SUMMARY OF POLAR BEAR MANAGEMENT IN ALASKA
2007/2008

Report to the Canadian Polar Bear Technical Committee
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Listing of Polar Bears as a Threatened Species Under the Endangered Species Act

The U.S. Fish and Wildlife Service (FWS) listed the polar bear as a threatened species under the Endangered Species Act (ESA) on May 14, 2008 (http://alaska.fws.gov/fisheries/mmm/polarbear/issues.htm). At that time the FWS also issued an interim final rule under section 4(d) of the ESA for the polar bear and accepted comment on that interim 4(d) rule. The ESA listing of the polar bear was based on the best available science, which shows that loss of sea ice threatens and will likely continue to threaten polar bear habitat. This loss of habitat puts polar bears at risk of becoming endangered in the foreseeable future, the standard established by the ESA for designating a threatened species.

The FWS finalized its protections for the polar bear under the ESA with the publication of a Final Rule under Section 4(d) of the ESA on December 16, 2008. The final 4(d) rule took effect on January 15, 2009 (http://alaska.fws.gov/pdf/pb4d.pdf). The special rule: (a) in most instances, adopts the conservation regulatory requirements of the Marine Mammal Protection Act of 1972, as amended (MMPA), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) as the appropriate regulatory provisions for the polar bear; (b) provides that incidental take of polar bears resulting from activities outside the bear's current range is not prohibited under the ESA; (c) clarifies that the Special Rule does not alter the Section 7 consultation requirements of the ESA; and (d) applies the standard ESA protections for threatened species when an activity is not covered by an MMPA or CITES authorization or exemption.

The 4(d) rule does not change the status of polar bear trophy importation. Under the MMPA when the polar bear was listed as a threatened species in May 2008, no imports other then for scientific research or enhancement may occur. This moratorium remains unchanged by the special 4(d) rule.

The Service is undertaking a number of actions subsequent to the threatened listing of the polar bear. These include: designation of Critical Habitat, establishing guidelines for human/bear interactions, and development of a Polar Bear Conservation Plan. Key conservation actions have been identified that, if fully implemented, will help minimize further stress or mortality to the species and ultimately help the species survive in the wild over the long-term. The FWS has outlined the following initiatives, for possible implementation, over the next year as part of a domestic and international polar bear conservation action plan:

- Aid local communities in managing bear-human interactions and improve conservation outreach, including assisting Alaska Native communities in developing bear/human interaction plans, establishing polar bear patrol programs, visiting villages to discuss polar bear conservation issues in public forums, and developing effective outreach materials.

- Plan and conduct the first Commission meeting under the U.S/Russia bilateral agreement and support US and Russian based research and management activities. The FWS's understanding of the Chukchi Sea polar bear population is limited and field studies are critical to ensuring that management of this population is based on sound science.

- Expand coordination with industry on mitigating potential impacts to bears, especially denning females, and monitor distribution and habitat use of polar bears on the North Slope of Alaska.

- Advocate active involvement by and information exchange with Native communities regarding polar bear harvest issues. Take proactive steps through the U.S./Russia Bilateral Agreement and the Inupiat/Inuvialuit Agreement to ensure that harvest levels are sustainable and adjusted as populations decline.

- Initiate a comprehensive circumpolar monitoring strategy for the species identified in the Inter-Governmental Polar Bear Range States meeting of June 2007.

International Treaties and Conventions

U.S./Russia Bilateral Agreement

On January 12, 2007, the President signed into law the implementing legislation for the *Agreement between the United States of America and the Russian Federation on the Conservation and Management of the Alaska-Chukotka Polar Bear Population* (Agreement); this Bi-Lateral Agreement was originally signed between the United States and the Russian Federation in 2000. The primary purpose of the Agreement is to assure long-term conservation of the Chukchi Sea polar bear population using the best biological information available. The Agreement calls for a Joint Commission, consisting of a representative of the government and a representative of Native people of each country that will design, coordinate, and evaluate management and research programs and activities. Both the United States and the Russian Federation have appointed Commissioners for the Agreement, for the United States they are Geoff Haskett, the FWS's Region 7 Director and Charlie Johnson, Executive Director of the Alaska Nanuuq Commission and for the Russian Federation, A. Amirkhanov (Russian Federal Government) and V. Kavry (Native People of Chukotka). We anticipate an initial meeting of the Commission in 2009.

