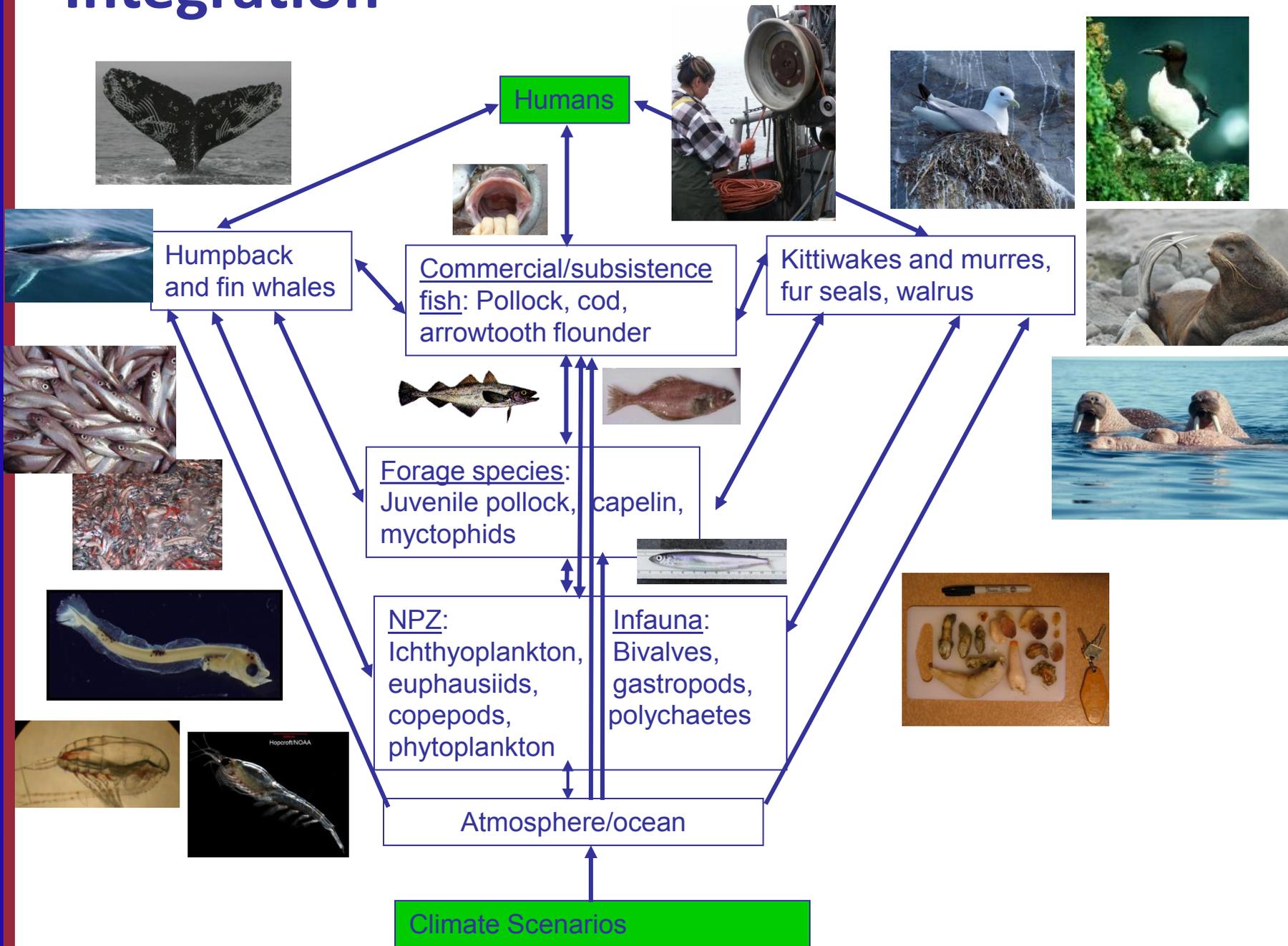
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