

Environmental Studies Program: Ongoing Study

Title	Aerial Surveys of Arctic Marine Mammals (ASAMM) – Personnel and Aircraft Needs (AK-16-01)
Administered by	Alaska Regional Office
BOEM Contact(s)	Rick Raymond, richard.raymond@boem.gov
Conducting Organizations(s)	NOAA-MML; USDOJ National Business Center
Total BOEM Cost	\$11,437,309 plus Joint Funding (~\$420,000)
Performance Period	FY 2016–2020
Final Report Due	June 2020
Date Revised	January 21, 2021
PICOC Summary	
<i><u>Problem</u></i>	Information is needed about distributions and relative densities of bowhead whales and other marine mammals to support NEPA analyses related to oil and gas exploration and development activities in the Beaufort and Chukchi Seas.
<i><u>Intervention</u></i>	Aerial surveys are conducted in the Chukchi Sea and Beaufort Sea Planning Areas from mid-July to the end of October to observe the fall migration of the bowhead whales.
<i><u>Comparison</u></i>	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.
<i><u>Outcome</u></i>	This continuation of long-term monitoring activities provides updated information about distribution and abundance of bowheads and other marine mammals in the U.S. Arctic areas.
<i><u>Context</u></i>	Beaufort Sea, Chukchi Sea

BOEM Information Need(s): This study will maintain long-term monitoring information about potential impacts to marine mammals from OCS oil and gas-related activities 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, and decision-making in the Beaufort and Chukchi Seas.

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 U.S. and form an important part of the diet and cultural base for most people in communities along the Beaufort and Chukchi coasts. Having a good understanding of the seasonal distribution, relative abundance, and habitat use of

marine mammals in the Beaufort and Chukchi Seas 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 estimating marine mammal populations. 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.

Aerial surveys of the fall migration of the bowheads have been conducted annually since 1979, initially by the Bureau of Land Management and subsequently by MMS, now BOEM. This is one of the longest-maintained monitoring programs 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 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 Seas are often sighted during the bowhead whale aerial surveys, their occurrence will also be part of the acquired data.

Objectives:

- Document the distributions and relative densities of marine mammals in the Chukchi Sea and Beaufort Sea Planning Areas.
- 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 calving 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 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 and Chukchi Seas 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.
- Document the spatial and temporal distribution of beluga and gray whales, and other marine mammal species as sighted.

Methods: This Interagency Agreement between NMFS and BOEM will fly aerial line-transect surveys in the Chukchi Sea and Beaufort Sea Planning Areas from mid-July to the end of October 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 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, acquiring all necessary permits, and insuring the safety of all people involved.

The necessary aircraft services (planes, fuel, maintenance, pilots, etc.) to pursue the science objectives will be supported via Interagency Agreement between the National Business Center's Office of Aviation Services and BOEM.

Specific Research Question(s):

1. What are the distribution and relative abundance of bowhead whales in the U.S. Arctic?
2. Can aerial survey results provide a population estimate for bowhead whales in the U.S. Arctic?

Current Status: Completed

Publications Completed:

- Brower, Amelia A., Janet T. Clarke, Megan C. Ferguson. 2018. Increased sightings of subArctic cetaceans in the eastern Chukchi Sea, 2008–2016: population recovery, response to climate change, or increased survey effort? *Polar Biology* 41:1033-1039.
- Brower, A.A., M. Ferguson, S. Schonberg, S. Jewett, and J. Clarke. 2017. Gray whale distribution relative to benthic invertebrate biomass and abundance: northeastern Chukchi Sea 2009-2012. *Deep-Sea Research II. Topical Studies in Oceanography*, vol In press . DOI: 10.1016/j.dsr2.2016.11.017
- Clarke, J.T. Megan C. Ferguson, Amy L. Willoughby and Amelia A. Brower. 2018. Bowhead and Beluga Whale Distributions, Sighting Rates, and Habitat Associations in the Western Beaufort Sea in Summer and Fall 2009 – 16, with Comparison to 1982 – 91. *Arctic* 71(2):115-138.
- Clarke, J.T., A.A. Brower, M.C. Ferguson, and A.L. Willoughby. 2017. Distribution and Relative Abundance of Marine Mammals in the Eastern Chukchi and Western Beaufort Seas, 2017. Annual Report. National Marine Mammal Laboratory, Alaska Fisheries Science Center, NMFS, NOAA, 7600 Sand Point Way NE, F/AKC3, Seattle, WA 98115-6349.
- Clarke, J., A. Kennedy, and M. Ferguson. 2016. Bowhead and gray whale distributions, sighting rates, and habitat associations in the eastern Chukchi Sea, summer and fall 2009-15, with a retrospective comparison to 1982-91. *Arctic* 69(4):359-378.
- Druckenmiller, M.L., J.J. Citta, M.C. Ferguson, J.T. Clarke, J.C. George, and L. Quackenbush. 2017. Trends in sea ice cover within bowhead whale use areas in the Pacific Arctic. *Deep-Sea Research II. Topical Studies in Oceanography*, DOI: 10.1016/j.dsr2.2016.11.017.

