

## **BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies**

**Region:** Alaska

**Planning Area(s):** Beaufort Sea, Chukchi Sea

**Title:** Distribution and Relative Abundance of Marine Mammals in the Chukchi Sea and the Fall Migration of Bowhead Whales in the Beaufort Sea – Personnel Needs (AK-10-05)

**BOEM Information Need(s) to be Addressed:** This study will generate information pertaining to possible impacts to marine mammals from exploratory offshore seismic surveying for oil and gas and subsequent leasing in the Chukchi and Beaufort Seas. The information will assist BOEM in NEPA analyses, ESA Section 7 consultations, MMPA documentation for Lease Sales, EPs and DPPs, and post-sale and post-exploration decision-making in the Beaufort and Chukchi Seas.

**Total Cost:** \$4,786,585

**Period of Performance:** FY 2011-2016

**Conducting Organization:** NOAA-NMML

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### **Description:**

**Background:** Bowhead whales (*Balaena mysticetus*), gray whales (*Eschrichtius robustus*), beluga whales (*Delphinapterus leucas*), Pacific walrus (*Odobenus rosmarus divergens*), polar bears (*Ursus maritimus*), bearded seals (*Phoca fasciata*), and several other species of ice seals are known to occupy the Chukchi Sea, at least during some seasons. All of these species are subject to changes in environmental variables such as oceanographic currents, sea temperature, sea ice cover, prey availability, and anthropogenic impacts. Moreover all of these species are used for subsistence both in Russia and the US and form an important part of the diet and cultural base for most people in villages along the Chukchi coast. Having a good understanding of the seasonal distribution, relative abundance, and habitat use of marine mammals in the Chukchi Sea is fundamentally important to evaluating the potential environmental impacts associated with oil and gas exploration and development and other anthropogenic activities. Reliable, up-to-date information of this type is needed for marine mammal populations in the Chukchi Sea. Aerial surveys of marine mammals are an efficient tool because they offer quick coverage of large marine areas. Past surveys are available for comparison with new data to assess whether changes in distribution or abundance have occurred since the earlier surveys were completed.

A recent, BOEM-funded investigation of the seasonal migration of the bowhead whales using satellite-tracked animal tags revealed that they are resident in the Bering Sea during the winter and return to the Beaufort Sea in the summer when opening spring leads allow for passage along the Alaskan and Canadian coasts. The bowheads leave the Beaufort in the fall and cross the Chukchi Sea before moving back into the Bering Sea for the winter.

Since 1979, aerial surveying of the fall migration of the bowheads has been conducted, initially by the Bureau of Land Management and subsequently by MMS, now BOEM. This is one of the longest-maintained monitoring of a biological phenomenon and has produced an invaluable baseline of the distribution and habitat use of the bowheads. The baseline can be used to observe changes in distribution and habitat use that may occur due to changing atmospheric and oceanic climates and to offshore oil and gas development activities. This investigation will continue the aerial observations of the fall migration for evidence of these changes

Since the beluga whales and other marine mammals seasonally or otherwise resident in the Beaufort and Chukchi are often sighted during the bowhead whale aerial surveys, their occurrence will also be part of the acquired data. This will be coincidental sightings, but of scientific value nonetheless.

#### Objectives:

- Document the distributions and relative densities of marine mammals in the Chukchi Sea Planning Area.
- To the extent possible, delineate the areas that are most important to marine mammals during critical seasons of their annual life history cycles such as molting, calving/pupping, and feeding.
- Define the annual fall migration of bowhead whales, significant inter-year differences, and long-term trends in the distances from shore and water depths at which whales migrate.
- Monitor temporal and spatial trends in the distribution, relative abundance, habitat, and behaviors (especially feeding) of endangered whales in arctic waters.
- Provide real-time data to BOEM and NMFS on the general progress of the fall migration of bowhead whales across the Alaskan Beaufort Sea for use in protection of this Endangered Species, if needed.
- Provide an objective wide-area context for management understanding of the overall fall migration of bowhead whales and site-specific study results.
- Record and map beluga whale distribution and incidental sightings of other marine mammals.
- Determine seasonal distribution of endangered whales in other planning areas of interest to BOEM.

Methods: Aerial line-transect surveys will be flown in the Chukchi Sea Program Area during two time periods: late-July to early-August and October to early-November. Aerial line-transect surveys will be flown in the Beaufort Sea to observe the fall migration of the bowhead whales, continuing the decades-long set of observations. For surveys in both seas, the observational and data recording methodology shall follow protocols used by the BOEM in the past surveys of the bowhead fall migration.