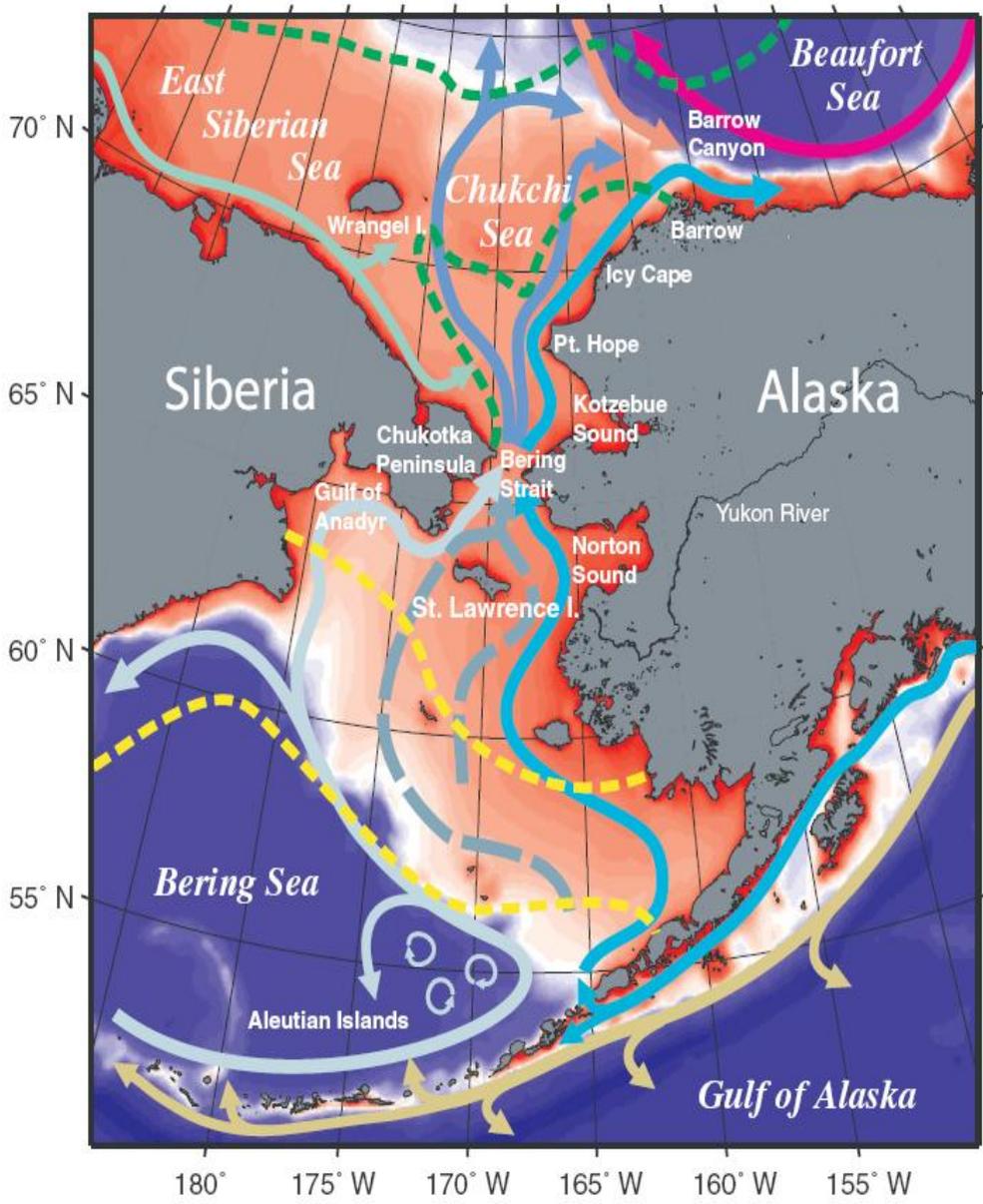
Bering Sea Integrated Ecosystem Research Program
(BSIERP)





