

**Report to Inupiat of the North Slope, Alaska, and the Inuvialuit of the
Northwest Territories, Canada
Polar Bear Management in the Southern Beaufort Sea, 2008-2009
Tuktoyaktuk, Northwest Territories, Canada
July 28-31, 2010**



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Introduction

This is the 20th year of implementation of the "Polar Bear Management Agreement for the Southern Beaufort Sea" signed in January 1988 by the Inuvialuit of the Inuvialuit Game Council (IGC), Northwest Territories, Canada, and the Inupiat of the North Slope Borough (NSB), Alaska, U.S. The principle of sustained yield derived from scientific information is integral to the agreement.

The initial Technical Committee, which met on October 17, 1988, reviewed population and harvest data and determined a sustainable take of 76 bears. The harvest was changed to 81 bears in 1997 based on a 4.5% harvest rate, a population size estimate of 1800 polar bears, and a 2:1 male to female harvest sex ratio.

Alaska Harvest Summary - July 1, 2008 to June 30, 2009

The 2008/2009 harvest for villages of the North Slope party to the North Slope Borough/Inuvialuit Game Council (Inuvialuit/Inupiat (I/I)) management agreement with the Inuvialuit was 25 polar bears: 16 males, 1 female, and 8 of unknown sex (Table 1). June was the only month in which no bears were harvested (Table 2). The sex composition of known-sex animals in 2008/2009 was 94% (16/17) male and 6% (1/17) female. If the unknowns were included as females then the female harvest would have been 36% (9/25). Harvest year 2005/2006 was the last year in which sufficient teeth were aged to be able to evaluate the age class composition of the harvest. The long-term (since 1980) age class distribution of polar bears in the Southern Beaufort Sea is 46% adults, 40% sub-adults, and 14% cubs. The age class distribution from the aged teeth since 1988/1989 when the MTRP started is 48 % adults, 40% subadults, and 12% cubs which is very similar to the age class distribution based on information provided by the hunters 48% adult, 44% subadult, and 8% cubs. During 2007/2008 teeth were collected from 32% (8/25) of the bears harvested and complete sex information was provided for 70% (17/25) of the harvest.

Collecting complete and accurate harvest age information is fundamental for management. Improvement in reporting is needed. The U.S. Fish and Wildlife Service (Service) requests that **Alaska Nanuuq Commission help make hunters aware that if you take a polar bear, you must have it tagged within 30 days, and a pre-molar tooth must be provided for aging.** Providing accurate, timely harvest data will help promote sustainable management of Alaska's polar bear populations. If at all possible, please also encourage hunters to provide samples for the ongoing Bio-monitoring Program.

Harvest Management for the Southern Beaufort Sea Population

There are provisions in the U.S. Marine Mammals Protection Act (MMPA) and the Endangered Species Act (ESA) that allow for a harvest if it does not prevent recovery of the population. In the southern Beaufort it is necessary to balance subsistence harvest with the potential negative effects of human-caused removals on the population. At the two most recent I-I meetings the Service has made presentations regarding the status of the Southern Beaufort Sea population, the potential effects of different harvest levels on the population, and provided information on how harvest quotas were

calculated. The Southern Beaufort Sea polar bear population has sufficient population data available to make relatively good management decisions regarding harvest levels. Historically, managers have used the Maximum Sustained Yield Model (MSY) developed by Taylor et al. (1987) to calculate sustainable harvest at a total removal rate of 4.5% of total population size (Brower et al. 2002). Using this MSY model, sustainable harvest for a population of approximately 1800 bears was 81 bears when incorporating a 2:1 male-to-female sex ratio in the harvest (the actual harvest limit was set at 80 bears by the I-I for practical purposes; Brower et al. 2002). The harvest limit of 80 remains in effect. However, the MSY model is only appropriate when environmental conditions are favorable and a population is capable of strong positive growth (Taylor et al. 1987). A recent capture-recapture study conducted in US and Canadian portions of the southern Beaufort Sea indicated that population size in 2006 was approximately 1526 bears (Regehr et al. 2006). Furthermore, scientific studies on polar bear body condition, recruitment, and survival (Regehr et al. 2009, Rode et al. 2009), and anecdotal observations of emaciated polar bears and cases of cannibalism (Amstrup et al. 2006, Stirling et al. 2008), indicate that the Southern Beaufort Sea population is declining due to loss of sea ice habitat. The southern Beaufort Sea population is expected to exhibit severe population declines in the next 100 years, based on population projections that incorporate sea ice loss forecasts from climate models (Amstrup et al. 2008, Hunter et al. 2007).

The MSY model (Taylor et al. 1987) and the existing harvest limit of 80 bears per year (using a 2:1 male-to-female sex ratio) are no longer valid for the southern Beaufort Sea polar bear population. First, a sustainable harvest of 80 corresponds to a population size of approximately 1800, whereas the current estimate of population size is 1526 (Regehr et al. 2006). We note that, using the MSY model, sustainable harvest for a population size of 1526 would be approximately 69 bears per year. However, this estimate of sustainable harvest is not valid either, because it is still based on the assumption of the MSY model that the population is capable of strong positive growth. This leads to the question: what level of harvest is currently sustainable in the southern Beaufort Sea? If the population continues to decline as forecasted by Hunter et al. (2007), there is no long-term sustainable harvest. In this case, any level of human-caused mortality will likely have a negative impact on the future viability of the population. Thus, a harvest limit of 0 is the most cautious management approach, until new scientific information or local knowledge is available that indicates conditions have improved for polar bears in the southern Beaufort Sea. However, recognizing the importance of subsistence harvest, the variability of the arctic environment in the short term, and uncertainties in previous population studies, several methods are available to estimate a reasonable range of harvest limits that would pose relatively low risks to the future viability of the population. The Potential Biological Removal (PBR; Wade 1998) method was developed by the National Oceanic and Atmospheric Administration for the management of marine mammal stocks, and is generally considered a conservative model. The PBR approach uses a minimum population size (N_{min}), which is calculated from the best estimate of actual population size. The PBR approach also incorporates a recovery factor (F_r) based on population status. Using PBR with $N_{min} = 1397$ (based on an actual population size of 1526), a maximum population growth rate $r_{max} = 0.06$ based on previous polar bear studies, and $F_r = 0.5$ as indicated by the MMPA for stocks listed as threatened or depleted, the annual harvest limit would be 21 bears per year, consisting of an equal number of females and males. An alternative approach to harvest estimation, which is similar to but less conservative than the PBR method, can be found in a modified version of the Prescribed Take Level (PTL) method (Runge et al. 2009). The modified PTL method was recently used to estimate an upper

