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CRS Report for Congress

Polar Bears: Proposed Listing Under the Endangered Species Act

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Polar Bears: Proposed Listing Under the Endangered Species Act

Summary

The proposed listing of polar bears as threatened under the Endangered Species Act (ESA; 16 U.S.C. §§1531 et seq.) highlights the intersection of two significant issues currently before Congress — climate change and species protection. According to the ESA, this listing decision rests solely on an interpretation of the best available scientific understanding of the species and how it may be affected by changes in its habitat.

Polar bears depend on Arctic sea ice, which most scientists acknowledge will be affected by climate warming causing, at minimum, an earlier annual or seasonal thaw and a later freeze of coastal sea ice. Globally, less than one-third of the 19 known or recognized polar bear populations are declining, more than one-third are increasing or stable. The remaining third have insufficient data available to estimate population trends and their status has not been assessed. Two polar bear populations occur within U.S. jurisdiction.

Polar bears are affected by climate change, contaminants, and subsistence and sport hunting. Environmental organizations have voiced public concern that polar bear populations are threatened by climate change. Scientists have confirmed that, in recent decades, the extent of Arctic sea ice has declined significantly as the result of climate warming: annual ice break-up in many areas is occurring earlier and freeze-up later. Arctic sea ice is experiencing a continuing decline that may not easily be reversed, and some models project that Arctic sea ice could disappear completely by the second half of this century. In addition, three main groups of contaminants are implicated as potentially threatening polar bears — petroleum hydrocarbons, persistent organic pollutants, and heavy metals. The United States allows limited subsistence harvest of polar bears by Alaska Natives. In Canada, Native hunters are permitted to allocate a limited portion of the subsistence harvest to sport hunters. Under 1994 amendments to the MMPA, U.S. citizens may obtain permits to import sport-harvested polar bear trophies from Canada.

The Fish and Wildlife Service (FWS) has proposed listing polar bears as a threatened species under ESA, acknowledging the increasing threats to their existence. The FWS listing decision must be based solely on the best available scientific and commercial information regarding five factors: habitat destruction, overutilization, disease or predation, inadequacy of other regulatory mechanisms, and other natural or manmade factors.

Controversy exists over how great a threat the changing climate might be to polar bears and whether they might be able to adapt to these changing conditions. Some point out that polar bears today are not coping with changing climate alone, but also face a host of other human-induced factors — including shipping, oil and gas exploration, contaminants, and reduced prey populations — that compound the threat to their continued existence. There is also considerable uncertainty in estimates of polar bear population numbers and trends as well as in our understanding of polar bear habitat.

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Background

The polar bear, *Ursus maritimus*, is the largest terrestrial carnivore and a top predator, inhabiting circumpolar Arctic regions wherever sea ice is present for a substantial part of the year. Nineteen known or identified populations of polar bears have an estimated total abundance of 20,000 to 25,000 animals (**Figure 1**). Two of these populations occur within U.S. jurisdiction — the Southern Beaufort Sea population (shared about equally with Canada) is estimated at 1,526 animals,[1] while the Chukchi/Bering Seas population (shared with Russia) is estimated at about 2,000 animals.[2]

Studies suggest that polar bear numbers are in decline in Western Hudson Bay,[3] but a multi-year study, to be completed in fall 2007 and following local reports of more bears being seen in the northern parts of the population range, will determine if the observed decline is the result of a change in population distribution or an actual reduction in abundance.[4] In addition, the polar bear population may be starting to decline in the Southern Beaufort Sea. Simulations suggest that polar bear populations are also declining in Baffin Bay, Kane Basin, and Norwegian Bay. Globally, less than one-third of the 19 populations are declining, and more than one-third are increasing or stable. The remaining third have insufficient data available to estimate population trends and their status has not been assessed.[5] The status of

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[1] E. V. Regehr, S. C. Amstrup, and I. Stirling, *Polar Bear Population Status in the Southern Beaufort Sea*, U.S. Geological Survey, Open File Report 1337 (2006).

[2] This abundance estimate, by the Polar Bear Specialist Group (see footnote 5), has low confidence, with no estimate of precision or bias.

[3] I. Stirling and C. Parkinson, "Possible Effects of Climate Warming on Selected Populations of Polar Bears (*Ursus maritimus*) in the Canadian Arctic," *Arctic*, v. 59 (September 2006): 261-275.