Integration





- █ Beaufort Gyre (surface)
- █ Atlantic Water (subsurface)
- █ Siberian Coastal Current
- █ Alaska Coastal Water
- █ Bering Shelf Water
- █ Bering Shelf Anadyr Water (Bering Sea Water)
- █ Aleutian North Slope, Bering Slope & Anadyr Waters
- █ Alaskan Stream
- - - September Ice Edge Maximum & Minimum Extent
- - - March Ice Edge Maximum & Minimum Extent

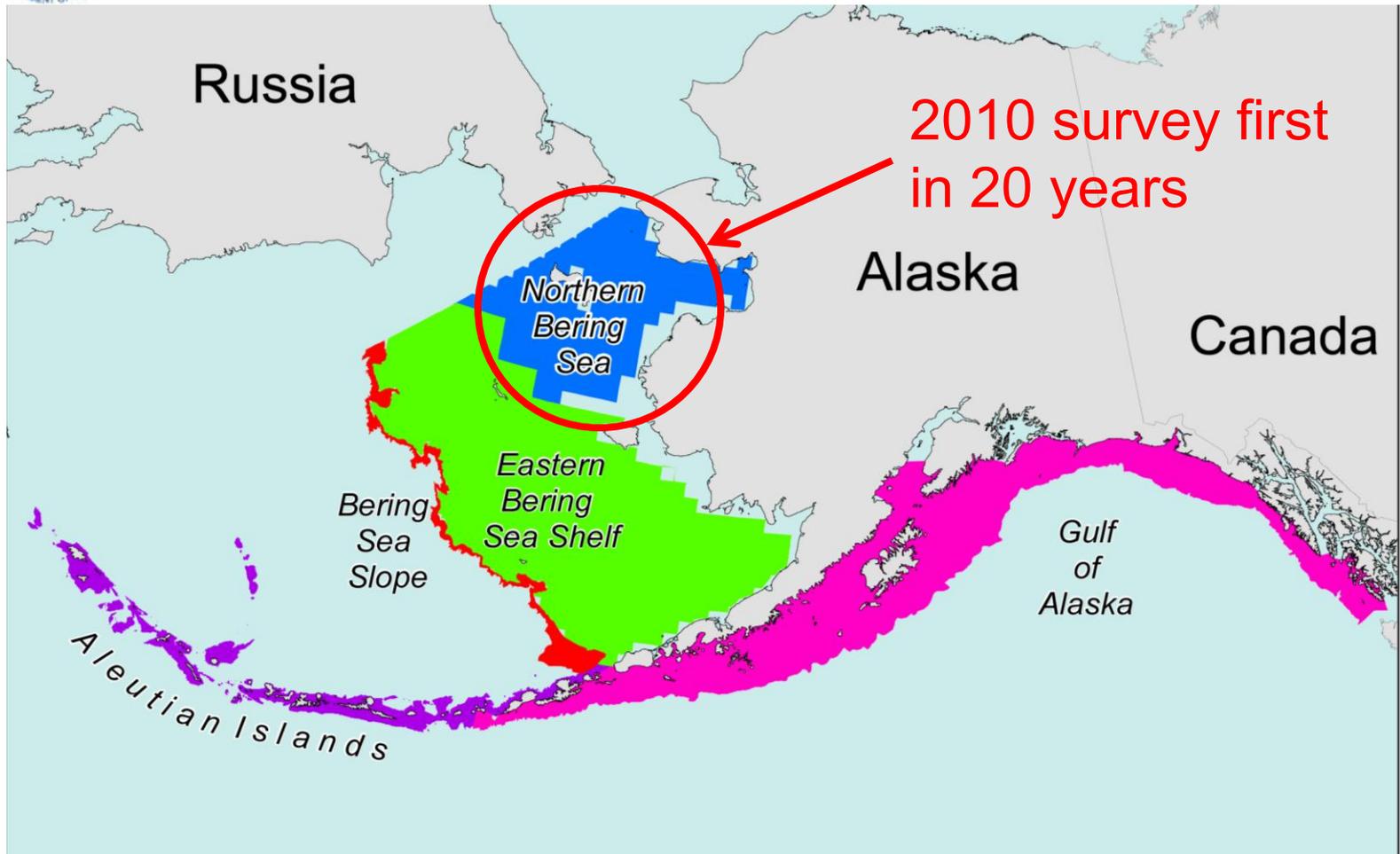


Depth (m)