The observations, data recording, and subsequent data analysis will be performed by scientists and support personnel at the National Marine Mammal Laboratory. Additionally, the scientists will be responsible for the management of this project, all necessary training of support personnel, providing all needed field equipment, conducting all logistical tasks, and insuring the safety of all people involved.

Aircraft support is funded under the companion study titled “Distribution and Relative Abundance of Marine Mammals in the Chukchi Sea and the Fall Migration of Bowhead Whales in the Beaufort Sea – Aircraft Needs.”

**Current Status:** Ongoing

**Final Report Due:** April 2016

**Publications Completed:**

- Final Reports include annual summaries for Fall 1987-2010. Recent reports include OCS Studies MMS 95-0033, 96-0006, 97-0016, 98-0059, 2000-066, 2002-014, 2002-061, 2005-037, 2010-029, 2010-040.
- Brower, A., C. Christman, M. Ferguson, J. T. Clarke, S. Grassia, R. Shea, B. Rone, A. Kennedy. 2012. Eastern North Pacific Gray Whales and Minke Whales from Aerial Surveys in the Alaskan Arctic, Summer and Fall, 2011. Poster presentation, Alaska Marine Science Symposium, Anchorage, AK; January 2012.
- Clarke, J.T., M. C. Ferguson. 2010. Aerial Surveys for Bowhead Whales in the Alaskan Beaufort Sea: BWASP Update 2000-2009 with comparisons to Historical Data. SC/62/BRG14. International Whaling Commission. Cambridge, UK. 11p.
- Clarke, J. T., C. L. Christman, A. A. Brower, M. C. Ferguson, S. L. Grassia. 2011. Aerial Surveys of Endangered Whales in the Beaufort Sea, Fall 2010. Annual Report, OCS Study 2011-035. National Marine Mammal Laboratory, Alaska Fisheries Science Center, NMFS, NOAA, 7600 Sand Point Way NE, F/AK3, Seattle, WA 98115-6349  
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- Clarke, J. T., C. L. Christman, A. A. Brower, M. C. Ferguson. 2012. Distribution and Relative Abundance of Marine mammals in the Alaskan Chukchi and Beaufort Seas, 2011. Annual Report, OCS Study BOEM 2012-009. National Marine Mammal Laboratory, Alaska Fisheries Science Center, NMFS, NOAA, 7600 Sand Point Way NE, F/AKC3, Seattle, WA 98115-6349. 344pp.
- Clarke, J. T., C. L. Christman, M. C. Ferguson, S. L. Grassia. 2011. Aerial Surveys of Endangered Whales in the Beaufort Sea, Fall 2006-2008. Final Report, OCS Study 2010-033. National Marine Mammal Laboratory, Alaska Fisheries Science Center, NMFS, NOAA, 7600 Sand Point Way NE, F/AK3, Seattle, WA 98115-6349  
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- Clarke, J. T., C. L. Christman, S. L. Grassia, A. A. Brower, M.C. Ferguson. 2011. Aerial Surveys of Endangered Whales in the Beaufort Sea, Fall 2009. Final Report, OCS Study 2010-040. National Marine Mammal Laboratory, Alaska Fisheries Science Center, NMFS, NOAA, 7600 Sand Point Way NE, F/AK3, Seattle, WA 98115-6349  
Email of corresponding authors: [janet.clarke@saic.com](mailto:janet.clarke@saic.com) and [megan.ferguson@noaa.gov](mailto:megan.ferguson@noaa.gov)
- Clarke, J. T., M. C. Ferguson, C. L. Christman, S.L. Grassia, A.A. Bower, L.J. Morse. 2011. Chukchi Offshore Monitoring in Drilling Area (COMIDA) Distribution and Relative Abundance of Marine Mammals: Aerial Surveys. Final Report, OCS Study BOEMRE 2011-06. NOAA-NMML, Alaska Fisheries Science Center. 7600 Sandpoint Way, NE, F/AKC#, Seattle WA. 286pp

