

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

**Region:** Alaska

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

**Title:** Abundance Estimates of Ice-Associated Seals: Bering Sea Populations that Inhabit the Chukchi Sea (AK-12-x10b)

**BOEM Information Need(s) to be Addressed:** BOEM needs reliable abundance estimates of ice-associated seal species for NEPA analysis and the future development of sound plans for management, conservation, and mitigation of potential environmental impacts from oil and gas activities and climate change. Improved monitoring of ice-associated seals is also fundamental for ensuring compliance with Federal management and regulatory mandates for stock assessments under the Marine Mammal Protection Act (MMPA) and establishing extinction risk assessments under the Endangered Species Act (ESA). Study findings will be used in pre-lease analyses and documentation for potential future Chukchi Sea lease sales, as well as post-sale NEPA analysis, review of EPs, DPPs and other reviews for post-sale and post-exploration BOEM decision making and mitigation.

**Total Cost:** \$700,000 plus Joint Funding

**Period of Performance:** FY 2012-2014

**Conducting Organization:** NMFS-NMML

**BOEM Contact:** [Dr. Dan Holiday](#)

### **Description:**

**Background:** Bearded, spotted, and ribbon seals, collectively referred to as ice seals, are key components of Arctic marine ecosystems and are important subsistence resources for northern coastal Alaska Native communities. These seals are protected under the MMPA and bearded seals are under consideration for listing through the ESA. More comprehensive abundance estimates for these ice-associated seals are needed to establish extinction risk assessments under the ESA and to ensure compliance with Federal management and regulatory mandates for marine mammals under the MMPA. Obtaining reliable abundance estimates for ice seals is also a key requirement for developing sound plans for response to potential environmental impacts of oil and gas activities and the impacts to ice seal populations due to climate change.

Scientists at NOAA's National Marine Mammal Laboratory (NMML) have been collaborating with Russian colleagues to conduct synoptic aerial surveys of ice-associated seals in the Bering and Okhotsk Seas. The seals' geographic distributions are broad and patchy, and the extent, locations, and conditions of their sea ice habitats change rapidly. Therefore, surveys must cover large areas throughout the species' ranges and must be completed in a relatively short period of time, preferably during the reproductive and molting period when the greatest proportions of the populations are hauled out on the ice and visible. Two years of survey effort will be required to achieve adequate precision (CV= 0.1) for abundance estimates and to ensure that sufficient periods of suitable weather occur during survey periods. Aerial surveys for bearded, spotted, and ribbon seals will be conducted in the spring of 2012 and 2013.

### Objectives:

- Calculate abundance estimates for bearded, spotted, and ribbon seals in the Bering and Chukchi Seas.
- Use BOEM funds to obtain the contract for a NOAA Twin Otter and a second longer-range aircraft to conduct surveys of the central and eastern Bering Sea shelf in April and May of 2012 and 2013.
- Conduct surveys of ice-associated seals using high-resolution digital photographic and thermal imaging sensors, with the coverage required to obtain annual seal abundance estimates with adequate precision (CV=0.2).
- Effectively retrieve, manage, and process sensor imagery for analyses.

Methods: 1) U.S. surveys will begin April 1, 2012, out of Anchorage. A total of 17,000 – 22,000 km of survey transects at an altitude between 800 -1000 ft. will be conducted during an estimated 6 week time period. 2) Surveys will be conducted using two aircraft: a NOAA Twin Otter aircraft and a chartered long range aircraft. The charter aircraft efforts will be focused on the central Bering Sea, an important concentration and breeding area for bearded, spotted, and ribbon seals that is inaccessible to the Twin Otter. 3) New instrument-based methods rather than traditional observer-based methods will be utilized. Multiple high-resolution digital cameras (Canon Mark III 1Ds) will allow surveys to be flown at altitudes too high for on-board observers to identify species. The increase in altitude will reduce disturbance to ice seals being surveyed while providing areal coverage equivalent to surveys flown at lower altitudes during observer-based surveys. 3) Temperature data from a thermal camera (FLIR SC645) paired with each Canon digital camera image will be used to identify when seals are present in the survey area. Utilizing these data will be a thermal automated count and camera-trigger system (Snowflake), a new system that will be tested during this study. This new system allows for images to be collected at regular intervals to monitor sea ice habitat throughout the survey in addition to collecting images when seals are present in the thermal signal. The purpose of this fully automated image collection system is to greatly reduce the number of images collected, thus reducing time for analysis and reducing computer storage space of raw imagery data. 4) After each survey, the digital images, thermal data, and GPS records will be downloaded, duplicated, and stored with appropriate metadata for later analysis. 5) Abundance estimations will be achieved using hierarchical models for seal abundance developed at NMML.

**Current Status:** Ongoing

**Final Report Due:** March 2014

**Publications Completed:** None

### **Affiliated WWW Sites:**

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

[ftp://ftp.afsc.noaa.gov/posters/pCameron06\\_aerial-survey-ice-seals.pdf](ftp://ftp.afsc.noaa.gov/posters/pCameron06_aerial-survey-ice-seals.pdf)

**Revised Date:** July 2012

**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)