Distance (km)

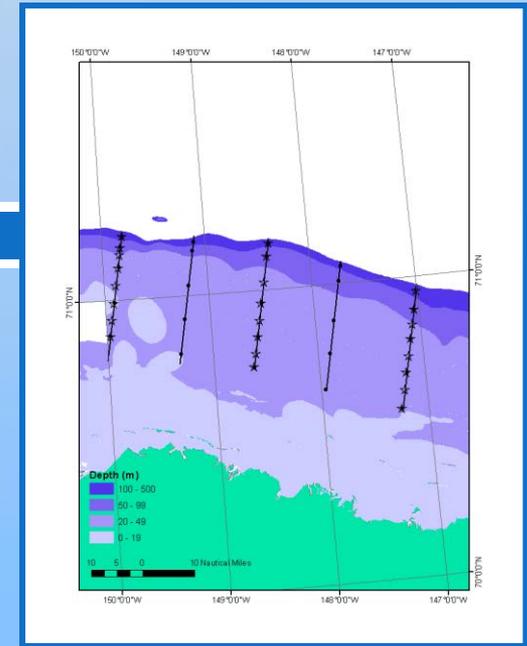


Loss of Sea Ice Program: Standard NOAA surveys



Beaufort Sea Marine Fish Survey (completed)

- Location: Beaufort Sea
- Funding Source: MMS
- Principle Investigator: Elizabeth Logerwell
- Quantify the distribution and abundance of benthic and pelagic fish; quantify characteristics of their marine habitats
- Use of bottom trawl & acoustic surveys. Oceanographic & biological samples
- FY09 results can be found at:
www.afsc.noaa.gov/REFM/Stocks/fit/Beaufort.php
- Collaborators: Alaska Fisheries Science Center, University of Alaska Fairbanks, University of Washington



The black lines are the acoustic transects, the solid circles are bottom trawl stations and the stars are CTD and zooplankton tow stations.

Top 5 fish species, by weight

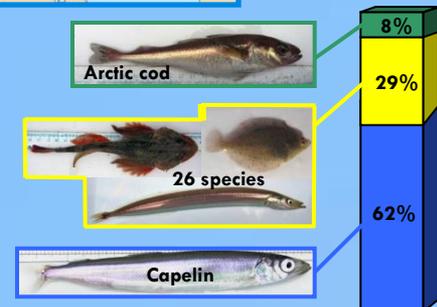
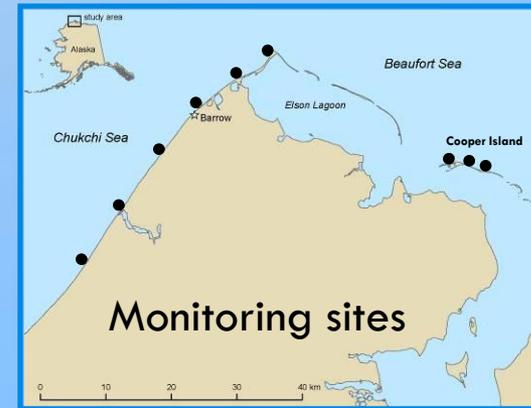
- Arctic cod
- Marbled eelpout
- Eelpout spp
- **Bering flounder**
- **Walleye pollock**



Arctic nearshore fish assemblages: Establishing a baseline (completed)