[4] Government of Nunavut, Submission from the Government of Nunavut, Department of Environment to the Supervisor, U.S. FWS, April 6, 2007, Appendix A, p. 31.

[5] Polar Bear Specialist Group, *Proceedings of the 14th Working Meeting of the IUCN/SSC*

(continued...)

Figure 1. Distribution of Polar Bear Populations Throughout the Circumpolar Basin

Source: Polar Bear Specialist Group, *Proceedings of the 14th Working Meeting of the IUCN/SSC Polar Bear Specialist Group*, p. 33. SB = Southern Beaufort Sea, NB = Northern Beaufort Sea, VM = Viscount Melville, NW = Norwegian Bay, LS = Lancaster Sound, MC = McClintock Channel, GB = Gulf of Boothia, FB = Foxe Basin, WH = Western Hudson Bay, SH = Southern Hudson Bay, KB = Kane Basin, BB = Baffin Bay, DS = Davis Strait.

polar bears in the Central Arctic Basin — transient bears that normally reside in other regional populations — is unknown. Two of the most southerly polar bear populations, in Southern Hudson Bay[6] and Davis Strait,[7] show no evidence of

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[5] (...continued)
Polar Bear Specialist Group, Occasional Paper of the IUCN Species Survival Commission No. 32 (2006), p. 34-35, available at [http://pbsg.npolar.no/docs/PBSG14proc.pdf].

[6] I. Stirling et al., "Polar Bear Distribution and Abundance on the Southwestern Hudson Bay Coast During the Open Water Season, in Relation to Population Trends and Annual Sea Ice Patterns," *Arctic*, v. 57 (March 2004): 15-26.

[7] Government of Nunavut, Submission from the Government of Nunavut, Department of (continued...)

population decline over the past two decades of decreasing sea ice. Large carnivorous mammals are generally considered to be most at risk of population declines and extinctions,[8] and the minimum viable total population of polar bears has been estimated at 4,961 adults.[9]

The primary prey of polar bears is the ringed seal — a polar bear may stalk a seal by waiting quietly for it to emerge from an opening in the ice that seals make to breathe or climb out of the water to rest. Ringed seals have a circumpolar distribution and are associated with ice seasonally for birthing and molting in the spring. Much of ringed seal habitat (especially in offshore drifting sea ice) has not been surveyed, leading to much uncertainty regarding population size and status. Current estimates of the global population numbers for ringed seal range from more than 2 million to as many as 7 million animals. Other prey include bearded and harp seals, juvenile walrus, beluga whales, narwhal, fish, and seabirds and their eggs. Over most of their range, polar bears remain on the sea ice year-round or spend at most only short periods on land. In October and November, male polar bears head out onto sea ice where they spend the winter. Polar bears are well adapted to this Arctic environment, where ice thickness can increase or decrease rapidly as well as differ significantly from year to year and between regions.[10]

Annual rates of population increase for polar bears may range to as much as 5%, with mature females reproducing once every three years (commonly twins, more rarely triplets).[11] Pregnant females either seek sites on the sea ice ("pelagic bears") or on mainland areas ("nearshore bears") to dig large dens in snow where they give birth and spend the winter.[12] Females do not require mainland sites for denning, but some individuals seem to prefer them. Both pelagic and nearshore individuals are known in all subpopulations studied.[13]

Currently, polar bears are protected and managed under domestic law and several international agreements. Because the primary habitat of the polar bear is sea

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[7] (...continued)
Environment to the Supervisor, U.S. FWS, April 6, 2007, p.7.

[8] M. Cardillo et al., "Multiple Causes of High Extinction Risk in Large Mammal Species," *Science*, v. 309, no. 5738 (August 19, 2005): 1239-1241.

[9] D. H. Reed et al., "Estimates of Minimum Viable Population Sizes for Vertebrates and Factors Influencing Those Estimates," *Biological Conservation*, v. 113, no. 1 (September 2003): 23-34.

[10] Seymour Laxon, Neil Peacock, and Doug Smith, "High Interannual Variability of Sea Ice Thickness in the Arctic Region," *Nature*, v. 425 (October 30, 2003): 947-950.

[11] A. E. Derocher, "Polar Bear," In *Encyclopedia of the Arctic*, M. Nuttall, ed. (Routledge, 2005), v. 3, p. 1656-1658.