- Clarke, J. T., M. Ferguson, C. Christman, A. Brower, S. Grassia, R. Shea, B. Rone, A. Kennedy. 2012. Distribution and Relative Abundance of Belugas (*Delphinapterus leucas*) in the Alaskan Arctic, Summer and Fall 2011. Poster presentation, Alaska Marine Science Symposium, Anchorage, AK; January 2012.
- Christman, C. L., M. C. Ferguson, J. T. Clark, Amelia, Brower. 2012. Marine mammal aerial surveys in the Chukchi Sea. ASAMM PowerPoint presentation, Pacific Walrus Haulout Workshop, Anchorage, AK; USFWS and Wildlife Conservation Society.
- Christman, C., A. Brower, M. Ferguson, J. T. Clarke, S. Grassia, A. Kennedy, B. Rone, R. Shea. 2012. Aerial Observations of Pacific Walruses (*Odobenus rosmarus divergens*) in the Northeastern Chukchi Sea, Summer and Fall, 2011. Poster Presentation, Alaska Marine Science Symposium, anchorage AK; January 2012.
- Ferguson, M.C. 2012. Quantifying spatial characteristics of the Bowhead Whale Aerial Survey Project (BWASP) Survey Design. *Journal of Cetacean Research and Management* 12(1):39-44.
- Ferguson, M. J. T. Clarke, A. Brower, C. Christman, S. Grassia, A. Kennedy, B. Rone, R. Shea. 2012. Bowhead Whale (*Balaena mysticetus*) Distribution and Relative Abundance in the Alaskan Arctic, Summer and Autumn, 2011. Poster presentation, Alaska Marine Science Symposium, Anchorage, AK; January 2012.
- Monnett, C. Bowhead Whale Aerial Survey Project. Spoken Presentation at 2005 Alaska Forum for the Environment.
- Monnett, C., J. S. Gleason, and L. M. Rotterman. 2005. Potential effects of diminished sea ice on open-water swimming, mortality, and distribution of polar bears during fall in the Alaskan Beaufort Sea. Abstract and Poster: Ed., Society for Marine Mammalogy, 16th Biennial Conference on the Biology of Marine Mammals.
- Monnett, C. and J. S. Gleason. 2006. Observations of mortality associated with extended open-water swimming by polar bear in the Alaskan Beaufort Sea. *Polar Biology* 29: 681-687.
- Treacy, S. D., J. S. Gleason, and C. J. Cowles. 2006. Offshore distances of bowhead whales (*Balaena mysticetus*) observed during fall in the Beaufort Sea, 1982-2000: an alternative interpretation, *Arctic*, 59(1): 83-90.
- Gleason, J. S. C. Monnett, and C. J. Cowles. 2006. Long-term changes in habitats associated with polar bear sightings in the Alaskan Beaufort Sea; 1979-2004. Abstract and Poster, The Wildlife Society 13th Annual Conference, September 23-27, Anchorage, Alaska.
- Schliebe, S., Rode, K.D., Gleason, J.S., Wilder, J., Proffitt, K., Evans, T.J., and Miller, S. 2008. Effects of sea ice extent and food availability on spatial and temporal distribution of polar bears during the fall open-water period in the southern Beaufort Sea. *Polar Biology* 31:999-1010.
- Gleason, J.S. and Karyn D. Rode. 2009. Polar bear distribution and habitat association reflect long-term changes in fall sea ice conditions in the Alaskan Beaufort Sea. *Arctic* 62(4):405-417.

**Affiliated WWW Sites:**

<http://www.boem.gov/akstudies/>

[http://www.afsc.noaa.gov/nmml/species/species\\_bowhead.php#research](http://www.afsc.noaa.gov/nmml/species/species_bowhead.php#research)

[ftp://ftp.afsc.noaa.gov/posters/pClarke02\\_bwasp.pdf](ftp://ftp.afsc.noaa.gov/posters/pClarke02_bwasp.pdf)

[ftp://ftp.afsc.noaa.gov/posters/pFerguson01\\_uas-bowhead-arctic.pdf](ftp://ftp.afsc.noaa.gov/posters/pFerguson01_uas-bowhead-arctic.pdf)

[ftp://ftp.afsc.noaa.gov/posters/pClarke03\\_aerial-survey-mar-mammals.pdf](ftp://ftp.afsc.noaa.gov/posters/pClarke03_aerial-survey-mar-mammals.pdf)

[ftp://ftp.afsc.noaa.gov/posters/pChristman01\\_walrus-comida.pdf](ftp://ftp.afsc.noaa.gov/posters/pChristman01_walrus-comida.pdf)  
[ftp://ftp.afsc.noaa.gov/posters/pMorse01\\_marine-mammal.pdf](ftp://ftp.afsc.noaa.gov/posters/pMorse01_marine-mammal.pdf)  
[ftp://ftp.afsc.noaa.gov/posters/pClarke01\\_marine-mammal.pdf](ftp://ftp.afsc.noaa.gov/posters/pClarke01_marine-mammal.pdf)

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**ESPIS: Environmental Studies Program Information System**

**All *completed* ESP studies can be found**

**here:** [http://www.data.boem.gov/homepg/data\\_center/other/espis/espisfront.asp](http://www.data.boem.gov/homepg/data_center/other/espis/espisfront.asp)