Canada/United States Memorandum of Understanding

On May 8, 2008, a Memorandum of Understanding (MOU) was signed by the Secretary of the Department of the Interior, Dirk Kempthorne, and the Minister of Environment, Canada, John Baird. This agreement was set to facilitate and enhance coordination and cooperation for the conservation and management of polar bears between the two countries. This MOU builds upon existing agreements and ongoing collaborations and is not intended to supersede previous and significant contributions by Inupiat and Inuvialuit people, FWS, Canadian Wildlife Service, U.S. Geological Survey, and Environment Canada, for the conservation and management of polar bears.

The MOU establishes the Bilateral Oversight Group in recognition of the need to leverage rather than duplicate the polar bear expertise and management experience of agency and Alaska Native/aboriginal people of both countries. The MOU also identifies the need to establish a Scientific Working Group to assess the available information and aboriginal traditional knowledge of North American polar bear

populations, and the establishment of other working groups as necessary to advise the Environment Canada and the U.S. Department of the Interior on polar bear management and conservation. Representatives from entities outside the Oversight Group may be invited to participate in the Group's deliberations, and where appropriate, the MOU encourages the Oversight Group to facilitate cooperation with such entities.

Harvest Summary

The total Alaska harvest of polar bears by Native subsistence hunters from June 2007 to July 2008 was 34 bears (12 males, 13 females, and 9 sex unknown) (Table 1). This is the lowest Alaska harvest recorded since 1980/1981, which is the first harvest year for which the FWS has reliable harvest records. The quota of 80-82 bears, which is split evenly between the United States and Canada, is based on a 2M:1F sex ratio and thus no more than 33% of the harvest should be female. Sex was reported for 74% (25/34) of the harvest in 2007/2008. The sex ratio of known-sex bears harvested during 2007/2008 was 48% male and 52% female. If the nine bears, for which sex was unknown, were designated as females, as is customary in Canada, then the percentage of females in the 2007/2008 harvest would be 65%. The harvest from the Chukchi/Bering Sea population declined from the 1980s ($\bar{x}$ = 92.1, SE=16.4, n=10) to 49 in the 1990s ($\bar{x}$ = 49.2, SE=7.4, n=10) and continues to decline (2000/2008, $\bar{x}$ = 42.5, SE=6.9, n=8). Although the overall harvest was low, the proportion of the statewide harvest from the Chukchi/Bering Sea during 2007/2008 (65%) was similar to the long-term average in 1980s and 1990s ($\bar{x}$ = 64%). In 2008 two bears were taken at inland locations: Fort Yukon (250 miles from the coast) and Noorvik (30 miles from the coast). One expected possibility resulting from the loss of sea ice habitat is that polar bears will spend more time on land during the open water period and may also become more nutritionally stressed. This could lead to more bear/human interactions.

The reasons for the low statewide polar bear harvest in 2007/2008 could be a result of changes in the distribution and abundance of polar bears due to changes in their sea ice habitat. Changes in the sea ice characteristics such as less multi-year pack ice and more seasonal ice, increased ice movement during storms, more severe effects of storms, longer open water period during the summer, lack of stable ice over prime polar bear feeding areas, and the loss of the more stable pack ice due to climate change could also affect the seasonal availability and accessibility of polar bears to hunters in both populations. In addition many hunters have reported that the high price of fuel has limited the number, length, and distance traveled during hunting trips. Thus, this year's low harvest may be a result of fewer active seal and polar bear hunting activities occurring from Native coastal villages.