limit on sustainable harvest for the Alaska-Chukotka polar bear population, which inhabits the Chukchi and Bering Seas (USFWS, unpublished data). Using the modified PTL method with $N = 1526$, $r_{max} = 0.06$, and $F_o = 0.50$ (the management factor F_o is conceptually similar to the recovery factor F_r in the PBR method), the annual harvest limit would be 34 bears per year, consisting of a 2:1 male-to-female sex ratio in the harvest. The modified PTL method allows for the additional take of male polar bears, because males are less important contributors to population growth than females (Taylor et al. 2008).

The Inuvialuit-Inupiat Agreement (Brower et al. 2002) has been a success and the Service would like to continue to manage the harvest through the I-I Agreement. Considering evidence that the southern Beaufort Sea population is likely to face severe declines, even in the absence of harvest, the Service believes that it is necessary to reduce subsistence harvest from the current limit of 80 bears per year. A current harvest limit of 0 bears per year would represent the most cautious approach, pending new studies that indicate conditions in the southern Beaufort Sea have improved for polar bears. Recognizing the importance of the subsistence harvest, a maximum annual harvest of 34 bears per year (to include a 2:1 male-to-female sex ratio), based on the modified PTL method, likely poses a low to moderate level of risk to the southern Beaufort Sea population in the short term. A harvest limit of 34 bears per year represents a reduction of 10 bears per year from the mean annual harvest of 44 bears per year that occurred in the combined US and Canadian portions of the southern Beaufort Sea from 2004-2008 (per the status table of the 2009 Polar Bear Specialist Group report). Any harvest limit agreed upon by the I-I must be re-evaluated periodically (i.e., increased or decreased) in light of new scientific studies, local knowledge, and traditional ecological knowledge. The Service is preparing a harvest analysis that more thoroughly evaluates the risks associated with various harvest levels, and that considers potential adaptive management systems designed to minimize the risk of population declines by reducing harvest when environmental conditions are poor, while safeguarding subsistence harvest when environmental conditions are favorable for polar bears. This analysis will be presented at the 2011 I-I meeting, and should help stakeholders determine an acceptable balance between subsistence harvest and the potential negative effects of harvest on the population. However, an analysis of harvest risk will not change recent evidence that the southern Beaufort Sea population is declining due to sea ice loss, nor will it alleviate the conservation need for a reduction in harvest limits. At present, a voluntary reduction in harvest limits would demonstrate that the managers of the I-I Agreement have taken positive steps that will address the negative effects of sea ice loss on polar bears and will improve the chances that polar bears will persist for future generations.

Fall Coastal Surveys in the Southern Beaufort Sea

The Service continued aerial surveys of polar bears on the barrier islands and coastline of the Southern Beaufort Sea during the fall of 2009. As in previous years the surveys were conducted to determine the spatial and temporal distribution of polar bears using coastal habitat and barrier islands during the late summer open water period. The surveys are designed to occur during the period between summer sea ice break-up and the beginning of ice formation in autumn. Surveys were conducted between Barrow and the Canadian border at a flight altitude of 300 ft (91 m) and a speed of 80–100 knots (148–185 km/h). Surveys were conducted between August 24 and October 7, 2009 using a Robinson R44 Raven II helicopter with fixed floats. This was a change from the fixed-wing aircraft used in previous surveys.

Although we had scheduled 4 bi-weekly coastal surveys, we completed only 3 surveys because bad weather grounded the aircraft. The R44 helicopter proved to be an excellent survey platform. The increased maneuverability made it easier to estimate sex and age class of observed bears, to evaluate body condition using a standardized fatness index, and to read numbers on bears that had been captured earlier in the summer by the U.S. Geological Survey. Of the 17 bears captured and marked by USGS and the University of Wyoming in August, we were able to see all of the bears at least once during the surveys. Re-sightings of marked polar bears allowed us to move beyond simple counts, and attempt to estimate the abundance of polar bears onshore during the ice-retreat season, using mark-resight methods. At times the ability to hover in the helicopter also allowed us to determine whether the bears retained the experimental glue-on and ear-mounted radiotelemetry tags that were applied by the USGS during onshore capture efforts. A maximum of 109 bears, including dependent young, were observed on October 5–7, 2009 between Barrow and the Canadian border. The body condition of most of the bears was good (i.e., subjective fatness index of 3) and, similar to 2008, few subadults and yearlings were seen compared to previous surveys. Once again the highest concentrations of polar bears were seen at Cross and Barter Islands; two locations where subsistence-harvested bowhead whale remains are present. Data from the 2009 coastal mark-resight survey are currently being analyzed.

New Radiotelemetry Tags

Satellite radiotelemetry provides critical information on the movement, ecology, and population dynamics of polar bears. Historically, radiocollars provided the only viable method to obtain satellite relocations of polar bears. While radiocollars remain an important research tool for polar bear studies, they also face several limitations, including: they cannot be attached to male and growing polar bears in a safe and effective manner, the potential for rubbing or cutting around the neck for polar bears that gain large amounts of weight, and a negative perception among some members of the public. To address these concerns, the Service and USGS began a new collaboration in 2009 to evaluate non-radiocollar satellite telemetry tags on polar bears. This collaboration is funded in part by the Minerals Management Service.