- Ferguson, M.C. and J.T. Clarke. 2018. Update on analysis of ASAMM 2016 data to derive a “minimum population estimate” for the Bering-Chukchi- Beaufort bowhead whale stock. Paper SC/67/XX presented to the IWC Scientific Committee, April 2018 (unpublished), Bled, Slovenia.
- Okkonen, S., J. Clarke, and R. Potter. 2017. Relationship among high river discharges, upwelling events, and bowhead whale (*Balaena mysticetus*) occurrence in the central Alaskan Beaufort Sea. *Deep Sea Research II. Topical Studies in Oceanography*. DOI: 10.1016/j.dsr2.2016.11.017.
- Stafford, K.M., M.C. Ferguson, D.D.W. Hauser, S.R. Okkonen, C.L. Berchok, J.J. Citta, J.T. Clarke, E.C. Garland, J. Jones, and R.S. Suydam. 2016. Beluga whales in the western Beaufort Sea: current state of knowledge on timing, distribution, habitat use and environmental drivers. *Deep-Sea Research II. Topical Studies in Oceanography*. DOI: 10.1016/j.dsr2.2016.11.017.
- Stimmelmayer, R., George, J.C., A. Willoughby, J. Clarke, M. Ferguson, G. Sheffield, K. Stafford, A. Von Duyke, T. Sformo, B. Person, L. Sousa, B. Tudor, and R. Suydam. 2018. 2017 health report for the Bering-Chukchi-Beaufort seas bowhead whales – preliminary findings. Paper SC/67/XX presented to the IWC Scientific Committee, April 2018 (unpublished), Bled, Slovenia.
- Stimmelmayer, R., J.C. George, A. Brower, J. Clarke, M. Ferguson, A. Von Duyke, G. Sheffield, K. Stafford, T. Sformo, B. Person, L. Sousa, B. Tudor, and R. Suydam. 2017. 2016 health report for the Bering-Chukchi-Beaufort seas bowhead whales - preliminary findings. Presented to the 2017 Scientific Committee of the International Whaling Commission. 21pp. SC/67a/AWMP.
- Willoughby, Amy L., Megan C. Ferguson, Janet T. Clarke, and Amelia A. Brower. 2018. Short Note: First Photographic Match of an Anomalously White Gray Whale (*Eschrichtius robustus*) in the Northeastern Chukchi Sea, Alaska, and Baja California, Mexico. *Aquatic Mammals* 44(1):7-12. DOI 10.1578/AM.44.1.2018.7.
- Willoughby, A.L., J.T. Clarke, M.C. Ferguson, R. Stimmelmayer, and A.A. Brower. 2018. Bowhead whale carcasses in the eastern Chukchi and western Beaufort seas, 2009-2017. Paper SC/67/XX presented to the IWC Scientific Committee, April 2018 (unpublished), Bled, Slovenia.
- Young, J.K., B.A. Black, J.T. Clarke, S.V. Schonberg, and K.H. Dunton. 2017. Abundance, biomass and caloric content of Chukchi Sea bivalves and association with Pacific walrus (*Odobenus rosmarus divergens*) relative density and distribution in the northeastern Chukchi Sea. *Deep-Sea Research II. Topical Studies in Oceanography*. DOI 10.1016/j.dsr2.2017.04.017.

Affiliated WWW Sites:

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

<https://marinecadastre.gov/epis/#/search/study/100113>