

Select Technologies of Arctic Research: Alaska OCS Focus

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MMS Alaska OCS Region

MMS *Securing Ocean Energy &
Economic Value for America*

February 2010

Outline

- Environmental Studies Program (ESP) Background
scope/scale of program
- Project Browser
www.mms.gov/alaska/ess/index.htm
- Select Technologies and Project Description
Oceanography, Biology, Social Systems

Alaska ESP – extensive history...

- In place since 1973, completed over 400 studies, numerous syntheses
- Funded \$330M+ on studies (\$1B constant dollars)
- Maintains 50+ ongoing study projects (handout)
- In terms of scale and longevity, the Alaska ESP is most comprehensive environmental Impact Assessment data collection effort in world

ESP Mission

- Establish the information needed to
 - Predict, assess, and manage
- Potential effects on the
 - Marine, coastal, and human environment
- As they relate to resource development activities on the federal OCS

Extensive Science Collaboration

- Federal
 - NOPP
 - NOAA-NMFS (especially NMML, PMEL)
 - USGS
 - FWS
 - BLM
 - NSF
- State of Alaska
 - University of Alaska (MMS Coastal Marine Institute)
 - Department of Fish and Game
- Interagency Coordination Units (MMS on Boards)
 - North Slope Science Initiative
 - Alaska Ocean Observing System (w/NPRB)
 - USARC / Arctic Council
- Universities
- Regional / Native Groups **
 - NSB Dept. of Wildlife
 - AEWG / AWC (Whale Tagging Studies; TK Review; Walrus Tagging)
 - Tribal / Village (eg. Kotzebue Sound; Nuiqsut KSOPI; Hunting Assoc)
- Private contractors
- Industry
- CIAP
- MMS Technology Assessment & Research Program

Studies webpage

Environmental Studies Program, Alaska OCS Region

MMS	Home	Search	Site Map	About MMS	What's New	U.S. Department of the Interior
Minerals Management Service Alaska OCS Region						

- [Upcoming Events](#)
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Environmental Studies Section

The Minerals Management Service (MMS) Environmental Studies Program began in 1973 as a means to gather and synthesize environmental, social, and economic information to support decision making for the offshore oil and gas program. Since its beginning, the National Environmental Studies Program has contracted for more than \$600 million dollars of studies throughout the coastal zone of the continental United States. These funds have supported studies of all aspects needed for a thorough understanding of the complex nature of the Alaskan Outer Continental Shelf and have aided in the wise protection of its valuable resources. The MMS uses information from the studies program in evaluating potential environmental problems associated with all levels of oil and gas activities.

[Alaska Annual Studies Plan FY 2010](#)

[Alaska Region Ongoing Studies Descriptions](#)

[Aerial Surveys of Endangered Whales - Bowhead Whale Aerial Survey Program \(BWASP\)](#)

[Coastal Marine Institute Annual Reports](#)

[Table Listing of Ongoing Studies](#)

[Table Listing of Completed Studies](#)

[Results of Completed Studies Available on the Web](#)

[Environmental Studies Program Information System \(ESPIS\)](#)

[Proceedings of Alaska Region Information Transfer Meetings](#)

[Information of Interest to Offerers](#)

[Links to Other MMS Environmental Studies Sites](#)

[International Polar Year 2007 - 2008](#)