In 2009, the Service provided the USGS with non-radiocollar radiotelemetry tags for deployment during August and October onshore capture-recapture studies in the southern Beaufort Sea. The USGS deployed 11 glue-on PTT tags (S216C), 2 glue-on GPS tags (MK10AFB), and 10 ear-mounted PTT tags (S227B) manufactured by Wildlife Computers. Mounting hardware for the ear tags was provided by Mikkel Villum. Preliminary results suggest that non-radiocollar tags are a viable option for providing short-term relocation data for polar bears, and may be suitable for some study designs, such as onshore capture-recapture studies during the ice-retreat season. Tag retention and performance data are currently being analyzed by the Service. In spring 2010, the Service deployed 20 ear-mounted PTT tags (S227B) on polar bears in the Chukchi Sea. Additionally, in 2010 the Service provided USGS with 15 ear-mounted PTT tags for deployment during onshore southern Beaufort Sea capture work in August 2010.

Summer Ecology Studies in the Southern Beaufort Sea

In August 2008, the University of Wyoming initiated a study to investigate the physiological and ecological response of polar bears to longer ice-retreat seasons in the southern Beaufort Sea. This project was funded by the National Science Foundation and included the U.S. Geological Survey, the University of Wyoming, and the Service as collaborators. Similar to 2008, in 2009 polar bears were again captured onshore in the southern Beaufort Sea in August, and then recaptured in October prior to sea ice formation. Additionally, in 2009 the offshore component of the study was accomplished, in which polar bears were first captured on the sea ice during spring capture-recapture operations by the USGS. These bears were targeted for recapture in October on the offshore pack ice of the southern Beaufort and Chukchi Seas. To access the remote regions of the Arctic Ocean where these bears occurred, the project used two Bell 206 helicopters based on the U.S. Coast Guard icebreaker the Polar Sea. Of 8 polar bears fitted with radiocollars in the spring that were identified as high priority bears, 4 were successfully recaptured during the Polar Sea cruise. Additionally, 2 polar bears that had been previously fitted with radiocollars by the USGS were recaptured, and 3 new polar bears were recaptured opportunistically, for a total of 17 individuals (including dependent young). The partial success in recapturing high priority polar bears was due in large part to poor ice conditions. Summer Arctic sea ice extent in 2009 was the third lowest on record since satellite imagery became available. Additionally, air and water temperatures were abnormally warm, which resulted in slow ice formation and difficulty in finding sea ice that was sufficiently thick to safely capture polar bears. Indeed, all 8 high priority polar bears were sighted, some multiple times, but unsafe ice conditions repeatedly prevented capture. This study will provide information on the physiological and ecological mechanisms available to polar bears to withstand longer ice-free periods, and is expected to help scientists refine models that predict the future status of polar bears in relation to climatic warming. Data from this study are currently being analyzed by the University of Wyoming (contact Dr. Merav Ben-David, BenDavid@uwyo.edu).

Polar Bear Conservation Activities at Barter Island

In 2009 the Service's Marine Mammals Management Office and Arctic National Wildlife Refuge staff continued efforts to support the community of Kaktovik in addressing bear/human interactions, and engage local residents in polar bear conservation issues. A new focus in 2009 involved addressing the increase in polar bear tourism/viewing.

Minimizing bear/human conflicts: the Native Village of Kaktovik (NVK) continued with initiatives started in previous years under a Service tribal grant to minimize bear/human conflicts in and around the village. Polar bear patrols were again implemented by the community, as well as efforts to minimize attractants during whaling. Polar bear patrols were successful in hazing polar bears (and brown bears) out of the village area; however, four bears were shot in August/September when patrols were not operational, further demonstrating the importance of these patrols as a polar bear conservation tool. Collared and paint-marked bears continue to be of concern to local residents; in 2009 the Service and the USGS conducted meetings and distributed posters and fact sheets to hear concerns and improve communication with residents.

Monitoring polar bear numbers: In 2009, two residents assisted in monitoring polar bear numbers at

Barter Island. Polar bears were first reported in town on August 10; most (4/5) were adult males. The official monitoring period was 20 August–28 September 2009; the minimum, maximum, and average number of bears observed was 11, 35, and 23, respectively (Table 5). We plan to continue our efforts in 2010.

Development of viewing guidelines: polar bear viewing guided by both local residents and outside companies is increasing. In 2009 the Service developed draft viewing guidelines for Arctic NWR lands and waters (surrounding Barter Island) and shared them with guides and community leaders, soliciting their input. Polar bear viewing is only permissible if no take (harassment) occurs; the guidelines provide suggestions on how to avoid disturbance to bears. Guided polar bear viewing is also occurring on non-Refuge lands; the Service is coordinating with other entities to encourage them to adopt similar viewing practices. In 2010, a permit will be required to conduct polar bear viewing on Refuge lands and waters. Planning is currently underway to conduct a 10–14 day workshop in Kaktovik for those residents interested in guiding to become compliant with Refuge permit and other federal and state requirements (e.g., first aid training, boat operator licensing, business licensing).

Polar bear research in the Chukchi and Bering Seas

Information on the status and trend of the polar bear population that inhabits the Chukchi and Bering Seas (referred to as the “Chukchi Sea” population) is urgently needed. Polar bears in the Chukchi Sea face a number of conservation challenges, including potentially unsustainable levels of human-caused mortality, sea ice loss due to climate change, and the future exploration and development of natural resources. Furthermore, a treaty signed between the US and Russia for the conservation and management of polar bears in this region is currently being implemented. This treaty includes an agreement to identify a sustainable harvest, to be divided evenly between coastal native residents of the US and Russia. Scientific data are needed to identify sustainable harvest levels, and to ensure the long-term conservation of the Chukchi Sea polar bear population.

The Service and the US Geological Survey (USGS) initiated a study in 2008 to address information needs for the Chukchi Sea population. The objectives of this study are to identify the best methodology to estimate survival rates, breeding rates, and population size; to develop an initial understanding of population dynamics (e.g., the sex and age structure of the population); to evaluate body condition, health, and feeding ecology; and to understand the distribution of polar bears and their response to environmental changes.

