

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 OCS seismic surveying for oil and gas and subsequent leasing in the Chukchi and Beaufort Seas. The information will assist BOEM in NEPA analyses for Lease Sales, EPs, and DPPs, ESA Section 7 consultations, MMPA documentation and decision-making in the Beaufort and Chukchi Seas.

Total Cost: \$4,586,585
plus Joint Funding (~\$1,702,000)

Period of Performance: FY 2011-2016

Conducting Organization: NOAA-NMML

BOEM Contact: [Carol Fairfield](#)

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 Sea

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 OCS oil and gas-related 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 Seas 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 U.S. 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 Planning 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: August 2016

Publications Completed:

- 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.
- Brower, A., M. Ferguson, C. Christman, J. T. Clarke. 2014. Gray Whale CalfO occurrence in the Alaska Arctic, Summer and Fall 2013, with Comparisons to Previous Years. Poster: Alaska Marine Science Symposium, Anchorage, AK; January 2014.
- Brower, A., J. T. Clarke, M. Ferguson, C. Christman. 2014. Gray Whale Foraging Habitats in the Alaska Arctic, Summer and Fall 2009-2013. Poster: Alaska Marine Science Symposium, Anchorage, AK; January 2014.
- Clarke, J.T., A. Brower, C. L. Christman, M. Ferguson. 2014. Distribution and Relative Abundance of Marine Mammals in the Northeastern Chukchi and Western Beaufort Seas 2013. Annual Report, OCS Study 2014-018: National Marine Mammal Laboratory, Alaska Fisheries Science Center, NMFS, NOAA, 7600 Sand Point Way NE, F/AKC3, Seattle, WA 98115-6349. 324 pp.
- Clarke, J. T., C. L. Christman, 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
- 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. 344 pp.
- 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.
- 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.
- Clarke, J., M. Ferguson, A. Brower, C. Christman. 2013. It's not just about bowhead whales – collaborations between ASAMM and other research. Poster Presentation, Alaska Marine Science Symposium, 16-20 January, 2013, Anchorage AK.
- Clarke, J., M. Ferguson, C. Christman, A. Brower, B. Small, R. Suydam. 2013. Distribution and relative abundance of belugas (*Delphinapterus leucas*) in the Alaska, Arctic, Summer and fall 2012 with comparisons to 2007-2011. Poster Presentation, Alaska Marine Science Symposium, 16-20 January, 2013, Anchorage AK.
- Clarke, J, Ferguson, M., C. Christman, A. Brower, V. Beaver. Why One Year is NEVER Enough_ Comparison of Bowhead Whale Distribution , Relative Abundance, Habitat Use and Behaviors in the western Beaufort Sea in July-August, 2012 and 2013. Poster: Alaska Marine Science Symposium, Anchorage, AK; January 2014.
- Clarke, J., Stafford, K., Moose, S., Rone, B., Crance, J. 2014. Subarctic Cetaceans in the southern Chukchi Sea: evidence of recovery or response to a changing ecosystem. *Oceanography* 24(4): 46-59
- Christman, C. L., J. J. Citta, L. T. Quakenbush, J. T. Clarke, B. K. Rone, R. A. Shea, M. C. Ferguson, and M. P. Heide-Jørgensen. 2013., July 9, 2013. Presence and Behavior of Bowhead Whales (*Balaena mysticetus*) in the Alaskan Beaufort Sea in July 2011. *Polar Biology* 36(12): 1851-1856. DOI 10.1007/s00300-013-1395-4.
- 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. L., M. C. Ferguson, A. Brower, J. T. Clark. 2013. Aerial sightings of Pacific walrus (*Odobenus rosmarus divergens*) in the Alaskan arctic, summer and fall 2012, with a comparison to sightings from 2009 – 2011. Poster Presentation, Alaska Marine Science Symposium, 16-20 January, 2013, Anchorage AK.
- Christman, C. L., M. C. Ferguson, J. T. Clark, A. Brower. 2014. Pacific walrus (*Odobenus rosmarus divergens*) haulouts along the northwestern Alaska coastline, summer and fall 2009-2013. Posster: Alaska Marine Science symposium, anchorage, AK, January 2014.
- Christman, C., A. Brower, M. Ferguson, J. T. Clarke, S. Grassia, A. Kennedy, B. Rone, R. Shea. 2012. Aeirial Observations of Pacific Walrus (*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. 2014. Modeling Western Arctic bowhead whale High use Areas in the Western Beaufort Sea, 2000-2012. Poster Presentation, Alaska Marine Science Symposium, Anchorage AK; January 2014.
- 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.

- Ferguson, M., J. T. Clarke, R. Shea, A. Brower, C. Christman. 2013. Summer in the western Beaufort Sea: Results from aerial surveys of Arctic marine mammals, July and August, 2012. Poster presentation. Alaska Marine Science Symposium, 16-20 January, 2013, Anchorage, AK.
- Sims, C., A. Brower, C. Christman, M. Ferguson. 2013. Sightings of Humpback, Fin, Minke and Killer Whales in the Alaskan Arctic from Aerial Surveys in 2012. Poster Presentation, Alaska Marine Science symposium, 16-20 January, 2013, Anchorage, AK.
- Stafford, K.M., S.R. Okkonen, and J.T. Clarke. 2013. Correlation of a strong Alaska Coastal Current with the presence of beluga whales (*Delphinapterus leucas*) near Barrow, Alaska. Mar. Ecol. Prog. Ser. Vol. 474: 287–297, doi: 10.3354/meps10076.

Affiliated WWW Sites:

<http://www.boem.gov/akstudies/>
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/pFerguson01_uas-bowhead-arctic.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/pMorse01_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