In contrast to the Chukchi Sea harvest, overall harvest levels in Alaska from the Southern Beaufort Sea have remained relatively constant since 1980 at 35 bears per year (SD=11.7, n=28, range 12 -62). Recent evidence, including reduction in population estimates from1800 to 1526 (Regehr et al. 2006), decreased survival of cubs, and decreased weights and skull measurements in adult males, suggests that the Southern Beaufort Sea population may be declining. Therefore it is important to adopt a conservative approach to managing the shared Alaskan polar bear populations. Conservative management practices may include establishment of quotas for those villages that harvest from the Chukchi/Bering seas

population, a reduction in the sustainable harvest levels for the Southern Beaufort Sea population, and designation of critical habitat. Changes in harvest limits would be decided by the U.S.-Russia Bilateral Commission for the Chukchi/Bering Sea population, and by the Inuvialuit/Inupiat Commission for the Southern Beaufort Sea. During 2007/2008 polar bears were harvested in every month except June, August, and September (Table 2). Once again we had many reports of unsafe ice conditions that prevented hunting.

Teeth collected from the 2007/2008 harvest have not yet been aged and thus we are reporting on the ages from the 2006/2007 harvest. The mean age of females ($\bar{x}$=5.0 years, SD=4.6, n=11) and males ($\bar{x}$= 8.0 years, SD=5.9, n=19) in 2006/2007 was within the 95% confidence interval of the long term average (since 1980) of 7.1 years (n=582) and 6.6 years (n=1055), respectively (Table 3a). A comparison of the sex and age of the harvest for each Alaskan polar bear population is presented in Tables 3b and 3c. The age class composition for 2006/2007 was 50% adult, 27% sub-adults, and 27% cubs (Table 4). The proportion of cubs in the harvest during the last two harvest years of 2006/07 and 2007/08 were slightly higher that the long-term average of 50% adult, 32% sub adult, and 17% cub. Overall the mean ages of both males and females in both populations have remained fairly consistent (Table 5, Table 6). Analysis of sex/age data can be complicated due to hunter selectivity and year- to-year variation in the availability of different age and sex classes.

The proportion of the harvest for which premolar teeth were obtained during 2007/2008 was 23% (8/34). Since implementation of the Marking, Tagging, and Reporting Program (MTRP) in 1988, premolar teeth have been collected from approximately 56% of the harvested bears. This under-reporting is part of a continuing trend that is occurring in Alaska. Despite numerous efforts to improve reporting, we have been unsuccessful. In 2008, we increased payments to taggers for collection of complete harvest information from the hunters and hope that this will increase compliance with the MTRP requirements. In 2009 we are also increasing outreach efforts in the villages. These efforts include more visits to the villages, development of fact sheets, posters, and a pamphlet summarizing harvest and research data, safety guidelines, and future concerns/issues related to subsistence uses and conservation of polar bears. We hope to involve the Alaska Nanuuq Commission, North Slope Borough, and NGOs in future outreach efforts.

The 2007/2008 harvest for villages of the North Slope party to the Inuvialuit/Inupiat (I/I) management agreement was 12 polar bears: 6 males, 4 females, and 2 of unknown sex (Table 1). There were six months in which no bears were harvested (January, March, and June through September) (Table 2). The sex composition harvest of known-sex animals in 2007/2008 was 60% (6/10) male and 40% (4/10) female. Harvest year 2004/2005 was the last year in which enough teeth were aged to be able to evaluate the age class composition of the harvest. The age class composition of the 2005/2006 harvest (n=11), was 36% (4/11) adults, 27% (3/11) sub-adults and 36% (4/11) cubs. Hunter estimated age class composition for the 2005/2006 harvest season (n=31) was 54% adults, 32% sub adults, and 12% cubs which is closer to the long-term (since 1980) age class distribution of polar bears is 48% adults, 39% sub-adults, and 13% cubs since 1988/1989 when the MTRP started. During 2007/2008 teeth were collected from 33% (4/12) of the bears harvested and complete sex information was provided for 83% (10/12) of the harvest.

The decline in the vital rates from the mark/recapture data (Regehr et al. 2006) suggests that the Southern Beaufort Sea population may be declining. If this is occurring then there may be no sustainable harvest. However there are provisions in the MMPA and the ESA which allow for a harvest as long as it doesn't prevent the recovery of the population. Our staff is currently working on modeling the effects of different harvest levels on a declining population to assist in the I/I commissioners in setting harvest quotas. We hope that this information can be presented at the next I/I meeting to be held in Barrow, AK on the April 28−29 2009. We recommend that reduction in the harvest (currently 80 bears split evenly between Canada and Alaska), be considered given the difficulties that polar bears are experiencing due to the loss of their sea ice habitat.