In March–April 2010, the Service continued this study for the third year. Our activities included the following:

- Capture, measurement, sampling, and release of 69 polar bears. Of these, 10 polar bears had been captured in the Chukchi Sea in 2008 or 2009. Six of the Chukchi Sea recaptures were located by standard search (i.e., by searching for new polar bears) and four were re-located by radiotelemetry. Additionally, we recaptured three polar bears that had been previously captured by the USGS in the southern Beaufort Sea.

- The sex and age class distribution of captured bears in 2010 differed from 2008 and 2009. The 2010 sample included 5 single adult females, 14 adult females with dependent young, 17 adult males, no subadult females, 8 subadult males, 4 two-year-olds, and 21 yearlings. The large number of yearlings captured in 2010 differed from 2008 and 2009, when only four and one yearling(s) were captured, respectively. This suggests that many females gave birth in maternal dens during the winter of 2008-2009 and were subsequently successful at rearing their cubs through the first year of life.
- Similar to previous capture seasons, no cubs-of-the-year (COY; cubs less than one year old) were observed. Tracks that appeared to belong to an adult female and two COY were observed in both 2009 and 2010. The absence of COY from our capture samples is likely a result of denning occurring primarily in Russia. Since females with COY tend not to travel far after den emergence, they may not be able to access habitats off the US coast in early spring.
- Overall, captured polar bears appeared to be in good nutritional condition. Average body weights were 545 lbs for adult females, 1016 lbs for adult males, 550 lbs for subadult males, 301 for two-year-old females, 423 lbs for two-year-old males, 225 lbs for yearling females, and 317 lbs for yearling males. Three adult males weighed over 1200 lbs.
- We deployed 16 satellite radiocollars on adult females and 20 ear-mounted satellite transmitters on subadults, adult males, and adult females. Radiocollars and ear-mounted tags provide information on the distribution, habitat use, and movement patterns of polar bears in the Chukchi Sea population. This information can be used to determine how bears may be responding to changing sea ice conditions and human activities. All radiocollars included an automatic release device, programmed to drop one year after deployment. Currently, radiocollars are the only method available to obtain movement data throughout the year. In an effort to investigate alternatives to radiocollars, we also deployed a new type of small, ear-mounted satellite transmitter. The ear tags will provide limited data on other sex and age classes of polar bears, which is important because radiocollars can only be deployed on adult females. In preliminary trials, ear-mounted tags have typically provided movement data for up to 3 months.
- Observations from the 2008–2010 capture seasons suggest that the offshore area between Kotzebue and Point Hope is important breeding and feeding habitat for polar bears in the spring. Numerous other marine mammals were observed during the polar bear study, including bowhead whales, belugas, and ringed and bearded seals.

Data collected from 2008–2010 will be used to begin analyzing the feeding ecology, body condition, and population dynamics of polar bears in the Chukchi Sea. Additionally, by spring of 2011, we plan to begin analyzing movement and habitat use data. These analyses will provide important information that can be used by the Scientific Working Group, established under the US-Russia treaty, to make recommendations regarding management of the Chukchi Sea polar bear population.

The Service expects to continue polar bear studies in the Chukchi Sea in 2011. Polar bears are long-lived animals, occurring at low densities in a rapidly changing environment. Multiple years of data are necessary to understand and monitor their population status and to account for variability among years. For more information, please contact Karyn Rode (Karyn_Rode@fws.gov) or Eric Regehr (Eric_Regehr@fws.gov).

Listing of Polar Bears as a Threatened Species under the Endangered Species Act

Critical Habitat

The Service proposes to designate critical habitat for polar bear (*Ursus maritimus*) populations in the United States under the Endangered Species Act of 1973 (ESA), as amended. In total, approximately 484,764 square kilometers (km²) (187,166 square miles (mi²)) fall within the boundaries of the proposed critical habitat designation. The proposed critical habitat is located in Alaska and adjacent territorial and U.S. waters.

For inclusion in a critical habitat designation, habitat within the geographical area occupied by the species at the time it was listed must contain the physical and biological features essential to the conservation of the species. Critical habitat designations identify, to the extent known using the best scientific data available, habitat areas that provide essential life cycle needs of the species discussed below. Occupied habitat that contains the features essential to the conservation of the species meets the definition of critical habitat only if those features may require special management considerations or protection. Under the ESA, we can designate unoccupied areas as critical habitat only when we determine that the best available scientific data demonstrate that the designation of that area is essential to the conservation needs of the species.

Based on polar bear needs and our current knowledge of the life history, biology, and ecology of the species, we have determined that the critical habitat types necessary for the polar bear in the United States are:

Sea-ice Habitat

Sea-ice habitat consists of approximately 464,424 km² (179,314mi²) of the sea-ice habitat ranging from the mean high tide line to the 300-m (984.2-ft) depth contour. Because we are limited by 50 CFR 424.12(h) to designating critical habitat only on lands and waters under U.S. jurisdiction, sea-ice habitat does not extend beyond the U.S. 370.7 nautical-km (200 nm) Exclusive Economic Zone or the United States–Canada border to the east. To delineate the southern boundary, we used the southern extent of the Chukchi and Bering Seas population as determined by telemetry data, since the 300-m (984.2-ft) depth contour extends beyond the southern extent of the polar bear population. The vast majority (93 percent) of Unit 1 is located within Federal waters.

Sea-ice habitat is required for feeding, breeding, denning, and movements that are essential for the conservation of polar bear populations in the United States. Special management considerations and protection may be needed to minimize the risk associated with oil and gas development and production, oil and gas tankers, and the risk associated with commercial shipping within this region and along the Northern Sea Route.

