

Fish and Wildlife of Alaska's North Slope

POLAR BEARS

Polar bears (*Ursus maritimus* or *nanuq*) occur in ice-covered seas of the Northern Hemisphere, including the coastal waters of the Bering, Chukchi, and Beaufort seas in Alaska. Over most of their range, polar bears are limited to areas of sea ice, and they seldom occur on land except for those females that den there. Periodically, however, polar bears can become stranded on land when the pack ice unexpectedly moves out to sea. In summer, sea ice recedes northward, and polar bears typically migrate north to stay with the pack ice in the Beaufort Sea, where polar bears are year-round residents.



Polar bear (Ursus maritimus or nanuq).

Polar bears in the Beaufort Sea have been exposed to oil and gas exploration and development activities for more than 30 years. This exposure has raised concerns for the welfare of polar bears and their habitats in the region. Scientists with the United States Geological Survey (USGS), working with support from ConocoPhillips, have conducted studies to assess the distribution and abundance of the Beaufort Sea population. Without mitigation and protective regulations, habitat alterations and distur-

bance from industrial activities could interfere with movement, feeding, denning, and breeding patterns, and could expose bears to various contaminants, particularly oil spills.

Polar bears have an inherently low reproductive rate and thus are susceptible to population declines from disturbance and habitat alteration that interferes with reproduction. The potential for impacts on denning female polar bears is greater because the young must remain in the maternal den until they are approximately three months old.

Expansion of oil and gas activity into the National Petroleum Reserve-Alaska (NPR-A) and east to the boundary of the Arctic National Wildlife Refuge (ANWR) could influence as much as two-thirds of the northern coastal region of Alaska.

Population Status

The ConocoPhillips-supported USGS studies have documented the population status and survival rates of adult and young polar bears living in the Alaskan Beaufort Sea. Some research suggests that the patterns of population composition, survival, and recruitment observed there are typical of a population nearing carrying capacity.

The polar bears in and near the southern Beaufort Sea are one of 20 recognized populations. Worldwide numbers of polar bears are estimated at between 21,500 and 25,000, and an estimated 1,800 of these are in the southern Beaufort Sea population. Population growth for nearly 30 years has coincided with increases in the number of

people on Alaska's North Slope and the expansion of oil and gas exploration and development. Excessive hunting during the 1960s substantially reduced the number of polar bears in the region. However, after sport hunting ended in Alaska in 1973 with the passage of the Marine Mammal Protection Act, the population has grown and current reports indicate continued increases in the coastal regions of the Beaufort Sea.

Polar bears in the wild can live to be more than 30 years old, and the adult survival rate is approximately 95 percent. Survival of dependent young to the time of weaning is 56 percent. Currently, the greatest source of human-caused mortality for adult polar bears in the Beaufort Sea population is subsistence hunting by Alaskan and Canadian natives. On average, 60 polar bears (35 in Alaska, 25 in Canada) were harvested annually from this population between 1988 and 2003.

Distribution and Movements

Until the 1960s, polar bears were thought to wander throughout the polar basin, perhaps carried passively on ice floes. More research began to change those ideas, but only recently has detailed knowledge of polar bear movements and distribution become available. USGS scientists, with support from ConocoPhillips, use satellite telemetry of locations of adult female polar bears to calculate activity areas of individual bears and



Polar bears near the oilfields in winter.

boundaries of three Alaska populations, including the Chukchi Sea, southern Beaufort Sea, and northern Beaufort Sea populations. The range of the southern Beaufort Sea population includes the region from Pt. Hope on the Chukchi Sea coast of Alaska to Cape Bathurst in Canada. The core activity area of the southern Beaufort Sea population, however, includes 84,000 square kilometers of mostly nearshore habitats from Barrow eastward to the MacKenzie River delta in Canada. Observations of bears in the oilfield region are likely polar bears from the southern Beaufort Sea population.

Female polar bears radio-collared and tracked in the Beaufort Sea frequented nearshore habitats, but were seldom found on land during the non-denning period, preferring instead to remain on sea ice. Female polar bears select habitat based on ocean depth, sea ice thickness, and floe size. During most of the year, polar bears appear to prefer productive waters over the relatively shallow continental shelf, combined with relatively thin first-year ice and stable large floes. However, during the past four years, more than 100 bears have been recorded on land each year during the time of minimum sea ice in late summer and early autumn, primarily near whale-butcher sites. Stranded bears generally remain near the coast and seldom wander inland.

Distribution patterns may alter as a result of sea ice change due to climate warming. Ice-minimum seasons and open-water extent may increase, resulting in more bears on persistent deep-water pack ice far from shore and bears onshore for longer periods. Bears disperse annually throughout the Beaufort Sea in winter and return to the central Beaufort Sea in summer. Studies have reported strong fidelity to late winter and spring feeding and breeding areas within nearshore areas. Polar bears were found to be highly mobile, sometimes moving 35 miles or more in a day. Polar bears prey primarily on seals, and the bears' population size and distribution likely reflect the abundance and availability of seals.

Maternal Denning

Pregnant female polar bears excavate dens in snow and ice in early winter, usually mid-November. Cubs are born in the dens in December or early January, and mothers with cubs typically emerge from dens in late March or early April. Newborn polar bears are highly dependent on their mothers, and the denning period is essential to their early

survival. Studies found that about half the dens in the Beaufort Sea region of Alaska and northwest Canada were on offshore sea ice. While sea ice dens may be more vulnerable to the dynamics of moving pack ice, land dens are more likely to be exposed to human-caused disruptions. However, production of cubs from dens at sea has been found to be not significantly different from that of land-based dens.