Polar Bear Research Activities

The FWS, in collaboration with the U.S. Geological Survey (USGS), initiated a mark/recapture study in 2008 in the Chukchi Sea. The short-term goals of this project are to identify the best methodology for estimating vital rates (i.e., breeding and survival rates) of polar bears in the Chukchi Sea, and to gain an initial understanding of the health and the sex and age structure of the population. The long-term goals are to estimate population status and trend, and to understand how polar bears are distributed in the region and how they use the sea ice habitat. These data will be evaluated in the context of rapidly changing sea ice conditions and other changes that may be occurring in the ecosystem. In 2008, 35 polar bears were successfully captured, and 11 collars deployed. Results from the 2008 pilot study provide the starting point for a dataset that will be used in management of polar bears via a joint U.S.-Russia Commission, and to inform user groups in Alaska. It is important to continue to coordinate Chukchi Sea efforts with the research being done in the Southern Beaufort Sea as changes in the sea ice habitat are likely to change the distribution of the polar bears. For example, many of the bears tagged in the Canadian portion of the Southern Beaufort Sea ended up in Alaska in 2008.

Polar Bear Conservation Activities at Barter Island

Field work for the Feeding Ecology Study (2002-2007) and Bear Interaction Study (2005-2007) is completed; final publications are in preparation. Focus in 2008 switched to developing more active involvement by local residents in polar bear conservation issues.

Minimizing bear-human conflicts: the Native Village of Kaktovik (NVK) received a tribal grant from FWS to minimize bear-human conflicts in and around the village. In 2008, NVK hired a coordinator and created a Bear Committee that met several times to address the best way to minimize attractants, develop a polar bear deterrence program (polar bear patrols), address polar bear viewing, and identify education/outreach needs. During the peak bear season, polar bear patrols were up and running, resulting in successful hazing of polar bears out of the village area. Improvements in handling and storage of whale meat were made through the Bear Committee's coordination with whaling captains. Later in the season, a few bears were reported as problems in the village; 2-3 bears were shot. A high degree of concern exists regarding neck damage from collared bears, the effects of capture on polar bears, and the potential for "research" bears to become problems in the village. These issues are currently being

addressed by both FWS and USGS through meetings and outreach, but will require additional attention in 2009 to ensure that research and management activities can continue without further conflict with Native residents.

Monitoring polar bear numbers: The FWS turned over long-term monitoring of bear numbers to the village. A local resident was trained to conduct daily bear counts through the open water period, as initiated during the Feeding Ecology Study. Polar bears were first observed in late July and present well into October, reflective of the trend of a longer period of use of the coastline. The official monitoring period was September 3-October 4, 2008; the minimum, maximum, and average number of bears observed were 12, 33, and 23, respectively (see Table 7). The highest count (33 bears) was recorded on October 4 after a major blizzard; in 2009 we will extend the study period into mid October to accommodate the potential change in peak season.

Fall Coastal Surveys in the Southern Beaufort Sea

The FWS continued aerial surveys of polar bears on the barrier islands and coastline of the Southern Beaufort Sea during the fall of 2008. Unlike previous years the surveys were started in August in response to increasing reports of polar bear sightings in the oil and gas fields during 2007, and in preparation for capture work being conducted by the University of Wyoming in August. As in previous years the surveys were conducted to determine the spatial and temporal abundance of polar bears using coastal habitat and barrier islands during the late summer open water period. Surveys were conducted between 6 August 2008 and 16 October 2008 using a Cessna 185 in August and a twin engine turbine Aero Commander fixed wing aircraft during September and October. Surveys were conducted between Barrow and the Canadian border at an elevation of 300 ft and a speed of 90-120 knots. Fall coastal surveys were also conducted in the Yukon at the same time by Ramona Maraj of Yukon Environmental. Polar bear observations increased from a low of 24 seen during August 6-7 to approximately a 100 from 19 August to the 1 October 2008, and then decreased to 70 after the sea ice began to freeze on October 14-16, 2008. A maximum of 107 bears, including dependent young, were observed on September 15-16, 2008 between Barrow and the Canadian border. Most of the bears looked healthy although fewer sub-adults 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.