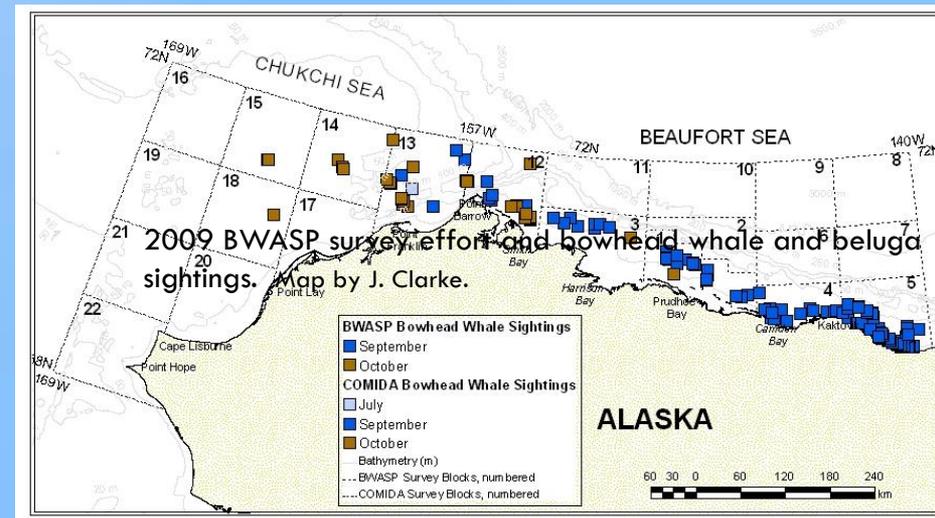
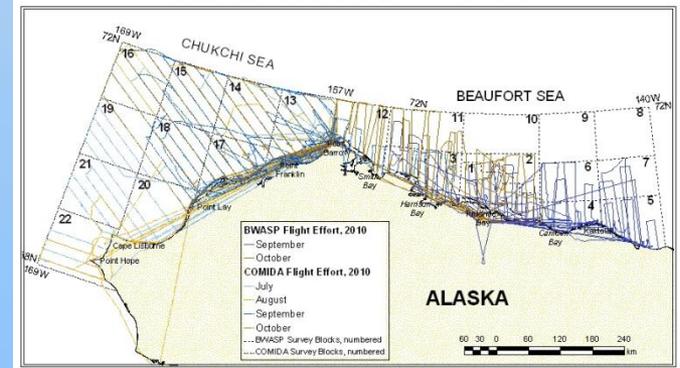
- Location: Barrow and vicinity
- Principle Investigators: Scott Johnson, John Thedinga
- Description: Establishing long-term monitoring sites in the nearshore Chukchi/Beaufort Seas
- Funding Source: NOAA Fisheries EFH 2007-2009
- **Funding amount: FY10 \$0K, FY11 \$0K**
- FY09 results can be found at: www.fakr.noaa.gov/habitat/fishatlas/
- SEEKING COLLABORATORS FOR FY10



Aerial Surveys of Arctic Marine Mammals FY11-FY15 (Continuation of BWASP & COMIDA)



- Location: Western Beaufort Sea & Northeastern Chukchi Sea
- Funding Source: BOEMRE
- FY11 funding: \$2.7 million
- Program leads: Megan Ferguson, Janet Clarke
- A 30-year time series. Provides real-time data on marine mammal distribution, relative abundance, habitat and behaviors in the Alaskan Arctic.
- Results can be found in annual reports from NMML to BOEMRE and at <http://www.afsc.noaa.gov/nmml/cetacean/bwasp/index.php>
- Collaborators: BOEMRE, NMFS



Bowhead Whale Feeding Ecology Study (BOWFEST) FY07-FY12 (ongoing)



- Location: Northeast of Point Barrow, Alaska
- Funding Source: BOEMRE
- FY11 funding amount: \$1530K; total funding: \$8187.3K
- Program lead: Phillip Clapham, Kim Shelden
- This research is designed to describe the summer feeding ecology of bowhead whales in the Western Beaufort Sea.
- Whale distribution is documented through aerials surveys, boat-based observations, and acoustics. Moorings and transects document ecological parameters such as bathymetry, currents, temperature, and prey availability. Short-term tagging provides fine-scale tracking of whale behavior relative to oceanographic features.
- Results can be found in annual reports from NMML to BOEMRE and at <http://www.afsc.noaa.gov/nmml/cetacean/bwasp/index.php>
- Collaborators: WHOI, Univ. of Rhode Is., UAF, UW, Oregon State, North Slope Borough, Barrow Whaling Captains' Assoc., ADFG