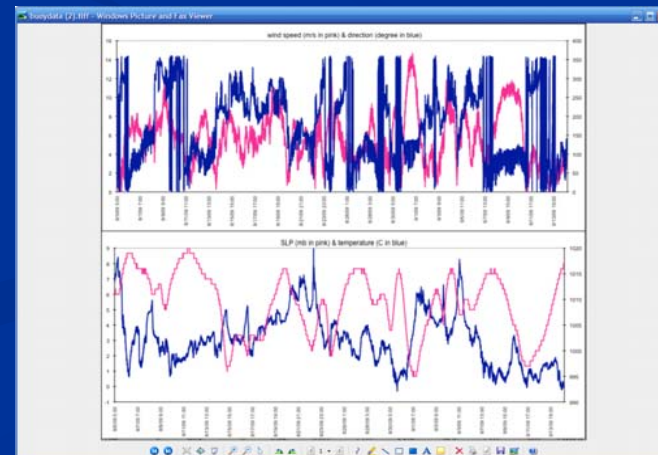
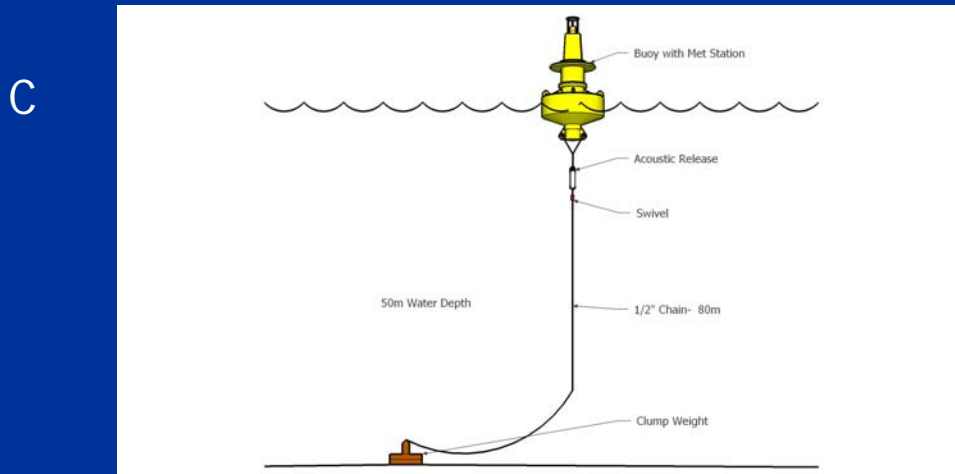
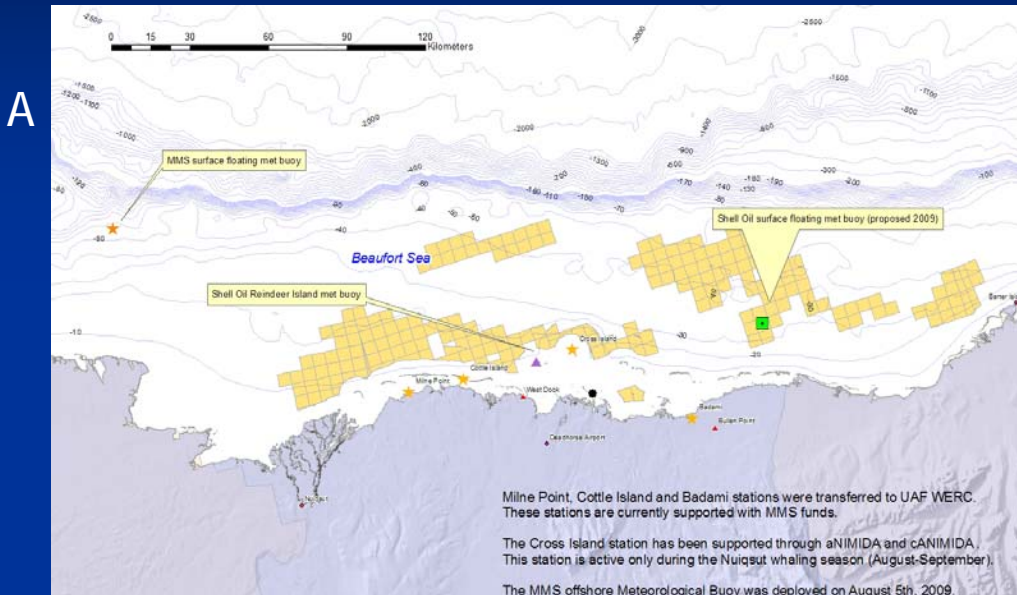
[Poster Presentations](#)


Questions?
Need More Information?
Please Write:
[Alaska Region Public Information](#)

This page last updated:
10/21/2009

Beaufort and Chukchi Seas Mesoscale Meteorology

Measurement of Offshore Winds from an MMS Surface Meteorological Buoy in the Western Beaufort Sea from August 5 to September 14, 2009



Development of the “Arctic Winch” Tethered Profiler



*Arctic Winch being recovered in
Beaufort Sea (courtesy of Bob Pritchard)*

- Traditional subsurface moorings cannot measure shallower than ~40m in the Arctic due to the threat of ice-ridging.
- The “Arctic Winch” tethered profiler can for the first time measure temperature and salinity in the upper part of the water column from a subsurface Arctic mooring.



