



North Pacific Research Board *Project Synopsis*

PROJECT **515**

CONTINUED AS 631

FUNDING SUMMARY

Principal Investigator

Brendan P. Kelly,

University of Alaska

Southeast

Year funded

2005

Research period

May 2005–December 2007

Budget

\$203, 644



RESEARCH THEME

Marine Mammals

Ice seal movements

USE OF SEA ICE BY RINGED SEALS

For about nine months each year, ringed seals inhabit ice-covered waters in which they feed on fish and zooplankton. To breathe, they must scratch holes through the ice, and they keep those breathing holes open with frequent scratching.

When snow above the breathing holes is deep enough, seals scratch out snow caves above the holes. The snow cover protects ringed seals from predators and cold temperatures, and is especially important for pups during the two-month long nursing period. We tracked the movements of ringed seals in and out of the ice-bound seasons.

WHY WE DID IT

As the climate warms, the ringed seal's sea ice breeding habitat is diminishing. The snow cover on which they depend melts earlier each spring. How vulnerable ringed seals are to extinction will depend, in part, on the degree to which individuals move from their birth sites to other areas to breed.

HOW WE DID IT

We tracked ringed seal movements throughout the year using three kinds of transmitters. Radio transmitters signaled when seals were out of the water and allowed us to determine where they were hidden beneath the snow. Acoustic transmitters—broadcasting outside of the seals' hearing range—tracked movements under the ice. Satellite-linked transmitters allowed us to follow long-distance movements that took place after ice break up.

WHAT WE DISCOVERED

During the ice-bound season, each seal remained in a very small area (usually less than two-and-half square kilometers), surfacing at 1-5 breathing holes. In the breeding season, adult males

(Continued)



A ringed seal rests on the ice. (Brendan Kelly)

The Big Picture

For most of the year, ringed seals actively maintain breathing holes in Arctic sea ice and, as a consequence, are restricted to very small home ranges. After traveling widely during the ice-free months, they return to the same winter home range used in previous years.

NPRB Research Interest

Ringed seals are the major prey of polar bears and an important subsistence resource to Alaska Natives. The ringed seal's dependence on snow and ice cover makes them particularly vulnerable to a warming climate.

used smaller under-ice areas than females and young seals. While the females concentrated on catching prey, the males appeared to focus their efforts on mating. When the ice broke up in summer, the seals ranged farther from their breeding sites, some traveling over 1,600 kilometers. At freeze up the following fall, however, they all returned to the range, within less than 28 km of the sites they occupied the previous winter.

WHAT'S NEXT?

The fact that adult ringed seals return to the same breeding site from one year to the next suggests that there is little exchange of genes from one area to another. If, like salmon, ringed seals breed in the same location in which they themselves were born, then the population is effectively divided into many independent subpopulations.

If ice seals rarely immigrate from one subpopulation to another, then each subpopulation is vulnerable to extinction. Determining the degree of population subdivision requires comparing DNA samples from around the Arctic, and we have begun such a study (NPRB Project 631).

OUTREACH HIGHLIGHTS

We gave more than 11 presentations at national and international scientific conferences and participated in seven workshops and eight community meetings. We made eight public presentations including testifying before the U.S. Senate Subcommittee on *Private Sector and Consumer Solutions to Global Warming and Wildlife Protection in 2007* and shared the project with six schools in Alaska. Press about the project appeared in five newspapers and journals, five radio, television and video interviews and two websites. In 2007, National Geographic produced a documentary, *Ice Masters*, featuring this project.

Visit <http://project.nprb.org> for more outreach details on this project.

MISSION OF THE NPRB

Building a clear understanding of the North Pacific, Bering Sea and Arctic Ocean ecosystems that enables effective management and sustainable use of marine resources



Young assistant peers into a subnivean seal lair, and what he sees.

North Pacific Research Board

1007 West 3rd Avenue, Suite 100
Anchorage, AK 99501-1936
907 644 6700 | www.nprb.org

MORE | <http://project.nprb.org>

Download reports associated with this project and learn more about ecosystem research funded by NPRB.