

BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Alaska

Planning Area(s): Beaufort Sea, Chukchi Sea

Title: COMIDA: Factors Affecting the Distribution and Relative Abundance of Endangered Whales: Passive Acoustic Detection and Monitoring of Endangered Whales in the Arctic (AK-09-02a)

BOEM Information Need(s) to be Addressed: Information from this study will document the general presence of bowhead, right, fin, gray, and other baleen whales in areas of potential seismic, drilling, construction, and production activities. Study results may be useful for estimating temporal limits and formulating designs of mitigation for such activities. Findings may be used for evaluating potential deferral areas and other potential limitations on offshore leasing and development. This study will provide useful information needed to support NEPA analysis and documentation for Beaufort and Chukchi Sea Lease Sales, DPPs, and monitoring. Results will support ESA consultations, MMPA permitting, and preparation of Biological Evaluations and Biological Opinions.

Total Cost: \$4,304,300
plus Joint Funding

Period of Performance: FY 2010-2015

Conducting Organization: NOAA-NMML

BOEM Contact: [Dr. Heather Crowley](#)

Description:

Background: The observed northward retreat of the minimum extent of summer sea ice has the potential to expand oil and gas-related exploration and development into previously closed seasons and localities in the Alaskan Arctic. This change, coupled with steadily increasing abundance and related seasonal range expansion by the bowhead, gray, humpbacked, fin, and possibly other whales, indicates that more complete information on the year-round presence of large whales is needed in the western Beaufort Sea and Chukchi Sea planning areas. Aerial surveys can provide some of the needed coverage, but are not cost-effective for extended use on a year-around basis. Nor will planned aerial surveys provide the geographic extent of coverage potentially available from passive acoustic monitoring.

Passive acoustic detection and tracking is a proven tool for assessment of large whales in Alaskan seas. Specifically, acoustic detection has proven a key addition to the census of bowhead whales (*Balaena mysticetus*) during their spring migration past Barrow, and in relation to oil and gas development activities offshore Prudhoe Bay. More recently, gray whale calls have been detected year-round near Barrow on long-term recorders deployed in collaboration with the NSF/Shelf-Basin Interaction Study. Other data have been obtained on North Pacific right, humpback, and fin whales in the southern Bering Sea.

The proposed study will fund the fabrication and deployment of arrays of long-term acoustic recorders in the Beaufort and Chukchi seas that are capable of continuous recording, year-round. Acoustically recording the Beaufort and Chukchi seas year-round for several years will provide previously unattainable assessment of the seasonal occurrence of large whales in these regions and their response to environmental changes (including climate and anthropogenic use of the area).

Objectives:

- Assess the year-round seasonal occurrence of bowhead, gray, and other baleen whale calls in the Beaufort and Chukchi Seas.
- Track individuals through a hydrophone array to estimate relative abundance.
- Evaluate whether changes in seasonal sea ice extent is enabling a northward shift of Bering Sea cetacean species such as fin, humpback and North Pacific right whales.
- Provide long-term estimates of habitat use for large whale species and compare this with annual ice coverage in order to establish predictive variables to describe large whale occurrence.
- Collaborate with the study entitled: “COMIDA: Factors Affecting the Distribution and Relative Abundance of Endangered Whales: Biophysical Moorings and Climate Modeling” in order to evaluate the extent to which variability in environmental conditions such as sea ice, oceanic currents, water temperature and salinity, and prey abundance influence whale distribution and relative abundance.

Methods: Build autonomous hydrophones based on a proven design, modified for cold, shallow water deployment for 365 days per deployment. Deploy instruments in tight arrays having a minimum of 3 instruments to facilitate evaluating the movements of individual animals. Refurbish and redeploy instruments annually. Analyze annual data for whale calls to estimate: seasonal occurrence by species, inter-annual differences in occurrence by species, variation in occurrence due to changes in ice extent, types and strengths of anthropogenic noise in the study area.

Current Status: Awaiting final report.

Final Report Due: August 2015

Publications Completed:

- Berchok, C., J. Crance, B. Rone, S. Moore. 2015. Marine mammal occurrence in the Distributed Biological Observatory (DBO) from ship-based visual and passive acoustic surveys. Poster, Alaska Marine Science Symposium, Anchorage, AK, January 2015.
- Clark, C. W., C.L. Berchok, S. Blackwell, J. Citta, D. Hannay, J. Jones, L. Quakenbush, and K.M. Stafford. In press. A year in the acoustic world of Western Arctic bowhead whales. Progress in Oceanography.
- Crance, J. and C. Berchok. 2013. Stereotyped, repetitive gunshot call patterns produced by the North Pacific right whale, *Eubalaena japonica*. Poster, Alaska Marine Science Symposium, Anchorage, AK, January 2013.

- Garland, E. and C. Berchok. 2013. Spatiotemporal distribution of Alaskan beluga (*Delphinapterus leucas*) populations based on acoustic monitoring. Poster, Alaska Marine Science Symposium, Anchorage, AK, January 2013.
- Garland, E., C. Berchok and M. Castellote. 2014. Spatio-Temporal Movement Patterns Of Alaskan Beluga Whale (*Delphinapterus Leucas*) Populations Based On Vocal Peaks From Passive Acoustic Monitoring. Poster, Alaska Marine Science Symposium, Anchorage, AK, January 2014.
- Garland, E.G., C.L. Berchok, and M. Castellote. In press. Temporal peaks in beluga whale (*Delphinapterus leucas*) acoustic detections in the northern Bering, northeastern Chukchi, and western Beaufort Seas: 2010-2011. *Polar Biology*.
- Grassia, S. and C. Berchok. 2013. Short- and long-term distribution of marine mammals in the Chukchi Sea. Poster, Alaska Marine Science Symposium, Anchorage, AK, January 2013.
- Guerra, M., A. N. Rice, D. W. Ponirakis, C. W. 2013. Characterization of the inter-annual ambient noise baseline off Icy Cape, AK and its primary noise sources (2010-2012). Poster, Alaska Marine Science Symposium, Anchorage, AK, January 2013.
- Napp, J., C. Berchok, P. Stabeno and S. Moore. 2013. An integrated ocean observing approach to understanding the effects of climate variability in the NE Chukchi Sea. Oral Presentation, Alaska Marine Science Symposium, Anchorage, AK, January 2013.

ftp://ftp.afsc.noaa.gov/posters/pBerchok01_chaoz-arctic.pdf

ftp://ftp.afsc.noaa.gov/posters/pCrance02_2010-chaoz.pdf

ftp://ftp.afsc.noaa.gov/posters/pJNapp09_chaoz.pdf

<http://www.afsc.noaa.gov/nmml/PDF/CHAOZ-2011-Cruise.pdf>

http://access.afsc.noaa.gov/pubs/posters/pdfs/pGrassia03_marine-mammals-chukchi.pdf

Affiliated WWW Sites: <http://www.boem.gov/akstudies/>

<http://www.afsc.noaa.gov/nmml/cetacean/research/caepresearch.php?url=nmmlcaep1208>

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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