Arcticwinch720.wmv

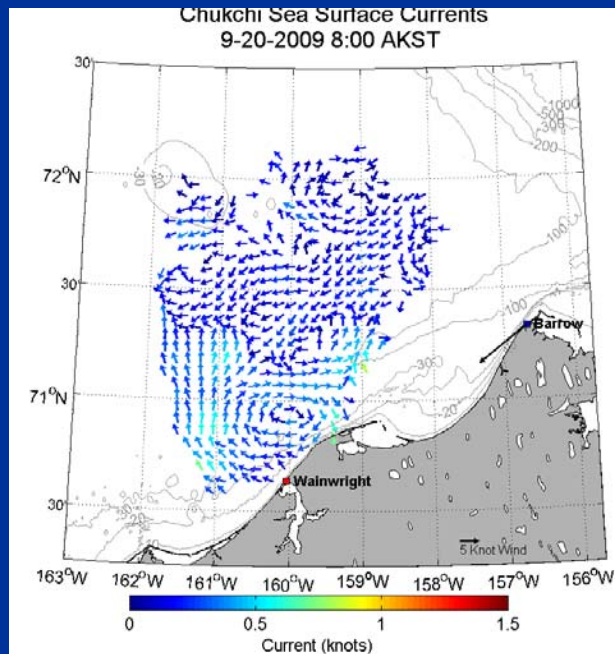
Application of High Frequency Radar in the Northeast Chukchi Sea