Polar Bear Bio-monitoring Program

Samples from all sex and age classes continue to be collected in Alaska for contaminant analysis, genetic analysis, food habitat studies, assessment of physiological parameters, and long term archival through the Alaska Marine Mammal Tissue Archival Project (AMMTAP).

Alaska samples were also provided to a circumpolar contaminant study recently conducted to document spatial and temporal trends of organic and metal contaminants in polar bears throughout the Arctic. Results from the Northern Contaminants Program (NCP) were presented at a workshop held in

Yellowknife, NT on September 22-25, 2008 by Rob Letcher and Melissa McKinney. The title of the presentation was *Temporal and spatial trends of legacy and emerging organic and metal contaminants in Canadian polar bears*.

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 and Enoch Oktollik as the alternate for the Joint Commission for the U.S./Bilateral Agreement. Members of the (Russian) 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 the 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 compliance with the MTRP regulations.

Incidental Take Program

The MMPA allows for incidental, non-intentional take of small numbers of marine mammals during specific oil and gas activities. The FWS administers an Incidental Take Program that allows polar bear managers to work cooperatively with oil and gas operators to minimize impacts of their activities on polar bears. The FWS evaluates each request for a Letter of Authorization (LOA) with special attention to mitigating impacts to polar bears, such as limiting industrial activities around barrier island habitat, which is important for polar bear denning, feeding, resting, and seasonal movements. Incidental take regulations have been issued since 1993 in the Beaufort Sea. The regulations typically extend for a five year period and the current regulatory period for the Beaufort Sea is 2006 to 2010. The five year regulatory duration is to allow the FWS (with public review) to periodically assess whether the level of activity continues to have a negligible impact on polar bears and their availability for subsistence uses.

During 2008, in the Beaufort Sea region, 14 LOA were issued to oil and gas companies for marine, terrestrial, and on-ice activities along the North Slope of Alaska (Figure 1). Ten companies observed 313 polar bears during 186 sightings (Figure 2). The highest number of bears was recorded in August, where 87 sightings totaling 162 bears were observed. The sighting trend was similar to bear sightings observed in 2007. The high number of bear sightings was most likely the result of an increased number of bears using terrestrial habitat, as well as increased compliance and monitoring of industry projects, especially during August and September, where some repeat sightings of individuals occurred.

Oil and gas activities continued in the Chukchi Sea region during 2008. Incidental take regulations were

promulgated for this region in June 2008. Three companies were issued an LOA to conduct activities during the open water period. There were 28 sightings of 40 individual polar bears during the open-water season in the Chukchi Sea. While the majority of the sightings occurred in the marine environment in the Chukchi Sea Lease Sale 193 area, bears were also observed on the mainland. Seven sightings of 13 polar bears were recorded near support operations at Wainwright, Alaska.

The FWS continues to work with oil and gas companies to improve polar bear monitoring and mitigation procedures within and around the North Slope oil and gas fields to limit disturbance to bears and subsistence users. This includes conducting polar bear awareness programs, such as safety and deterrence training; providing guidance to industry for development of plans of cooperation with affected communities; and creating a train-the-trainer curriculum for both polar bear deterrence and polar bear den detection survey methods.

References

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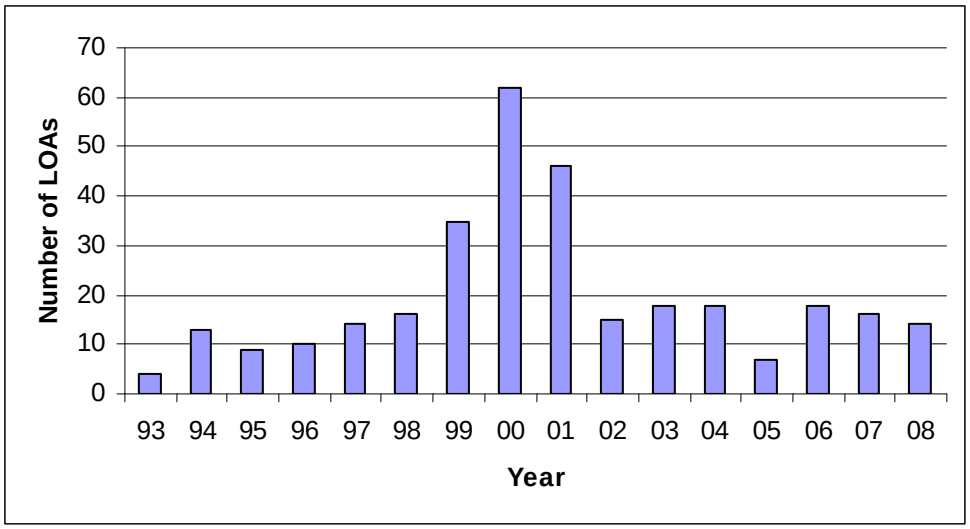