[12] U.S. Dept. of the Interior, Fish and Wildlife Service, "Polar Bear Fact Sheet," available at [http://www.fws.gov/home/feature/2006/polarbear.pdf], and "Polar Bear Questions and Answers," available at [http://www.fws.gov/home/feature/2006/PolarbearFAQ.pdf].

[13] Mette Mauritzen, Andrew E. Derocher, and Oystein Wiig, "Space-Use Strategies of Female Polar Bears in a Dynamic Sea Ice Habitat," *Canadian Journal of Zoology*, v. 79 (September 2001): 1704-1713.

ice and this species is evolutionarily adapted to life at sea, it is managed as a marine mammal. In the United States, polar bears are protected under the Marine Mammal Protection Act (MMPA; 16 U.S.C. §§1361 et seq.), with the Fish and Wildlife Service (FWS) in the Department of the Interior as the federal management agency. The Alaska Nanuuq Commission, a Native organization representing villages in northern and northwestern Alaska, has a co-management agreement with the FWS to provide input on matters related to the conservation and sustainable use of polar bears.[14]

Internationally, the multilateral 1973 Agreement on the Conservation of Polar Bears[15] and the 2000 bilateral 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[16] provide a basis for cooperation on polar bear management. In addition, Alaska and Canada exercise joint cross-border management through the Inuvialuit-Inupiat Polar Bear Management Agreement for the Southern Beaufort Sea.[17] The International Union for the Conservation of Nature (IUCN) classifies the polar bear as *vulnerable* on the IUCN Red List of Threatened Species. The IUCN classification of *vulnerable* represents a judgment that the species is facing a high risk of extinction in the wild.[18]

In addition, polar bears are listed on Appendix II of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES). Appendix II contains species not necessarily threatened with extinction but requiring controlled trade to prevent population declines, as well as other species whose body parts are difficult to distinguish by visual inspection (the so-called "look-alike" problem, in this case in controlling trade in bear gall bladders).[19] ESA implements CITES provisions domestically. As such, ESA affords protection to endangered species and wildlife of global concern. To complement CITES, ESA specifically prohibits interstate and foreign commerce in ESA-listed species. FWS agents and inspectors work to control any illegal trade and international movement of CITES- and ESA-listed species, since some species found in other countries may be brought into the United States by activities that could threaten their long-term survival. ESA is applicable to activities within U.S. jurisdiction, as well as activities by U.S. citizens anywhere, including the high seas.

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[14] See [http://www.nanuuq.info/index.html].

[15] Parties to this agreement are Canada, Denmark, Norway, the Russian Federation, and the United States. See [http://sedac.ciesin.org/entri/texts/polar.bears.1973.html].

[16] See [http://alaska.fws.gov/media/pbsigning/agreement.html].

[17] See [http://pubs.aina.ucalgary.ca/arctic/Arctic55-4-362.pdf].

[18] This assessment is based on a suspected population decline of more than 30% within three generations (45 years) due to decline in area of occupancy, extent of occurrence, and habitat quality.

[19] For additional background on CITES, see CRS Report RL32751, *The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): Background and Issues*, by Pervaze A. Sheikh and M. Lynne Corn.

Circumstances Potentially Affecting Polar Bears

Climate Change[20]

Climate change is widely believed to be one of the most significant contemporary threats to biodiversity worldwide.[21] A May 2002 report by the World Wildlife Fund raised public concern that polar bear populations are threatened by climate change.[22] Scientists have confirmed that, in recent decades, the extent of Arctic sea ice has declined significantly as the result of climate warming: annual ice break-up in many areas is occurring earlier and freeze-up later. Arctic sea ice is experiencing a continuing decline that it is thought may not easily be reversed,[23] and some models project that Arctic sea ice could disappear completely by the second half of this century.[24] However, any link between climate-model predictions and threats to polar bears is characterized as tenuous by many scientists, acknowledging the limitations of correlational studies and the hypothetical nature of model-based predictions of environmental conditions decades into the future.[25]

Distribution patterns of some polar bear populations have changed in recent years. Greater numbers of bears are being found onshore near the Bering Sea,[26] and in some parts of Canada,[27] with Inuit hunters reporting more bears present on land

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[20] For background on climate change, see CRS Report RL33849, *Climate Change: Science and Policy Implications*, by Jane Leggett.