Terrestrial Denning Habitat

Terrestrial denning habitat consists of an estimated 14,678 km² (5,668 mi²) of land, located along the northern coast of Alaska, with the appropriate denning macrohabitat and microhabitat characteristics (Durner *et al.* 2001). The area proposed as critical habitat contains approximately 95 percent of the

known historical den sites from the southern Beaufort Sea population. The inland extent of denning distinctly varied between two longitudinal zones, with 95 percent of the polar bear dens between the Kavik River and the Canadian border occurring within 32 km (20 mi) of the mainland coast, and 95 percent of the dens between the Kavik River and Barrow occurring within 8 km (5 mi) of the mainland coast. We did not identify critical terrestrial denning habitat for the Chukchi and Bering Seas population because most of the denning for this population occurs on Wrangel Island and Chukotka Peninsula, Russia.

Twenty percent, 74 percent, and 6 percent of terrestrial denning habitat is located within State of Alaska land, Federal lands, and Native owned lands, respectively. In addition, 52.4 percent of the land included within terrestrial denning habitat occurs within the boundaries of Arctic National Wildlife Refuge.

Terrestrial denning habitat contains the necessary topographic and macrohabitat and microhabitat features essential for the conservation of polar bears in the United States. Special management considerations and protection may be needed to minimize the risk of human disturbances and risk associated with oil and gas development and production, and the risk associated with commercial shipping.

International Treaties and Conventions

U.S./Russia Bilateral Agreement

The Agreement between the Government of the United States of America and the Government of the Russian Federation on the Conservation and Management of the Alaska-Chukotka Polar Bear Population done at Washington on October 16, 2000 (the 2000 Agreement) provides legal protections for the population of polar bears found in the Chukchi – Northern Bearing Sea. The 2000 Agreement is implemented in the United States through Title V of the Marine Mammal Protection Act (MMPA) (16 U.S.C. 1361 et seq.), and builds upon those protections already provided to this population of polar bears through the Agreement on the Conservation of Polar Bears done at Oslo, November 13, 1973 (the 1973 Agreement), which was a significant, early step in the international conservation of polar bears. The 1973 Agreement is a multilateral treaty to which the United States and Russia are parties with other polar bear range states, Norway, Canada, and Denmark. While the 1973 Agreement provides authority for the maintenance of a subsistence harvest of polar bears and provides for habitat conservation, the 2000 Agreement specifically establishes a common legal, scientific, and administrative frame work for the conservation and management of the Alaska-Chukotka polar bear population between the United States and Russia. Because of the shared interest in this population of polar bears, which readily move between United States and Russian Federation jurisdictions, a cooperative management regime is key to both providing for the long-term viability of the population as well as meeting the social cultural and subsistence needs of Alaska Natives and native people of Chukotka. The 2000 Agreement requires the United States and the Russian Federation to manage and conserve polar bears based on sound science and to meet the needs of native peoples. For example, the 2000 Agreement provides a definition of “sustainable harvest” as one which does not exceed the net annual recruitment of polar bears to the population and works to maintain the current population of animals.

In addition, the 2000 Agreement establishes the U.S. / Russia Polar Bear Commission (Commission), which functions as the bilateral managing authority to make scientific determinations, establish taking limits, and carry out other responsibilities, important to the conservation and management of the polar bear. At its first meeting, held in Moscow, Russia, 23–25 September 2009, the Commission identified members of a Scientific Working Group (SWG) and tasked the SWG with reviewing the current level of take of polar bears. Recommendations from the SWG will help guide the research necessary to address present and future polar bear conservation issues in the shared Alaska-Chukotka Polar Bear population. The Commission also identified: 1) habitat conservation as an important issue for the long-term conservation and management of the Alaska-Chukotka polar bear: 2) ways to ensure full participation of Native Peoples in the conservation of the shared polar bear population: and, 3) adopted Rules of Procedure for the Commission.

The first meeting of the SWG was held 01–05 March, 2010, in Anchorage, Alaska. The SWG, tasked by the Commission with identifying a sustainable level of human-caused removals for the Alaska-Chukotka polar bear population, recognized that reliable scientific information was critical to the identification and implementation of a sustainable level of removals. At the same time, the SWG acknowledged that the information necessary to derive accurate estimates of sustainable removals for the Alaska-Chukotka polar bear population is currently limited. However, the SWG recognized that the current unlimited harvest in the United States and illegal killing of polar bears in Russia represented an immediate threat to the Alaska-Chukotka polar bear population.

The SWG evaluated the plausible range of sustainable removals based on population models and assumed values of population size and growth rate. These parameters and resulting estimate of sustainable removals were based on expert opinion of the group. The SWG identified two management options for consideration by the Commission. Both management options were short term (1 to 3 years) and require re-evaluation when new information becomes available. Management option 1 was a moratorium on harvest of polar bears in the United States in conjunction with a continued moratorium on harvest in Russian. Such a regime would be contingent upon effective enforcement capabilities in both countries. Management option 2 was to establish a regulated harvest in both the United States and Russia. Such a regime would be contingent upon the enforcement of a regulated harvest and the implementation of community-level conservation programs in both the United States and Russia. Furthermore, under management option 2, the SWG opined that the removal of up to 45 polar bears per year is likely to be sustainable if a 2:1 male-to-female sex ratio (i.e., the maximum removal of 15 females and 30 males per year) is adopted.

The second meeting of the Commission took place June 7–10, 2010, in Anchorage, Alaska. During this meeting the Commission reviewed the recommendations of the SWG and, consistent with the SWG's recommendation, determined that establishing a limit to the harvest of polar bears from the Alaska-Chukotka Polar Bear Population was needed. The Commission therefore adopted that no more than 58 polar bears per year, of which no more than 19 animals may be females, should be removed from the Alaska-Chukotka polar bear population. The Commission determined that all human-caused mortality to the Alaska-Chukotka Polar Bear Population will be counted toward this annual maximum limit. Further, the Commission determined that the two countries will work together over the coming year to identify legal requirements and documents needed to implement the identified harvest limit and that

further discussion would take place at the next Commission meeting in June 2011.