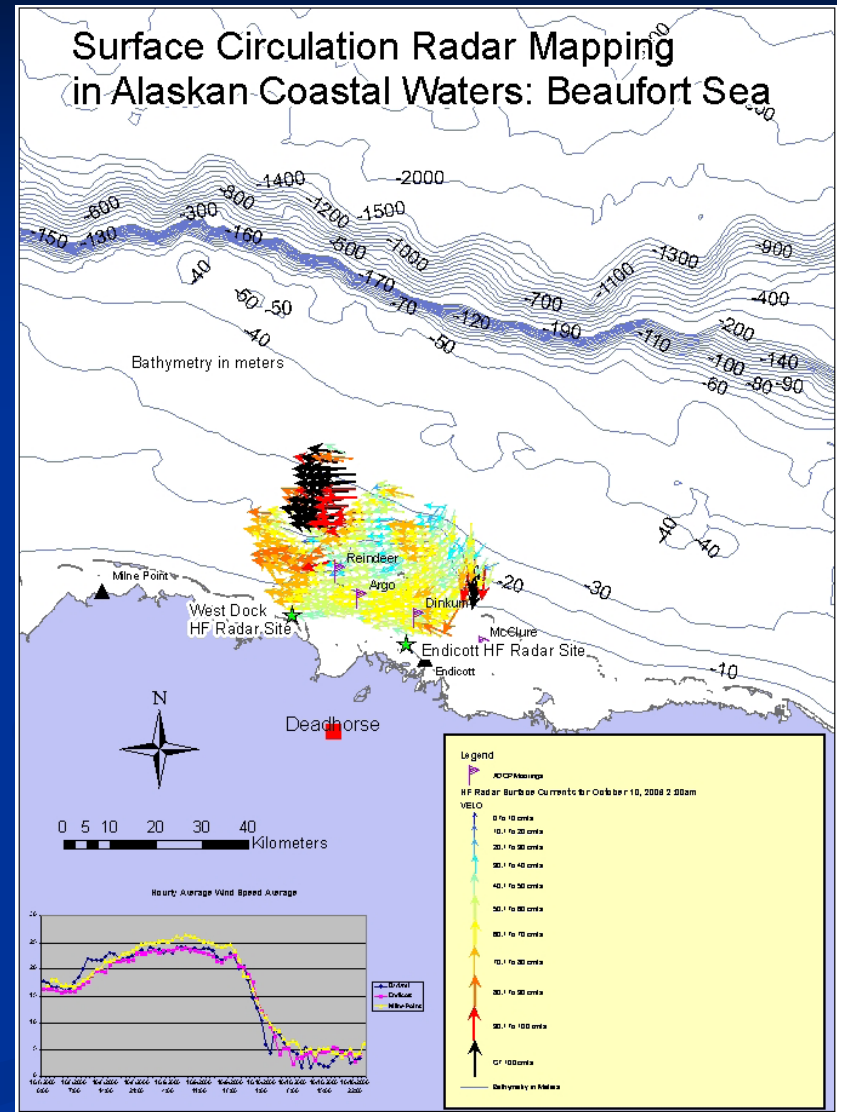
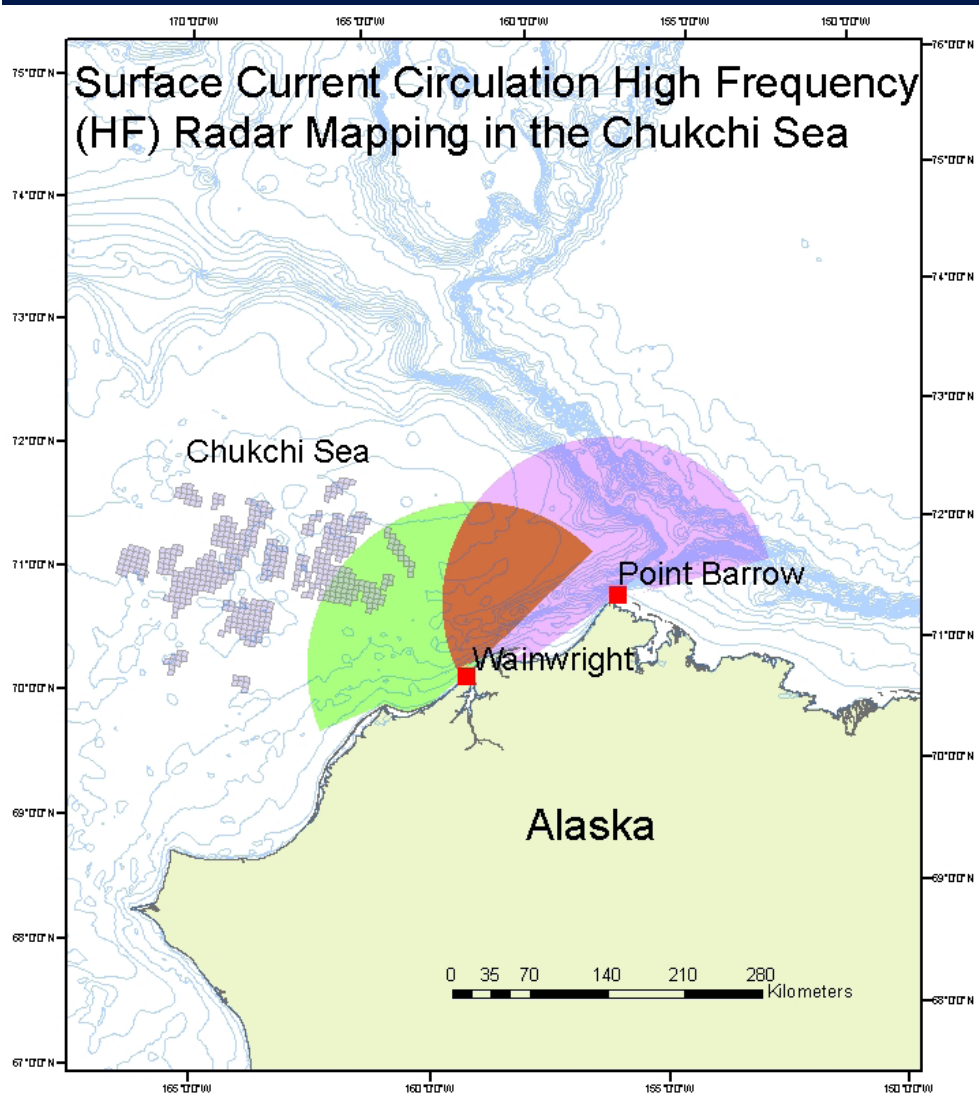
Surface currents were measured hourly in real time September 15 - November 15, 2009