[21] C. D. Thomas et al., "Extinction Risk from Climate Change," *Nature*, v. 427, no. 6970 (January 8, 2004): 145-148; Arctic Climate Impact Assessment, *Impacts of a Warming Arctic: Arctic Climate Impact Assessment* (Cambridge University Press, 2005), 144 p.

[22] Stefan Norris, Lynn Rosentrater, and Pal Martin Eid, *Polar Bears at Risk* (World Wildlife Fund, May 2002), available at [http://www.ngo.grida.no/wwfap/polarbears/risk/PolarBears AtRisk.pdf].

[23] R. W. Lindsay and J. Zhang, "The Thinning of the Arctic Sea Ice, 1988-2003: Have We Passed a Tipping Point?" *Journal of Climate*, v. 18, no. 22 (2005), pp. 4879-4894.

[24] Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis*, Summary for Policymakers (Geneva, Switzerland: February 2007), 21 pp.

[25] D. Berteaux et al., "Constraints to Projecting the Effects of Climate Change on Mammals," *Climate Research*, v. 32 (October 2006): 151-158; D. B. Botkin et al., "Forecasting the Effects of Global Warming on Biodiversity," *Bioscience*, v. 57 (March 2007): 227-236; C. J. Krebs and D. Berteaux, "Problems and Pitfalls in Relating Climate Variability to Population Dynamics," *Climate Research*, v. 32 (October 2006): 143-149; and M. G. Dyck, et al., "Polar Bears of Western Hudson Bay and Climate Change: Are Warming Spring Air Temperatures the 'Ultimate' Survival Control Factor?" *Ecological Complexity*, v. 4 (2007): in press.

[26] S. L. Schliebe, T. Evans, S. Miller, and J. Wilder, "Fall Distribution of Polar Bears along Northern Alaska Coastal Areas and Relationship to Pack Ice Position," in *Collection of Scientific Papers from the 4th International Conference of Marine Mammals of the Holarctic*, V. M. Belkovich, ed. (St. Petersburg, Russia: 2006), p. 559.

[27] E. K. Parks et al., "Seasonal and Annual Movement Patterns of Polar Bears on the Sea Ice
(continued...)

during summer and fall.[28] There may be several reasons for the observed changes, including changes in sea ice; those who conduct population censuses of polar bears will need to be cautious in interpreting whether apparent population variations are indicative of different habitat use (e.g., greater numbers of bears onshore) or actual changes in population abundance. Recent studies found that mid-latitude Europe populations of Arctic fox became extinct at the end of the Pleistocene and did not track the habitat when it shifted to the north, suggesting that some populations of Arctic species are unable to track decreases in habitat availability and may be vulnerable to increases in global temperatures.[29]

The projected loss of sea ice could affect survival and reproduction of polar bears by:

- shortening the season during which ice is available to serve as a platform for hunting seals;[30]
- increasing the distance between the ice edge and land, thereby making it more difficult for nearshore female bears that prefer to den on land to reach preferred denning areas;
- reducing the availability of sea ice dens for gestating pelagic female bears;
- requiring nearshore bears to travel through fragmented sea ice and open water, which uses more energy than walking across stable ice formations;[31]
- reducing the availability and accessibility of ice-dependent prey, such as ringed seals, to nearshore populations;[32] and

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[27] (...continued)
of Hudson Bay," *Canadian Journal of Zoology*, v. 84, no. 9 (September 2006): 1281-1294.

[28] Unpublished reports in 2005 by M. Dowsley and M. Taylor, as cited in the FWS polar bear status assessment report (see footnote 51).

[29] Love Dalen et al., "Ancient DNA Reveals Lack of Postglacial Habitat Tracking in the Arctic Fox," *Proceedings of the National Academy of Sciences of the United States of America*, v. 104, no. 16 (April 17, 2007): 6726-6729.

[30] For every week earlier the sea ice breaks up, bears come ashore 10 kilograms lighter in weight, on average. See Ian Stirling and A. E. Derocher, "Possible Impacts of Climatic Warming on Polar Bears," *Arctic*, v. 46 (1993): 240-245.

[31] Loss of sea ice forces polar bears to cross large expanses of water and increases risk of drowning. In 2004, scientists documented polar bears swimming as far as 60 miles offshore and observed 4 drowned bears. See C. Monnett and J. S. Gleason, "Observation of Mortality Associated with Extended Open-Water Swimming by Polar Bears in the Alaskan Beaufort Sea," *Polar Biology*, v. 29, no. 8 (July 2006): 681-687.

