

Scientists listen to whales, walruses, seals in a changing arctic seascape

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A herd of walrus, one of the focal species of a recently completed acoustic study of marine mammals in the northern Bering Sea. Credit: Maxim Chakilev

A year-round acoustic study of marine mammals in the northern Bering Sea is providing scientists with a valuable snapshot of an Arctic world

already under drastic pressure from climate change, according to WCS (Wildlife Conservation Society), Columbia University, Southall Environmental Associates, and the University of Washington.

Authors of the new study in the journal *Marine Mammal Science* conducted a 4-year acoustic monitoring project to determine how seasons, [sea surface temperature](#), and sea ice influence the presence, distribution, and movements of five species of endemic Arctic marine mammals. It is the first study to conduct year-round acoustic monitoring for marine mammals off St. Lawrence Island in the Bering Sea.

"The data gathered during the study will serve as an important baseline for future monitoring of the effects of [climate change](#), subsequent sea ice changes, and expected increases in shipping on the distribution of the region's marine mammals," said Emily Chou, WCS scientist and lead author of the study.

The scientists conducted the study between 2012 and 2016 with a focus on five species of Arctic marine [mammal](#): [bowhead whales](#) (*Balaena mysticetus*), beluga whales (*Delphinapterus leucas*), walrus (*Odobenus rosmarus*), bearded seals (*Erignathus barbatus*), and ribbon seals (*Histiophoca fasciata*).

With the support of local indigenous hunters and fishermen, the scientists deployed archival acoustic recorders in three locations in the northern Bering Sea. "Working with local residents to deploy and retrieve equipment was an important part of our effort to keep the work as locally-based as possible," said co-author Martin Robards.

Two of the recorders (attached to flotation devices and anchored to the seafloor with weights) were deployed off the northern shore of St. Lawrence Island, specifically near the Native villages of Savoonga and Gambell. The third recorder was placed in the Bering Strait, a 36-mile

wide gap between the Russian Far East and Alaska that serves as the migratory pathway for thousands of marine mammals moving between the Bering Sea and the Arctic Ocean.

"Acoustic monitoring is the most effective means of determining the seasonal presence of these species in these challenging Arctic areas, given the unpredictable weather conditions and variable daylight and ice conditions," said Brandon Southall, a co-author on the study. "It can also be used to measure variability in ocean noise from both natural and human sources, such as shipping, and how they may affect the behavior and well-being of marine mammals."

The recorders logged more than 33,000 individual vocalizations from whales, walruses, and seals over the study period. Overall, the study supported previous scientific and traditional knowledge about the distribution of marine mammals in the northern Bering Sea with a finer-scale resolution than previously available. The data showed consistent seasonal distribution and movement patterns for most species, and analyses showed that time-of-year was the most statistically significant factor in the detection of marine mammal vocalization.



A bearded seal, one of the most vocal of pinnepeds; the male animals emit a distinctive descending "trill" call. Credit: NOAA Fisheries

The study findings will help guide future monitoring efforts on the region's cetacean and pinniped species and will inform conservation management decisions for acoustically sensitive marine mammals in the context of disappearing ice and projected increases in maritime traffic. Specifically, this type of work and continued monitoring at strategic locations in this Arctic area will eventually help identify trends caused by long-term changes in environmental conditions and human-related activities.

"There is no doubt that the Arctic is currently undergoing rapid and significant changes that are alarming," said Dr. Howard Rosenbaum,

Director of WCS's Ocean Giants Program. "Our work on Arctic [marine mammal](#) populations in this region is essential to assess any forthcoming resulting shifts or changes resulting from warming Arctic conditions, and ultimately working partners and authorities to find solution to protect these iconic species and their habitats"

More information: Emily Chou et al, Seasonal variation in Arctic marine mammal acoustic detection in the northern Bering Sea, *Marine Mammal Science* (2019). [DOI: 10.1111/mms.12658](https://doi.org/10.1111/mms.12658)

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