HF Radar:

- can measure surface currents and waves over large area ($> 20,000$ Km) in near real time, during the open water season.
- has much higher resolution in space than previous techniques like current meters.

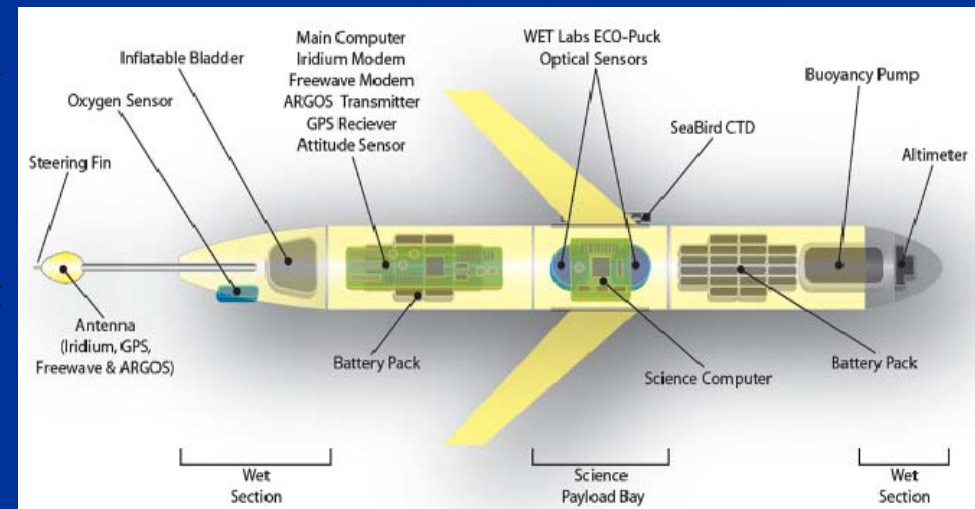
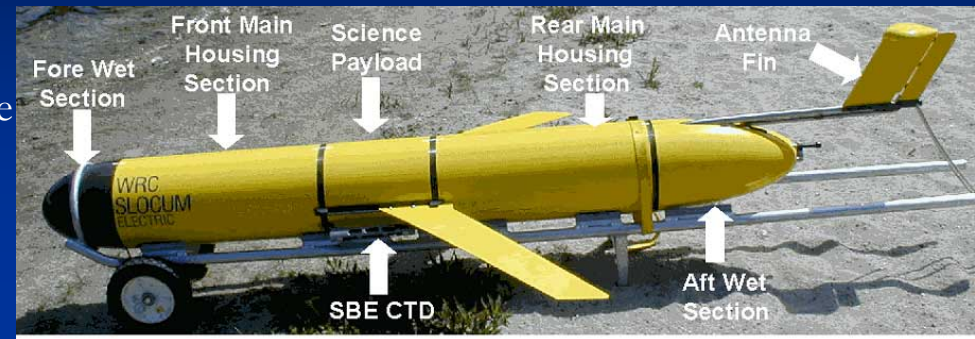
- can map the dominate oceanographic features and track their variability over time.
- provides data to support improvements to ocean circulation, wave, and coastal erosion models.
- can be used for search and rescue operations and spill response.