Figure 1. Number of Letters of Authorization (LOA) issued for the oil and gas industry (1993-2008), North Slope, Alaska.

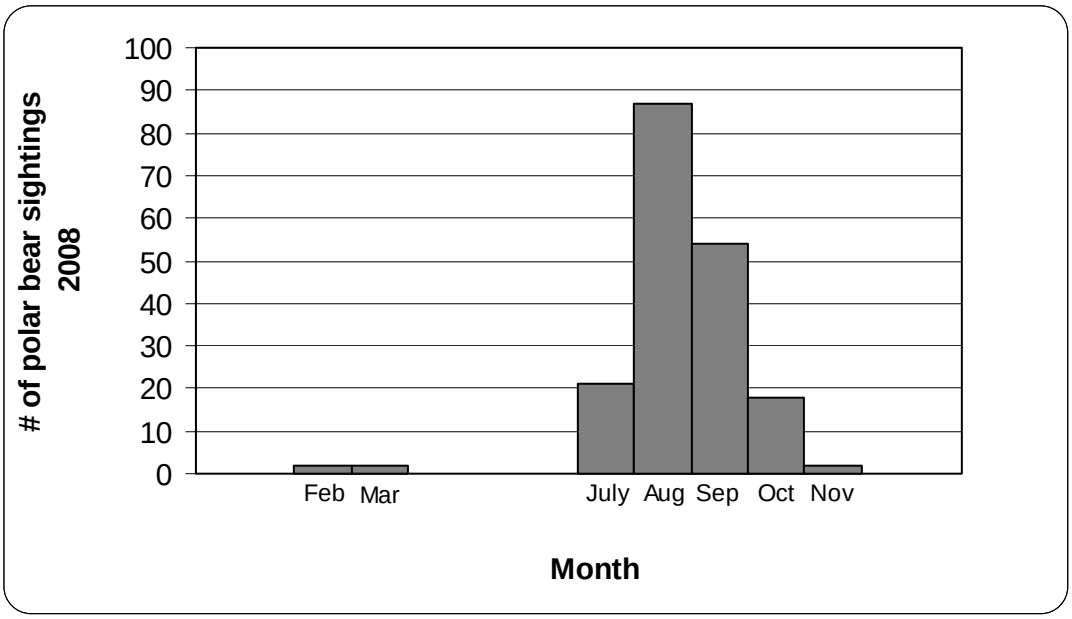

Figure 2. Number of polar bear sightings in 2008 from oil and gas industry monitoring reports, North Slope, Alaska.

Table 1. Native subsistence polar bear harvest in Alaska by village for 2007/2008 harvest season.

Village	Male	Female	Unknown	Total
Kaktovik*	-	1	-	1
Nuiqsut*	-	-	-	0
Barrow*	6	3	1	10
Atqasuk*	-	-	-	0
Wainwright*	-	-	1	1
Fort Yukon	-	1	-	1
Point Lay	-	-	-	0
Point Hope	5	5	6	16
Kotzebue	-	1	1	2
Kivalina	-	-	-	0
Noorvik	1	-	-	1
Shishmaref	-	-	-	0
Wales	-	-	-	0
Little Diomede	-	1	-	1
Savoonga	-	1	-	1
Gambell	-	-	-	0
Total	12	13	9	34
Percent	(35.3)	(38.2)	(26.5)	(100)

* Villages party to the NSB/IGC management agreement. Harvest season extends from July 1, 2007 to June 30, 2008.