The adoption of an annual take limit by the Commission is a significant accomplishment in the conservation and management of the shared Alaska-Chukotka polar bear population. The additional data obtained through enhanced management, especially in Russia where only limited information has been available, as well as increased monitoring of what was previously and unknown take of bears, will provide vital information and greater understanding of the status and trends of the Alaska-Chukotka polar bear population. Resultant data will enable the countries to develop a more effective and robust strategy for the conservation and management of this shared population.

The regulated subsistence harvest will also provide for the cultural, spiritual, and nutritional importance to Native people of Chukotka. It is anticipated that the illegal hunting of polar bears in Russia, will decrease dramatically with the involvement of native Chukotkans in the implementation of harvest monitoring and management, and enhanced legal enforcement. The Commission tasked the SWG with conducting an annual review of the annual take and to provide a recommendation to the Commission each year confirming continuation of the existing harvest limit or specifying a new harvest limit recommendation.

Canada/United States Memorandum of Understanding

The purpose of the Memorandum of Understanding (MOU) is to facilitate and enhance coordination and cooperation regarding polar bear conservation and management and to provide a framework for the development and implementation of mutually agreeable actions that focus on specific components of polar bear conservation. The MOU established a Bilateral Oversight Group (BOG) comprised of Federal, State/Territorial, and Aboriginal representatives.

On August 6, 2009, the inaugural teleconference for the MOU was held. Discussion amongst participants included the need for updates and future dialogue on: 1) status of on-going research in the two countries; 2) individual protections afforded polar bears under respective domestic laws as well as the Convention on International Trade of Endangered Species of Wild Fauna and Flora; 3) incorporating Traditional Ecological Knowledge into management actions; and 4) outreach and education.

On November 19-20, 2009, the BOG met in Inuvik, Canada, where discussion focused on a need to leverage rather than duplicate existing polar bear coordination and management efforts between agency and aboriginal people of both countries. For example, subsistence harvest of polar bears in the Southern Beaufort Sea is managed under the voluntary Inupiat/Inuvialuit Agreement (1988), with sustainable harvest guidelines providing for the take of up to 80 bears split evenly between Canada and the U.S. The BOG considered this existing system fully capable of addressing future, potentially significant issues, related to likely downward population trends and shifting population distributions.

Another subject of discussion and joint concern is the need to develop strategies to address increased human-bear interactions resulting from changes in polar bear distribution. Both the U.S. and Canada recognize this as a range-wide issue and we are working with other Polar Bear Range States under the

1973 Agreement on the Management and Conservation of Polar Bears to develop responsive management actions.

Co-Management

The Alaska Nanuuq Commission (ANC) was formed in 1994 to represent Alaska Native hunters concerning issues related to the conservation and subsistence uses of polar bears. The ANC consists of representatives from 15 villages from northern and western coastal Alaska. The last annual meeting was held in Nome, Alaska on January 17–18, 2008. The Executive Committee chose Charles H. Johnson to represent the Alaska Nanuuq Commission. In addition Enoch Oktollik was chosen as the alternate for the Joint Commission for the U.S./Bilateral Agreement. Members of Association of Traditional Mammal Hunters of Chukotka (CHAZTO-Russian Acronym) attended the annual meeting in January.

The ANC has been very active working with the Indigenous Peoples for Marine Mammals (IPCoMM), which represents Alaska Native Organizations that are involved in the co-management of marine mammals in Alaska. The ANC also participated in Harvest Assessment Workshop in Barrow on August 27–28, 2008. The main focus of the workshop was seeking ways to improve compliance with the reporting and tagging provisions of the Marking and Tagging Reporting Program.

Polar Bear Conservation Plan

The U.S. Fish and Wildlife Service (Service) is in the pre-preliminary stage of developing a Conservation Plan for polar bears to help guide management and research activities into the future. We envision the plan as being threat-based, action driven, and involving others. During a recent facilitated workshop (June 21–25, 2010), our Polar Bear Team summarized the threats and issues facing polar bears. Our thinking was informed by a long-standing collaborative history with the USGS, partners, and the public. We referenced the 2008 Final Rule listing the polar bear as threatened and the 1994 Polar Bear Conservation Plan. We ranked threats according to our understanding of the severity and potential impact, and then developed objectives and action items to address each identified threat factor.

The main product of the workshop was a list of 23 objectives and associated action items to address the threats identified facing polar bears now and into the future. This list of objectives and action items represents a distillation of the threats identified in the 2008 listing Final Rule and the 1994 Conservation Plan. As such, the objectives and action items developed also represent a distillation of the analyses resulting from recent collaborations with USGS and our other partners during the listing process, and serve to facilitate understanding of our multifaceted program by organizing conservation activities by threat category. The objectives and action items developed represent a way forward to facilitate productive involvement of our partners, to provide for public participation in planning, and to ensure that Service polar bear conservation and research programs are attentive and responsive to public interest and need. We recognize that this is necessarily an iterative process; therefore, we want to make sure we capture issues that are important to others throughout the process, incorporate others' comments early in the process, and work to build on the collaborative relationships necessary to most effectively achieve our combined conservation goals for polar bears.

This effort represents a continuation of the process formally initiated by the release of the 1994 Polar Bear Conservation Plan, and will help us meet our obligations to the other polar bear Range States (Canada, Denmark, Norway, Russia). To address the growing concern over polar bear conservation in relation to climate change and other stressors, the polar bear Range States agreed in March 2009 to develop national “action plans” by 2011 that will lead to a coordinated approach to conservation and management of polar bears throughout their range. Our initial objective, therefore, is to complete a draft Conservation Plan by December 2010 that will compliment the action plans under development in the other Range States and result in a focused approach to the conservation of Alaska’s polar bears.

Ultimately, this plan will lead to coordinated conservation strategies prioritized by the threats that polar bears face now and into the future. By ensuring that management strategies are threats-based, scientifically sound, and based on collaborative efforts with our partners, the Service will help ensure that it most effectively uses available resources for polar bear conservation.

