U.S. Fish & Wildlife Service

Ongoing Polar Bear Research in Alaska

DAN COX, NATURAL EXPOSURES

Capturing and handling polar bears increases our understanding of population health.

The U.S. Fish and Wildlife Service (FWS) is responsible for monitoring polar bear populations in the United States and works cooperatively with the U.S. Geological Survey's (USGS) polar bear research program as well as other research entities to better understand Alaska's polar bears. Of 19 polar bear populations throughout the world, two live in Alaska waters. The Chukchi Sea population ranges primarily between western Alaska and Siberia, while the Southern Beaufort Sea population extends from western Alaska east into the Canadian Arctic.

LONG-TERM RESEARCH ON POLAR BEARS IN THE SOUTHERN BEAUFORT SEA

The Southern Beaufort Sea (SB) polar bear population is one of the best-studied populations in the world. Much of what we know about polar bears has come from a long-term capture-recapture study conducted in the SB by the USGS. Captures of polar bears in this population began as early as the 1960s, with relatively consistent data collection starting in the early 1980s. In 2001, a 5 year intensive capture-recapture study began with the objective of estimating the size and vital rates of this population.

From the intensive capture-recapture study, USGS estimated that there are 1500 polar bears in the SB population. This is less than the estimate of 1800 polar bears that was derived in the 1980s and 1990s. Because of uncertainty in both estimates, we can't be sure that the size of the SB population has declined in the past 20 years. However, recent studies have shown that SB polar bears are being strongly affected by declines in the sea ice. In years with long open-water seasons, polar bear survival and breeding rates are low, which causes deaths to outpace births, and leads to reductions in population size. One explanation is that, in years with long open-water seasons, polar bears spend less time hunting seals on sea ice over the biologically productive waters of the continental shelf. This limits the amount of fat they can store, leading to nutritional stress and possibly starvation. Indeed, some sex and age classes of bears appear to grow more slowly and be thinner in years with long open-water seasons.

MORE TO LEARN ABOUT POLAR BEARS IN THE SOUTHERN BEAUFORT SEA

Although research and traditional knowledge have taught us a lot about polar bears in the SB, this population is facing new challenges and there's a lot we do not know. For example, what are the mechanisms by which climate change is affecting polar bears? While nutritional limitations appear to be affecting some segments of the population such as young, growing males, others, such as adult females, appear to have remained in good condition. Are drowning events, contaminants, or disease further impacting this population? Will changes in the sea ice cause polar bears to leave their old ranges and move into new areas? Will offshore oil development impact the ability of polar bears to cope with climate change? These types of questions, in addition to long-term monitoring of the health, condition, and vital rates of bears in this population, are being addressed through ongoing capture efforts.

For more information and connections to publications generated from long-term studies in the Southern Beaufort Sea, go to: http://alaska.usgs.gov/science/biology/polar_bears/

A NEW STUDY IN THE SOUTHERN BEAUFORT SEA IN 2008

To better understand the response of polar bears to climatic warming, a new research study funded, in part, by the National Science Foundation, is being conducted by the University of Wyoming, the USGS, and FWS. The goal is to compare the activity, movements, body condition, and physiology of polar bears that spend the fall open water season on land, versus polar bears that follow the sea ice as it retreats north into the polar basin. In 2008, polar bears were captured in the Prudhoe Bay area at the beginning and end of the open-water season to determine how their condition and physiology changed during this time, including whether or not they gained weight, accumulated body fat, or fasted. Similarly, in 2009, polar bears were captured on land but also out on the Beaufort Sea pack ice at the beginning and end of the open-water season. This will help us understand how polar bears will cope with the longer open-water seasons that are predicted to occur in coming years, and should help managers anticipate challenges associated with bears spending more time on land.

FALL AERIAL SURVEYS IN THE SOUTHERN BEAUFORT SEA

Since 2000, the FWS has conducted aerial surveys along the SB coastline and barrier islands between Barrow and the Canadian border. The purpose of the surveys is to document the distribution and number of bears on shore during the fall open water period. Analysis of data collected in 2000-2005 determined that on average, less than 4% of the SB population came on shore during the fall, and of those that did come to shore, 65% did so at Barter Island where they have access to subsistence-

harvested bowhead whale carcasses. The number of bears observed on shore and the amount of time they spent there was higher during years when the ice retreated furthest from shore. The FWS continued aerial surveys in 2007-2009 with extra surveys flown in August of 2008 and 2009 to accomodate sightings by oil and gas industry workers, which indicate that bears may be coming to shore earlier than in previous years. Future aerial surveys, in combination with the new fall capture program outlined above, will allow us to monitor polar bear responses to future changes in fall sea ice conditions.