Table 2. Monthly polar bear harvest, Alaska 2007/2008.

Village	Month												
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Kaktovik*	-	-	-	1	-	-	-	-	-	-	-	-	1
Nuiqsut*	-	-	-	-	-	-	-	-	-	-	-	-	0
Barrow*	-	-	-	-	3	3	-	1	-	1	2	-	10
Atqasuk*	-	-	-	-	-	-	-	-	-	-	-	-	0
Wainwright*	-	-	-	1	-	-	-	-	-	-	-	-	1
Fort Yukon	-	-	-	1	-	-	-	-	-	-	-	-	1
Point Lay	-	-	-	-	-	-	-	-	-	-	-	-	0
Point Hope	-	-	-	-	-	-	7	3	1	5	-	-	16
Kotzebue	2	-	-	-	-	-	-	-	-	-	-	-	2
Kivalina	-	-	-	-	-	-	-	-	-	-	-	-	0
Noorvik	-	-	-	-	-	-	1	-	-	-	-	-	1
Shishmaref	-	-	-	-	-	-	-	-	-	-	-	-	0
Wales	-	-	-	-	-	-	-	-	-	-	-	-	0
Diomede	-	-	-	-	-	-	-	-	1	-	-	-	1
Savoonga	-	-	-	-	-	-	-	-	-	1	-	-	1
Gambell	-	-	-	-	-	-	-	-	-	-	-	-	0
Total	2	0	0	3	3	3	8	4	2	7	2	0	34
Percent	(5.9)	(0.0)	(0.0)	(8.8)	(8.8)	(8.8)	(23.5)	(11.7)	(5.9)	(20.6)	(5.9)	(0.0)	(100)

*Villages party to the NSB/IGC management agreement. Harvest season extends from July 1, 2007, to June 30, 2008.

Table 3a. Mean age of polar bears harvested in Alaska, 2002-2007. Ages based on cementum annuli of the first premolar. N = Number of bears analyzed. M = Mean age. SD = Standard Deviation.

Sex	2002/2003[a]			2003/2004[a]			2004/2005[a]			2005/2006[a]			2006/2007[a]		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Male	(17)	7.3	6.0	(16)	8.1	8.0	(16)	5.2	3.3	(26)	6.8	5.6	(19)	8.0	5.9
Female	(9)	5.3	2.4	(13)	5.2	5.1	(13)	7.4	4.7	(14)	9.4	5.7	(11)	5.0	4.6
Unknown	-	-	-	(3)	11.0	13.9	(1)	2.0	-	-	-	-	-	-	-

[a] Harvest season extends from July 1 to June 30.

Table 3b. Mean age of polar bears harvested in the Southern Beaufort Sea, Alaska, 2002-2007. Ages based on cementum annuli of the first premolar. N = Number of bears analyzed. M = Mean age. SD = Standard Deviation.

Sex	2002/2003[a]			2003/2004[a]			2004/2005[a]			2005/2006[a]			2006/2007[a]		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Male	(6)	7.3	7.7	(6)	6.2	7.8	(3)	3.3	3.1	(7)	1.9	1.6	(2)	4.5	0.7
Female	(5)	6.2	2.7	(9)	5.4	5.5	(6)	6.0	3.9	(4)	12.5	5.1	(1)	3.0	
Unknown	-	-	-	(2)	15.0	17.0	-	-	-	-	-	-			

[a] Harvest season extends from July 1 to June 30.

Table 3c. Mean age of polar bears harvested in the Chukchi/Bering Seas, Alaska, 2002-2007. Ages based on cementum annuli of the first premolar. N = Number of bears analyzed. M = Mean age. SD = Standard Deviation.

Sex	2002/2003[a]			2003/2004[a]			2004/2005[a]			2005/2006[a]			2006/2007[a]		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Male	(11)	7.4	5.3	(10)	9.3	8.2	(13)	5.6	3.3	(19)	8.6	6.3	(17)	8.4	6.1
Female	(4)	4.3	1.5	(4)	4.7	4.8	(7)	8.6	5.2	(10)	8.1	5.9	(10)	5.2	4.8
Unknown	-	-	-	(1)	3.0	-	(1)	2.0	-	-	-	-	-	-	-

[a] Harvest season extends from July 1 to June 30.