Polar Bear-Human Information Management System

As a result of on-going and predicted future habitat loss, polar bears are expected to spend longer periods of time on land where they are susceptible to human disturbance. At the same time, human activity in coastal areas of the Arctic is increasing (e.g., oil and gas exploration, tourism) in conjunction with an increased number of nutritionally stressed bears occurring on land. The increasing trend of both polar bear and human use of coastal areas has the potential to result in increasing polar bear/human interactions. Interactions with humans may threaten polar bears by: 1) displacement from preferred habitats, such as denning, feeding and resting areas; 2) ingestion of or exposure to contaminants or toxic substances; 3) association of humans with food (food-conditioning) resulting in bears being killed by local residents/workers due to safety concerns. For example, data indicate that defense-of-life kills have been increasing (Service unpublished data) in Alaska. To date, polar bear attacks on humans have been rare, but when they do occur they evoke strong public reaction.

Polar bear managers can help conserve polar bear populations by reducing lethal take of polar bears during bear/human interactions. To prevent escalating conflicts between polar bears and humans, bear/human interaction plans need to be developed and implemented, based on relevant data. To implement sound management strategies for polar bears, and to adequately protect people living, recreating, and working in polar bear country, it is imperative that polar bear managers assemble critical information related to bear/human interactions.

During the March 2009 Polar Bear Range States Meeting in Tromso, Norway the parties agree on the need to develop comprehensive strategies to manage bear/human conflicts. Tor Punsvik, Environmental Advisor, Office of The Governor of Svalbard, Norway and Dr. Terry D. DeBruyn, Polar Bear Project Leader, Service, Alaska were tasked with taking the lead on developing a polar bear/human interaction initiative to address the anticipated future increase in interactions due to climate change.

Objectives of the polar bear/human interaction initiative are:

1. Develop a user-friendly, range state-wide database of bear-human interaction and natural history information.

2. Display those bear-human interaction and natural history information in a GIS format, and link it with a database which is designed to analyze the important variables associated with bear-human interactions.
3. Develop specific guidelines for managing polar-bear human interactions at both site-specific and regional scales.
4. Develop consistent and scientifically based bear-human interaction safety messages adaptable to specific sites via the development of bear-safety brochures for use by member range states.

The Polar Bear/Human Information Management System (PBHIMS) has been developed to standardize the collection of polar bear data across the Range States. This system enables a data-based assessment of bear/human interactions and provides a scientific framework for preventing negative bear/human interactions in the future. The system provides a user-friendly data entry interface and the ability to analyze collected data. Data stored in the system includes bear-human conflicts, bear observations, bear harvests, and bear natural history data. Scanned images of the original bear forms, narratives, reports, and photos can be attached to each incident to provide additional information that may not be captured in the system. Another benefit of this system is a dynamic link to Arc View which displays a visual map of the incidents. The link tool can be used to query incidents in Access or Arc View and then display the corresponding data in the other application.

It is anticipated that a draft database, populated with data from the U.S. and Norway, will be ready by April 2010 for testing and comment by the Polar Bear Specialist Group (PBSG). The draft database will be distributed to PBSG members, comment sought, and a request made that members populate the database with pertinent polar bear/human incidents (of primary interest, initially, are records from each country that relate to the use of bear spray and fatalities [both bear and human] resulting from bear/human interactions). At a subsequent meeting of the U.S. and Norway in spring 2010, the database will be updated and thereafter redistributed to the PBSG and Range States members. It is expected that data from all Polar Bear Range States will then be available for consolidation and validation in winter 2010 and ready to present at the Range States meeting in 2011. To ensure the success of the project, partnering with various agencies and pertinent groups in the range state countries will need to occur.

This version of PBHIMS is compatible with Access 2003 (XP) and was developed by Terry D. DeBruyn (FWS), James Wilder (FWS), Angela Southwold (NPS), Tor Punsvik (Norway), and Dag Vongraven (Norway).

**ALASKA POLAR BEAR SUBSISTENCE HARVEST
SOUTHERN BEAUFORT SEA, 2008/2009**

Table 1. Alaska polar bear harvest, Southern Beaufort Sea, 2008/2009^a.

Sex	Village					Total
	Kaktovik	Nuiqsut	Barrow	Atqasuk	Wainwright	
Male	2	-	13	-	1	16
Female	-	-	1	-	-	1
Unknown	2	-	5	1	-	8
Total	4	0	19	1	1	25

^a Harvest season extends from July 1, 2008 to June 30, 2009.

Table 2. Chronology of village polar bear harvest, Southern Beaufort Sea, 2008/2009^a.

Village	Month												Total
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	
Kaktovik	-	-	-	-	2		1	-	-	1	-	-	4
Nuiqsut	-	-	-	-	-	-	-	-	-	-	-	-	0
Barrow	-	1	6	1	2	2	1	2	2	1	1	-	19
Wainwright	1	-	-	-	-	-	-	-	-	-	-	-	1
Atqasuk	-	1	-	-	-	-	-	-	-	-	-	-	1
Total	1	2	6	1	4	2	1	2	3	2	1	0	25

^a Harvest season extends from July 1, 2008 to June 30, 2009.

