

## Semiannual Progress Report

**Project #:** F0515  
**Title:** Ice Seal Movements and Stock Structure in a Changing Cryosphere

**Principal Investigator(s)  
and Recipient Organization(s):**

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**Contract Period and  
Amount of Funding:** May 2005- April 2007 (\$203,644)  
**Report Period:** 1 January to 30 June 2006  
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**Lead Author of Report:** Brendan P. Kelly

**Project Summary:**

Ice seasonally covers 14,000,000 km<sup>2</sup> of northern seas and supports an ecosystem that includes spotted, ribbon, ringed, and bearded seals. These ice-associated seals are the main prey of polar bears and have been vital to the subsistence economy of northern people for thousands of years. The sea ice ecosystem and subsistence economies in the arctic are threatened by decreases in sea ice cover associated with climate change. Assessing the impacts on the ice-associated seals requires knowledge of their movement patterns and population biology. Understanding the population structure of ice-associated seals will help the NMFS and Alaska Natives to manage and protect these important components of “the ecologically diverse marine ecosystems of the North Pacific, and provide long-term, sustained benefits to local communities and the nation,” a research goal of the NPRB. A primary need is to understand the vulnerability of local subpopulations of seals to extinction. If immigration occurs from other populations, vulnerability is low, but if immigration is absent or very rare, the potential for local extinction is high. We are using satellite-linked transmitters to determine whether ringed seals return to the same breeding locations in successive breeding seasons, an indication that immigration rates are low. We also have begun to collect and analyze DNA samples as a further indication of the frequency of immigration.

**Progress Summary:**

Tracking seal movements

Thirteen seals were tagged with satellite-linked transmitters in 2005 and 12 seals were tagged in 2006. In March 2006, seven ringed seals were tagged north of the Mackenzie River Delta in a collaborative effort with the Department of Fisheries and Oceans (Canada) and hunters from Inuvik, Tuktoyuktok, and Holman Island. In April and May 2006, 5 ringed seals were tagged near Peard Bay, Alaska in collaboration with the North Slope Borough’s Department of Wildlife Management and the Alaska Ice Seal Committee. Transmitters on 4 of the seals (3 ringed seals and 1 bearded seal) tagged in 2005 and all seals tagged in 2006 continue to transmit to ARGOS satellites as of July 2006.

In both years, the tagged seals remained within a few kilometers of their capture sites until the ice broke up in July. In July – September 2005, tagged seals moved north and east, ranging over 1,000 kilometers from their capture sites. In October 2005, tagged seals returned to their capture sites.

### Population genetics

In May 2006, we collected an additional 28 samples of shed ringed seal skin between Peard Bay and Point Barrow. We also have identified 1,503 ringed seal specimens collected during the breeding season (March-June) and archived at the University of Alaska Museum of the North. Extraction of DNA from those samples will begin in July 2006. Currently, we are mapping locations for the museum specimens to determine which were collected on shorefast ice and which on pack ice. Russian colleagues and subsistence hunters have suggested that different “ecotypes” of ringed seals inhabit shorefast and pack ice. We intend to test that hypothesis using molecular markers.

### Outreach

Results of this study were presented at 16 meetings between January and June 2006:

Science for Alaska Lecture Series, University of Alaska Anchorage - 23 January

Marine Science in Alaska 2006 - 25 January

University of Alaska Anchorage Bookstore - 25 January

Ice Seal Committee, First Alaskan's Institute, Anchorage - 31 January

Science for Alaska Lecture Series, Fairbanks, Alaska - 14 February

Arctic Ocean Synthesis meeting - Honolulu - 16-17 February

Shelf Basin Interactions PI's meeting - Kauai, Hawaii - 25-28 February

Office of Polar Program, National Science Foundation - 7 March

Climate Change Seminar, University of Alaska Southeast - 10 March

North Slope Borough Fish and Game Committee, Barrow - 29 March

Pacific Rim Conference - 30 March

Associated Press interview - 12 April

Earth Day, Mendenhall Visitor's Center, Juneau - 22 April

Glacier Bay National Park and Preserve - 24 April

Northwest Alaska Climate Change Workshop, Kotzebue - 24-25 May

Auke Bay Laboratory, NOAA, Special Seminar - 22 June

This project also is contributing to the education of students. Stephanie Sell has assisted the project in the laboratory and the field as an undergraduate student at the University of Alaska Southeast. This month, she will begin graduate work at Central Michigan University analyzing micro satellite DNA collected from ringed seals in this study. Micaela Ponce participated in the 2006 data collection and is contributing to data analysis as a Research Experiences for Undergraduates Fellow (funded by the National Science Foundation) at the University of Alaska Southeast.

### Project Personnel and Assistance

John Moran ably led the collection of data in the field. In addition to Stephanie Sell and Micaela Ponce, we were assisted in the field by Tom Smith, Raymond Ettiagiak, Roger Memorana, Rowenna Flinn, and Rex Snyder. Melanie Duchin made her Labrador retriever dog, Cooper, available for finding seal holes. Taqulik Hepa and her staff at the Department of Wildlife Management, North Slope Borough, were extremely generous in providing logistic support and information. Ida and Nate Oleman made their cabin in Peard Bay available.