Polar bears were found to be faithful to their previous den substrates, whether land or sea ice, but not to specific locations. Female bears were reported to forage until the time of den entry, with denning occurring where they happened to be foraging. Because polar bears are dependent on snow drifts for denning, annual variation in autumn snow and ice conditions can affect den locations.

Typical landscape features that accumulate snow, and hence are suitable denning habitat, include coastal and river banks, and lake shores with abrupt changes in elevation. These landscape features can be mapped through interpretation of high-resolution aerial photography, or radar elevation data, and incorporated into a geographic information system (GIS). The GIS map of den habitat may be used in management plans to minimize impacts on den habitat and denning polar bears. ConocoPhillips has provided support to USGS scientists who are mapping polar bear den habitat in the NPR-A.



ConocoPhillips biologist with a tranquilized female polar bear and cubs.

Human-Caused Disturbance

Federal scientists conducting polar bear studies in the oilfield region have concluded that because dens in this region of the Beaufort Sea are sparse relative to other areas of the Arctic, population-level impacts from localized oilfield activities or developments seem unlikely. During the last 30 years of oil and gas exploration and development on Alaska's North Slope, only two polar bears have been killed in association with industrial activities.

Mitigation

Since the 1980s, ConocoPhillips has prepared and implemented a series of polar bear mitigation and avoidance programs for its exploration and development operations. North Slope workers are provided annual training in polar bear awareness, and select groups of workers receive additional training from USGS biologists on hazing techniques. These programs are in compliance with the Marine Mammal Protection Act and are designed to both protect individual polar bears and to ensure the safety of workers. These programs include working with federal, state, and local governments to design appropriate bear encounter and avoidance programs. These plans identify strict operational protocols and have largely prevented interactions between bears and people.

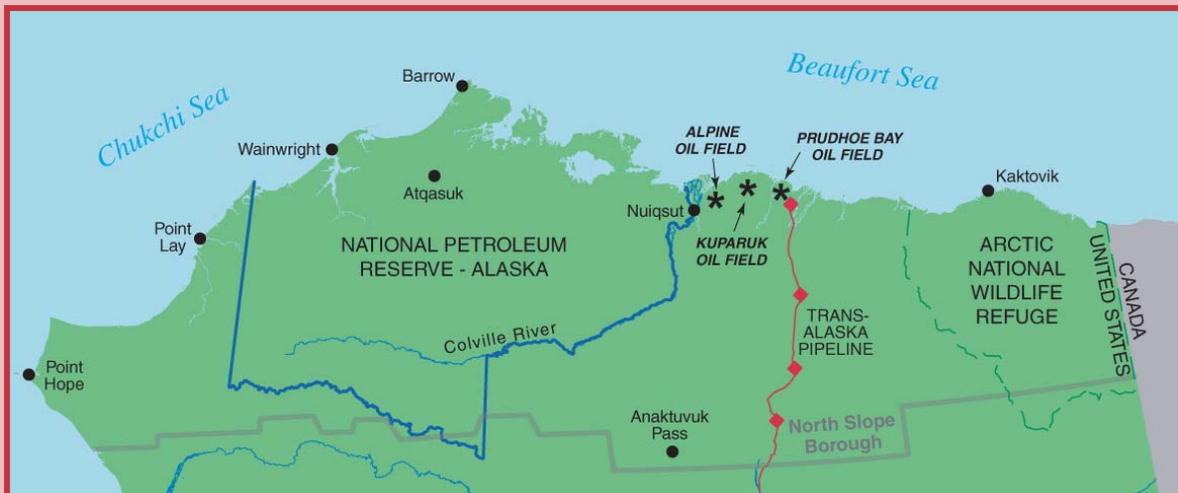


Polar bear traveling across sea ice.

The USGS maintains a polar bear location database and annually conducts winter surveys of polar bear dens. ConocoPhillips uses this information to monitor current bear dens to ensure its North Slope activities cause minimal disturbance to bears. Before the start of onshore or offshore seismic or drilling exploration programs, ConocoPhillips checks the USGS database to identify den locations. A trained polar-bear monitor is placed at all exploration drilling sites to ensure bears do not interact with the drilling operations. When polar bears are in the oilfields, security personnel monitor the bears until they leave to ensure they do not encounter any problems. In addition, Environmental Alerts are posted around the oilfield camps

and safety meetings are held to disseminate the bear-sighting information. Field-wide bear encounter reports are submitted to the U.S. Fish and Wildlife Service each year to assess the effect of industrial activities on polar bears and monitor human-bear encounter trends, such as the time of year and frequency of encounters and the location of the encounters.

To increase the accuracy of polar bear surveys and efficiency in monitoring bears, USGS scientists, with support from ConocoPhillips, began a series of experiments in the 1990s to test the ability of forward-looking infrared (FLIR) thermal-imaging equipment to detect heat signatures of polar bears in dens. The study showed that the majority of tested polar bear dens were visible to the FLIR sensor. This indicates that FLIR can be an effective management tool, especially when used in conjunction with maps of likely polar-bear den habitat, to minimize industrial impacts on denning bears.



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