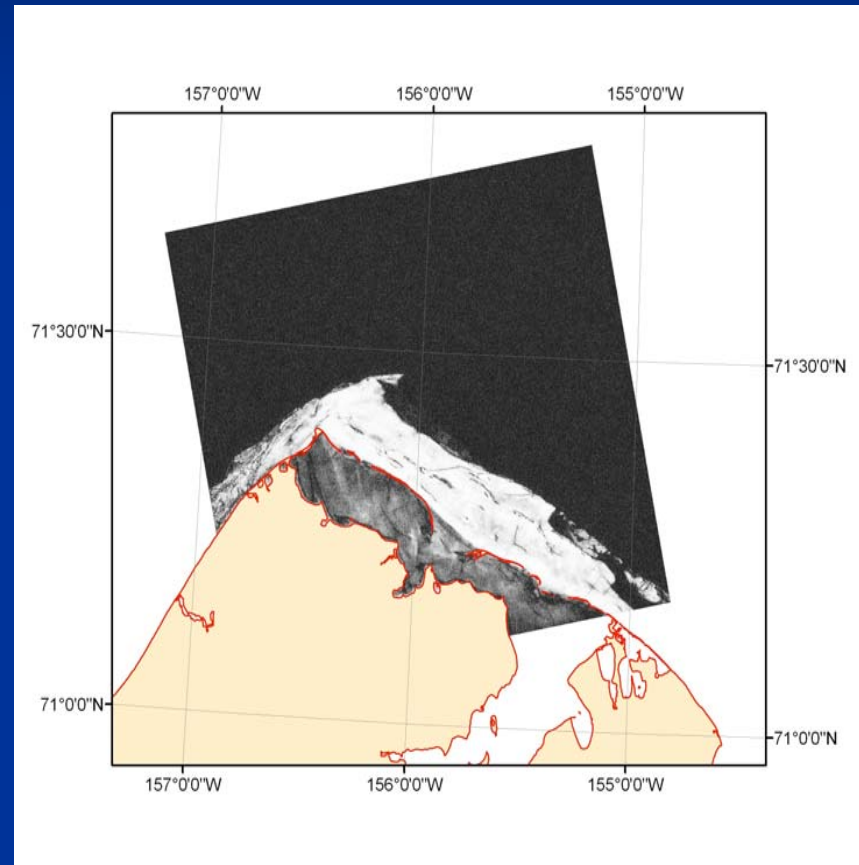
Automated Underwater Vehicles (AUV-Gliders)

- Gliders can remotely collect near real-time oceanographic measurements over the entire water column, and can travel long distances over weeks and months at a time.
- The sustained data permits scientists to gather regional data to address how the oceans are changing.
- Gliders in the Chukchi Sea this summer will collect data to characterize the three-dimensional, time-dependent stratification of the water column.
- These measurements are part of an ongoing integrated physical oceanographic study in the Chukchi Sea that define the spatial and temporal variability of surface and subsurface currents over five years.



Mapping Leads and Landfast Ice within the Beaufort and Chukchi Seas

- Imagery from the Advanced Land Observing Satellite (ALOS) PALSAR sensor are being examined to determine the stability of landfast ice as seen in this figure from northeast of Barrow.
- High coherence areas on the satellite imagery (bright areas) represent areas of stationary landfast ice.
- The stability of landfast ice is important to the Native subsistence community and to the oil and gas industry.

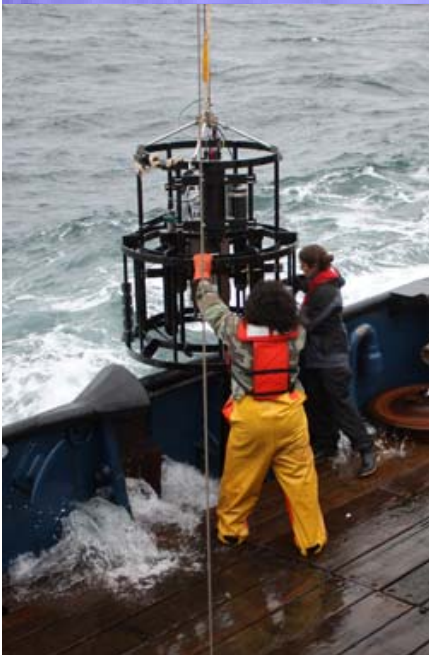


Bowhead Whale Feeding Variability in the Western Alaskan Beaufort Sea



Transmitter attached by suction cups

Oceanographic Sampling



Whales are tagged with transmitters that last for ~2 hours and record dives.