[32] I. Stirling and C. L. Parkinson, "Possible Effects of Climate Warming on Selected Populations of Polar Bears (*Ursus maritimus*) in the Canadian Arctic," *Arctic*, v. 59, no. 3 (September 2006): 261-275; S. H. Ferguson, I. Stirling, and P. McLoughlin, "Climate Change and Ringed Seal (*Phoca hispida*) Recruitment in Western Hudson Bay," *Marine Mammal Science*, v. 21, no. 1 (January 2005): 121-135.

- requiring nearshore bears to spend more time on land, thereby increasing the potential for adverse human-polar bear interactions.[33]

In addition to changing sea ice conditions, others have expressed concern that climate change could affect the integrity of polar bear den sites, as rain can destroy ice dens, exposing young polar bears to the elements prematurely.[34]

Although some scientists predict the extinction of polar bears under potential climate change scenarios, not all sea-ice changes would harm polar bears. For example, reduced sea ice thickness and coverage in far northern regions is likely to improve polar bear habitat, by increasing the availability and accessibility of ice-dependent prey, such as ringed seals.[35] Others remind biologists that climate-related changes to a species' distribution does not necessarily result in changes in abundance.[36]

Contaminants

Three main groups of contaminants are implicated as potentially threatening polar bears — petroleum hydrocarbons, persistent organic pollutants, and heavy metals. Polar bears are particularly vulnerable to oil spills, because oil damages polar bear fur (decreasing the bears' ability to thermoregulate) and because of oil ingestion (poisoning) via grooming and/or eating contaminated prey.[37] Although elevated concentrations of some persistent organic pollutants have been discovered in polar bears, it has been difficult to determine what biological effects these chemicals might have on polar bears; weakened immune systems and reduced reproductive success are among the concerns.[38] Some persistent organic pollutants are endocrine disruptors and are thought to cause pseudo-hermaphrodism and aberrant genital morphology in polar bears.[39] Mercury is a particular concern because of its toxicity at low concentration, and its magnification and accumulation through the food web.

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[33] Marine Mammal Commission. *Annual Report to Congress, 2005* (Bethesda, MD: July 15, 2006), p. 52.

[34] Stefan Norris, Lynn Rosentrater, and Pal Martin Eid, *Polar Bears at Risk* (World Wildlife Fund, May 2002).

[35] A. E. Derocher, N. J. Lunn, and I. Stirling, "Polar Bears in a Warming Climate," *Integrative and Comparative Biology*, v. 44, no. 2 (April 2004): 163-176.

[36] C. J. Krebs and D. Berteaux, "Problems and Pitfalls in Relating Climate Variability to Population Dynamics," *Climate Research*, v. 32 (2006): 143-149.

[37] D. J. St. Aubin, "Physiologic and Toxic Effects on Polar Bears," in *Sea Mammals and Oil: Confronting the Risks*, J. R. Geraci and D. J. St. Aubin, eds. (New York, NY: Academic Press, Inc., 1990), p. 235-239; N. A. Oritsland, et al., *Effect of Crude Oil on Polar Bears*, Environmental Studies No. 24, Northern Affairs Program, Northern Environmental Protection Branch, Indian and Northern Affairs, Canada (1981), 268 pp.

[38] J. U. Skarre et al., "Ecological Risk Assessment of Persistent Organic Pollutants in the Arctic," *Toxicology*, v. 181-182 (2002): 193-197.

[39] C. M. Fossi and L. Marsili, "Effects of Endocrine Disruptors in Aquatic Mammals," *Pure and Applied Chemistry*, v. 75, nos. 11-12 (November-December 2003): 2235-2247.