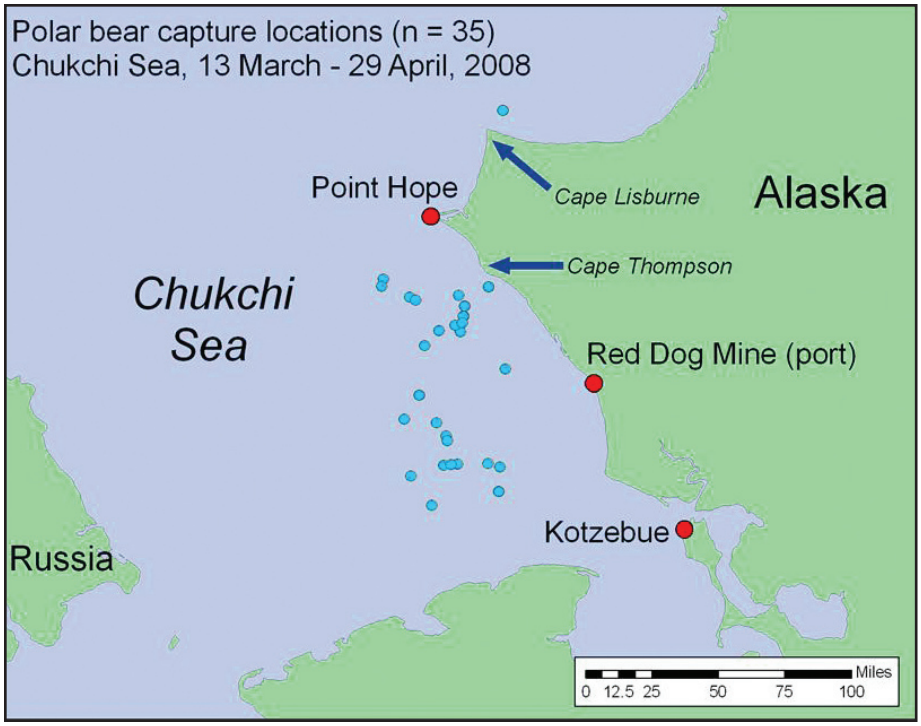
NEW RESEARCH ON POLAR BEARS IN THE CHUKCHI SEA

In 2000, the U.S. and Russia signed a bilateral treaty to cooperatively manage polar bears in the Chukchi Sea. This treaty establishes a Joint Commission of federal and Native representatives from the U.S. and Russia who will make decisions involving polar bears in the Chukchi Sea. To ensure that the Joint Commission will have the best available science on which to base management decisions, FWS and USGS initiated a study in 2008 to begin gathering biological and demographic information on polar bears in the Chukchi Sea.

Currently, very little is known about the status and health of polar bears in the Chukchi Sea, including reproductive rates, survival, or population size. The first step of this study is to identify the best methodology for estimating population, status and trends of polar bears in the region, and to gain an initial understanding of the health and sex/age structure of the population. The long-term goals are to estimate population status and trend using the methods identified, and to understand how polar bears are distributed in the region and how they use sea ice habitat. This information will be evaluated in the context of rapidly changing sea ice conditions and other changes that may be occurring in the ecosystem.

KARYN RODE, USFWS

George Durner, USGS Research Zoologist, examines a 1,240-pound adult male captured 65 miles off the Chukchi Sea coast in April 2008.



KARYN RODE, USFWS

Location of polar bears (blue dots) captured in March and April 2008.

In March-May of 2008 and 2009, polar bears were captured out on the sea ice between Point Hope and Kotzebue in the Alaskan Chukchi Sea. A total of 74 polar bears were captured and standard information such as body weight and body length/skull size were recorded. In addition, samples of blood, hair, and fat biopsies were obtained from captured bears. Twenty-one adult females were fitted with satellite radiocollars that provide their locations every 3 days for up to 2 years. These collars are fitted with new software that tracks the daily amount of time bears spend in the water. This information will be important in assessing any impacts that changing sea ice conditions may have on polar bear behavior and their risk of drowning. Data collected during this initial capture effort will be added to data collected during subsequent capture efforts planned for 2010-2012 to establish current baseline information for the population. In addition, efforts are being made to expand capture efforts in Russia to gain a more comprehensive assessment of the status of polar bears in the Chukchi Sea.

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