Arctic Whale Ecology Study (ARCWEST)

FY12-16

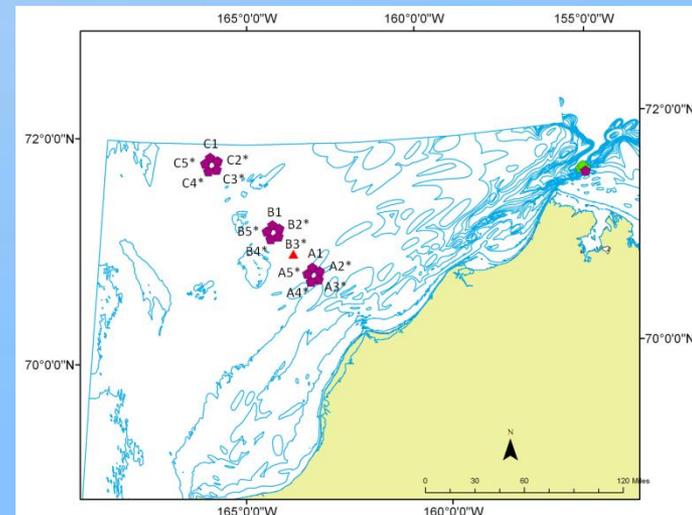
- Location: eastern Chukchi Sea
- Funding Source: BOEM
- Funding amount: \$4,834K
- Bowhead and gray whales;
fin and humpback whales
- Use passive acoustics, oceanography, satellite tagging,
and visual surveys to investigate the source of cetacean
prey and its influence on distribution and abundance.
- Collaborators: PMEL (NSB, WHOI on separate funding)



CHukchi Acoustics, Oceanography, and Zooplankton Study I: FY10-FY15

- Location: Bering Strait to Point Barrow, Alaska
- Funding Source: BOEMRE
- Funding amount: \$4,304.3 K
- Program lead: Catherine Berchok
- Research focus: 1. Use passive acoustic techniques to document the general presence and detailed movements of bowhead, fin, gray, humpback, and other baleen whales in areas of potential seismic, drilling, construction, and production activities. 2. Compare spatial and temporal trends in cetacean calling behavior to changes in environmental conditions.
- Principal Investigator: Catherine Berchok (NMML)

http://www.pmel.noaa.gov/foci/operations/2010/1AE10/CHAOZ2010_CruiseReport.pdf

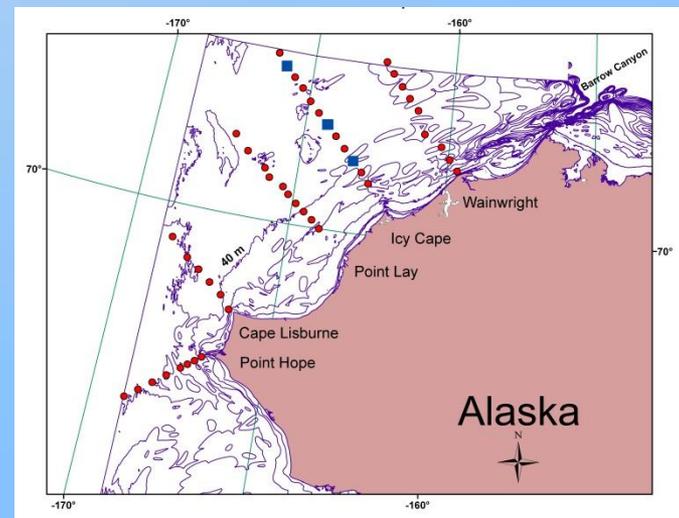


Three arrays of five subsurface moorings (purple pentagons) were deployed off Icy Cape, AK in 2010.