Table 4. Age class of polar bears harvested from Alaska, 2003-2008. Ages based on cementum annuli of the first premolar. Two year old bears are considered sub-adults after April 30. ( ) = Percentage of known age bears by harvest year.

Age Class	2003/2004[a]	2004/2005[a]	2005/2006[a]	2006/2007[a]	2007/2008[a]	Total
Adults (5+ yrs)	12(38)	16(53)	24(60)	15(50)	2(67)	69(51)
Sub-adults (2.3-5 yrs)	16(50)	10 (33)	7(18)	7(23)	1(33)	41(30)
Cubs (0-2.3 yrs)	4(12)	4(13)	9(22)	8(27)	-	25(19)
Unknown Age	33	35	49	41	31	189
Total	65	65	89	71	34	324

[a] Harvest season extends from July 1 to June 30.

Table 5. Mean ages of male and female polar bears in the Southern Beaufort Sea since 1980/81. The averages are calculated for all bears (≥1 yrs) and for adult bears (≥5 yrs). N = Number of known-age bears analyzed. M = Mean age. SD = Standard Deviation. Harvest season extends from July 1 to June 30.

	Females						Males					
	≥1 year			≥ 5 years			≥ 1 year			≥ 5 years		
Season	M	SD	N	M	SD	N	M	SD	N	M	SD	N
1980-1982	9.6	4.8	7	10.8	3.8	6	6.4	4.2	8	8.6	3.8	5
1982-1985	6.8	4.6	28	10.2	3.8	15	4.9	3.6	42	8.5	3.4	16
1985-1988	6.6	5.0	18	9.5	4.4	11	6.1	5.9	27	13.4	4.6	9
1988-1991	6.6	5.0	8	9.8	5.6	4	7.2	5.9	43	10.9	5.5	24
1991-1994	7.8	6.2	17	11.8	4.9	10	7.2	7.1	34	12.9	6.7	16
1994-1997	7.4	8.6	16	15.2	10.3	6	7.5	6.6	26	11.3	6.5	15
1997-2000	5.4	4.2	7	12.0	3.4	3	6.8	4.5	21	9.4	4.4	12
2000-2003	5.4	3.1	10	8.5	2.6	4	6.6	5.5	23	10.1	5.5	12
2003-2006	7.1	5.4	19	11.3	5.5	9	4.6	6.3	13	11.0	9.6	3

Table 6. Mean ages of male and female polar bears in the Chukchi/Bering since 1980/81. The averages are calculated for all bears (≥1 yrs) and for adult bears (≥5 yrs). N = Number of known-age bears analyzed. M = Mean age. SD = Standard Deviation. Harvest season extends from July 1 to June 30.

	Females						Males					
	≥1 year			≥ 5 years			≥ 1 year			≥ 5 years		
Season	M	SD	N	M	SD	N	M	SD	N	M	SD	N
1980-1982	6.8	4.6	43	10.2	4.8	33	5.1	4.0	63	8.6	3.9	27
1982-1985	6.4	4.5	88	9.7	3.4	48	5.9	4.7	181	10.2	4.4	79
1985-1988	6.3	4.8	84	9.8	4.4	42	6.1	4.9	126	9.9	4.6	61
1988-1991	9.4	6.8	50	12.1	6.2	36	7.3	6.4	114	11.6	6.1	60
1991-1994	8.3	5.7	48	12.0	4.5	29	9.8	7.6	65	14.3	6.4	40
1994-1997	7.5	6.5	27	12.8	5.4	13	6.9	6.2	56	12.2	6.0	25
1997-2000	6.8	5.2	42	9.1	5.2	27	6.5	5.4	66	10.4	6.0	30
2000-2003	8.5	7.0	28	12.6	6.1	17	7.8	5.6	64	11.2	5.0	37
2003-2006	7.6	5.4	21	12.0	3.7	11	8.0	4.1	41	10.7	5.6	28

Table 7. Minimum, maximum and average number of polar bears observed at Barter Island, Alaska, 2002-2008. SD =standard deviation.

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