Table 3. Number of polar bears taken during the subsistence hunt from the Southern Beaufort Sea Population 1988–2009. M = Males, F = Females, U = Unknown

Village	1988/1989 ^a			1989/1990			1990/1991			1991/1992			1992/1993			1993/1994			1994/1995			1995/1996			1996/1997			
	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	
Atqasuk	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-
Barrow	19	1	9	10	4	-	10	4	-	15	7	1	17	7	2	21	6	2	6	4	1	14	2	2	19	18	3	
Kaktovik	6	2	2	1	1	-	-	-	2	-	-	-	3	-	1	2	3	-	-	1	3	-	1	-	1	1	2	
Nuiqsut	2	-	2	-	-	-	-	-	-	-	2	-	-	-	-	2	2	1	-	1	-	1	-	-	-	-	-	
Wainwright	10	-	4	6	1	2	4	2	-	1	2	-	4	1	3	7	2	1	4	2	1	5	-	9	6	1	2	
Subtotal	38	4	17	17	6	2	14	6	2	16	11	1	24	8	6	33	13	4	10	8	5	20	3	11	26	21	7	
Total	59			25			22			28			38			50			23			34			54			
Village	1997/1998			1998/1999			1999/2000			2000/2001			2001/2002			2002/2003			2003/2004			2004/2005			2005/2006			
	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	
Atqasuk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	1	-	-	-	-	-
Barrow	12	4	2	8	5	3	15	-	2	11	6	11	18	4	3	22	2	1	13	7	2	12	1	-	13	10	1	
Kaktovik	1	-	1	-	1	1	1	-	-	-	-	-	2	-	1	1	2	1	-	2	5	-	4	5	-	-	-	
Nuiqsut	2	-	-	2	1	-	5	1	1	2	2	1	1	-	1	2	1	-	1	1	-	1	1	-	3	-	-	
Wainwright	2	2	2	1	-	1	4	1	-	7	2	1	2	-	-	2	2	1	5	2	6	1	2	2	3	2	-	
Subtotal	17	6	5	11	7	5	25	2	3	20	10	13	23	4	5	28	7	4	19	12	13	14	9	7	19	12	1	
Total	28			23			30			43			32			39			44			30			32			

Table 3 (cont). Number of polar bears taken during the subsistence hunt from the Southern Beaufort Sea 1988–2009. M = Males, F = Females, U = Unknown

Village	2006/2007 ^a			2007/2008 ^a			2008/2009 ^a			Total		
	M	F	U	M	F	U	M	F	U	M	F	U
Atqasuk	1	-	-	-	-	-	-	-	1	4	3	2
Barrow	8	6	4	6	3	2	13	1	5	283	102	56
Fort Yukon	-	-	-	-	1	-	-	-	-	-	1	-
Kaktovik	-	-	-	-	1	-	2	-	2	20	19	26
Nuiqsut	-	-	1	-	-	-	-	-	-	23	12	7
Wainwright	-	-	1	-	-	1	1	-	-	75	24	37
Subtotal	9	6	6	6	5	3	16	1	8	405	161	128
Total		21		14			25			694		

^a Harvest season extends from July 1 to June 30

Table 4. Age class of known-aged polar bears harvested from the Southern Beaufort Sea 1988–2009. Ages based on cementum annuli of the first premolar. Three year old bears are considered subadults after April 30. () = Percentage.

Age Class	1988/1989 ^a	1989/1990 ^a	1990/1991 ^a	1991/1992 ^a	1992/1993 ^a	1993/1994 ^a	1994/1995 ^a	1995/1996 ^a
Adults (5+ yrs)	14(52)	8(62)	6(50)	9(70)	7(64)	10(37)	6(43)	9(47)
Subadults (3-4 yrs)	11(40)	4(31)	3(25)	3(23)	3(27)	11(41)	7(50)	6(32)
Cubs (0-2 yrs)	2(8)	1(8)	3(25)	1(8)	1(9)	6(22)	1(7)	4(21)
Unknown Age	32	12	10	14	27	23	9	15
Total	59	25	22	27	38	50	23	34

^a Harvest season extends from July 1 to June 30.

Table 4 (cont). Age class of known-aged polar bears harvested from the Southern Beaufort Sea 1988–2009. Ages based on cementum annuli of the first premolar. Three year old bears are considered subadults after April 30. () = Percentage.

Age Class	1996/1997 ^a	1997/1998 ^a	1998/1999 ^a	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005
Adults (5+ yrs)	10(53)	6(50)	2(29)	6(67)	3(33)	8(50)	4(44)	6 (35)	3(37)
Subadults (3-4 yrs)	6(32)	6(50)	5(71)	3(33)	4(44)	6(38)	3(33)	11(65)	5(63)
Cubs (0-2 yrs)	3(16)	0	0	0	2(22)	2(12)	2(22)	0	0
Unknown Age	35	16	16	21	34	17	30	27	22
Total	54	28	23	30	43	33	39	44	30

^a Harvest season extends from July 1 to June 30.

Table 4 (cont). Age class of known-aged polar bears harvested from the Southern Beaufort Sea 1988–2009. Ages based on cementum annuli of the first premolar. Three year old bears are considered subadults after April 30. () = Percentage.

Age Class	2005/2006 ^a	2006/2007 ^a	2007/2008 ^a	2008/2009 ^a	Total ^a
Adults (5+ yrs)	4(36)	1(33)	2 (67)	2(33)	129(48)
Subadults (3–4 yrs)	3(27)	2 (67)	1(33)	4(67)	107(40)
Cubs (0–2 yrs)	4(36)	0	0	0	34(12)
Unknown Age	21	18	10	19	424
Total	32	21	13	25	694

^a Harvest season extends from July 1 to June 30.

Table 5. Minimum, maximum and average number of polar bears observed at Barter Island, Alaska, 2002–2008.

Whole Island Count Summary Entire Study Period*, 2002-2008							
	2002	2003	2004	2005	2006	2007	2008
Minimum	0	3	22	0	0	18	12
Maximum	51	61	65	36	31	37	33
Mean	22.77	33.58	40.88	13.18	13.27	28	23.06
SD	17.71	14.32	9.88	10.17	8.8	8.26	4.83
*Study Period	Sep.3-29	Aug.29-Oct. 3	Sep.7-Oct. 4	Aug.29-Sep. 26	Sep.26-Oct. 2	Sep.6-27	Sep.3-Oct. 4
Whole Island Count Summary for Core Monitoring Period of September 7-26, 2002-2008							
	2002	2003	2004	2005	2006	2007	2008
Minimum	3	23	22	6	0	18	12
Maximum	51	61	65	36	25	37	29
Mean	26.24	38.72	41.33	18.63	11.71	28.2	22.55
SD	15.18	10.39	11.28	7.36	7.89	5.96	4.5

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