Ocean conditions and krill are also sampled.

BOWHEAD WHALE FEEDING VARIABILITY IN THE WESTERN ALASKAN BEAUFORT SEA: SATELLITE TRACKING

Feeding Bowhead Whales



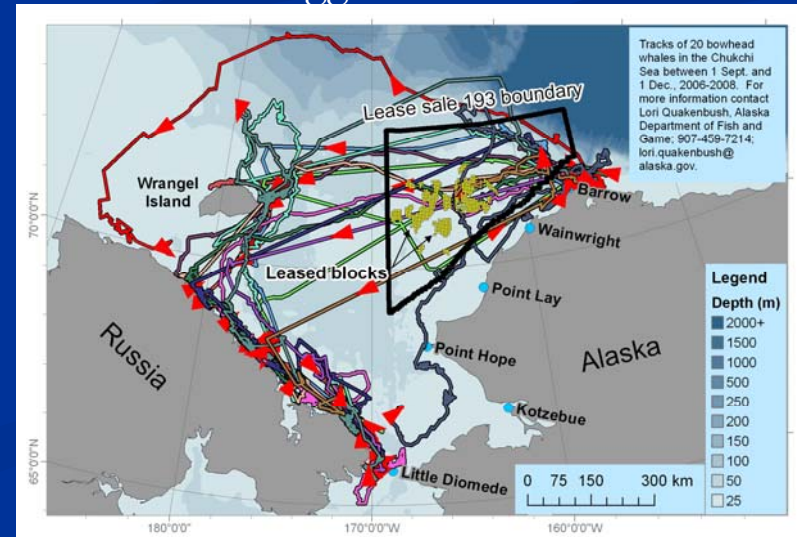
Whalers Discussing Tags



Satellite Tags are Embedded in Blubber



Tracks of Tagged Bowhead Whales



Light Detection and Ranging (LiDAR)

Used for spatio-temporal mapping of near-shore juvenile fish and settling crab



Recent advances in using LiDAR will detect fish and zooplankton in the upper 30 meters of the water column and within 1 meter of the bottom in shallow depths

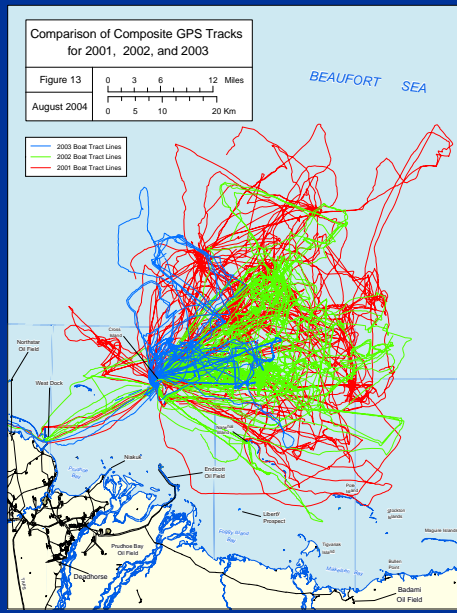
Advantages over ship-based surveys:

- Aerial view to allow location and adaptive sampling in biological hot spots
- Cover large area in small time period
- Survey in 'constant' oceanographic conditions
- Survey shallow depths not covered by traditional ship-based fish surveys.
- Cost effective, covering 10 times the distance a ship can cover at less cost

Impact Monitoring for Offshore Subsistence Marine Mammal Hunting, Beaufort/Chukchi



- The Garmin 76CX GPS is waterproof and it floats. It is used by subsistence hunters to track their marine hunting routes.



- Composite maps indicate areas of high sensitivity that are used to monitor and mitigate potential effects of development.

Remote Sensors:

- More comprehensive data
- Real-time information
- Less cost over time
- Improved human safety
 - Unmanned
 - Hazard detection
 - Search and rescue