Chukchi Acoustics, Oceanography, and Zooplankton Study II: FY10-FY15

- Location: Bering Strait to Point Barrow, Alaska
- Funding Source: BOEMRE
- Funding amount: \$2,042.0 K
- Program lead: Phyllis Stabeno
- Research focus: 1. examine the changing Chukchi Sea ecosystem using biophysical moorings, shipboard observations and climate numerical models, and 2. link these data to the distribution and behavior of cetaceans to provide an integrated look at how changing regional and local conditions are affecting protected species.
- Principal Investigators: S. Moore (NMFS S&T), J. Napp (AFSC), J. Overland (PMEL), P. Stabeno (PMEL)



Stations occupied in FY10.

- = biophysical moorings;
- = hydrographic and plankton stations

<http://gos2.geodata.gov/wps/portal/gos>

http://www.pmel.noaa.gov/foci/operations/2010/1AE10/CHAOZ2010_CruiseReport.pdf



Distributed Biological Observatory (DBO)

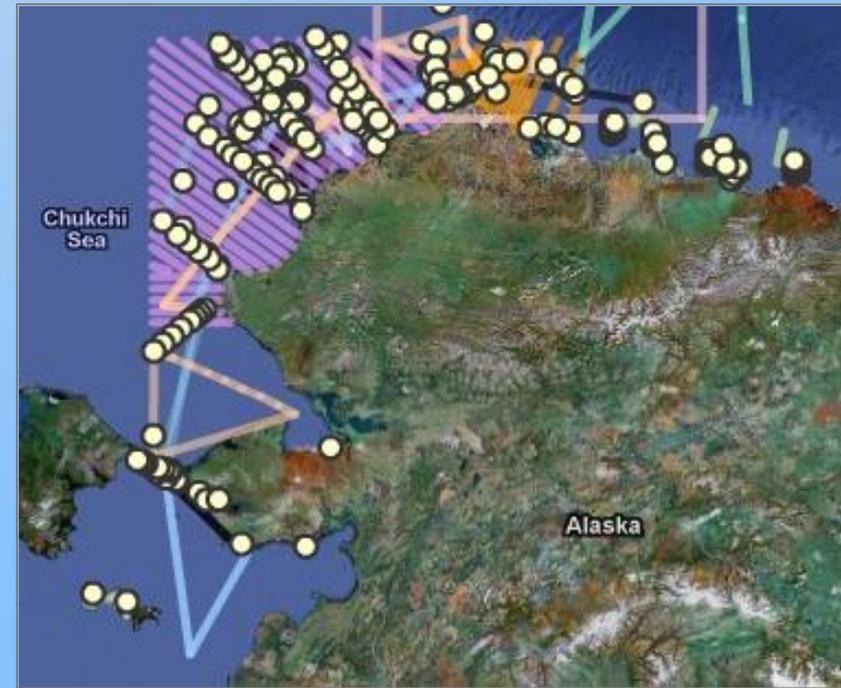
- Location: Bering and Chukchi Seas
- Funding Source: NOAA plus partners
- Organizers: NOAA: D. DeMaster, J. Calder, J. Overland, A. Holman; J. Grebmeier (UMD), R. Pickart (WHOI)
- Description: The DBO serves as a 'change detection array', promoting standardized measurements of physical and biological parameters along a latitudinal gradient. Data are collected both by dedicated cruises and research vessels of opportunity.
- Key international partners in the conduct of the 2010-2011 Pilot DBO include colleagues from Japan, Korea, China, Canada & Russia, organized under the IASC Pacific Arctic Group



<http://www.arctic.noaa.gov/dbo/>

Synthesis of Arctic Research (SOAR) -- Physics to marine mammals in the Pacific Arctic

- Location: U.S. Arctic
- Funding Source: BOEM
- Study Group: Comprehensive
- Description: NOAA-led multidisciplinary group of Arctic scientists working together to integrate information from completed and ongoing marine research in the Pacific Arctic.
- Collaborators: S&T/NMFS (P.I. Sue Moore), AFSC/NMFS, PMEL/OAR, BOEM, many others



Many projects - One vision