However, polar bears appear able to demethylate (i.e., alter the chemical form and biological reactivity of) mercury and accumulate somewhat elevated levels of mercury without harm.[40] Climate change may alter contaminant pathways through increased precipitation, increasing the potential threat to polar bears.[41]

Subsistence and Sport Harvest

The United States allows limited subsistence harvest of polar bears by Alaska Natives. Subsistence harvest of depleted, threatened, and endangered marine mammals can be managed in different ways. Due to concerns for depleted beluga whales in Cook Inlet, AK, subsistence harvest by Alaska Natives has been severely restricted (0 to 2 animals annually) since 1999.[42] On the other hand, a substantial Alaska Native subsistence harvest of endangered bowhead whales continues, with 75 whales permitted to be struck in 2006.[43] In the year from July 1, 2004, through June 30, 2005, Alaska Natives harvested 27 polar bears from the Southern Beaufort Sea population and 33 polar bears from the Chukchi/Bering Seas population. In addition, there is particular concern for the Chukchi/Bering Seas population due to anecdotal evidence that unregulated harvest by Russian Natives on the Chukotka Peninsula may be reaching unsustainable levels.[44]

Some have suggested that habitat alteration from climate change may interact with subsistence and sport harvest to increase polar bear mortality. For example, they believe that large adult male bears, more likely to be targeted by hunters, could also be more at risk from the effect of climate change on prey availability since larger bears require greater amounts of food. Others counter that habitat conditions and prey availability for polar bears could improve as climate warms as a result of increased marine productivity in regions currently dominated by multi-year ice.[45] In addition, since male bears represent a threat to cubs and juvenile bears,[46] any factor — such as sport and subsistence hunting — that reduces this mortality may exert a larger positive influence should bears become nutritionally challenged in the future.

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[40] Arctic Monitoring and Assessment Programme, *AMAP Assessment 2002: Persistent Organic Pollutants in the Arctic* (Oslo, Norway: 2005), p. 123.

[41] R. W. Macdonald, T. Harner, and J. Fyfe, "Recent Climate Change in the Arctic and Its Impact on Contaminant Pathways and Interpretation of Temporal Trend Data: Review Article," *Science of The Total Environment*, v. 342, no. 1-3 (April 1, 2005): 5-86.

[42] 71 *Fed. Reg*. 15697-15698 (March 29, 2006).

[43] 71 *Fed. Reg*. 7539 (February 13, 2006).

[44] Marine Mammal Commission. *Annual Report to Congress, 2005* (Bethesda, MD: July 15, 2006), p. 50-51.

[45] A. E. Derocher, N. J. Lunn, and I. Stirling, "Polar Bears in a Warming Climate," *Integrative and Comparative Biology*, v. 44 (June 2004): 163-176; I. Stirling and C. Parkinson, "Possible Effects of Climate Warming on Selected Populations of Polar Bears (*Ursus maritimus*) in the Canadian Arctic," *Arctic*, v. 59 (September 2006): 261-275.

[46] A. E. Derocher and O. Wiig, "Infanticide and Cannibalism of Juvenile Polar Bears (*Ursus maritimus*) in Svalbard," *Arctic*, v. 52 (September 1999): 302-310.

Canadian Non-Resident Sport Harvest.[47] In Canada, Native Inuit hunters are permitted to allocate a limited portion of the subsistence harvest to sport hunters.[48] Under 1994 amendments to the MMPA, U.S. citizens may obtain permits to import sport-harvested polar bear trophies from Canada, if taken under quotas scientifically designed to ensure the maintenance of the affected population at a sustainable level.[49] In 2006, FWS issued 72 permits for importing polar bear trophies from Canada, with more than half taken from the Lancaster Sound population (see **Table 1**). The U.S. permit issuance fee for sport-hunted polar bear trophies is $1,000.[50]

Although each Canadian jurisdiction manages polar bears in its own territory, non-resident hunts (i.e., sport hunts) only occur in Nunavut and the Northwest Territories (NWT). Some of the regional polar bear populations in Nunavut and NWT are shared with other jurisdictions; harvest sharing is undertaken through inter-jurisdictional meetings and awareness of neighbors' hunting needs. The overall harvest quota for each jurisdiction is based on recommendations made by two federal-provincial-territorial polar bear committees (the Polar Bear Technical Committee and the Polar Bear Administrative Committee) made up of appropriate representatives of the relevant jurisdictions.

Nunavut. The total allowable harvest (TAH) level for each of the 12 polar populations found in Nunavut is determined based on the best scientific knowledge; this determination is then subject to review and adjustment by Inuit knowledge holders. Three Regional Wildlife Organizations (RWOs, representing the Hunters and Trappers Organizations from each of the Nunavut communities) make an initial determination of how these TAHs will be shared among the communities that hunt bears.

Memoranda of understanding (MOUs) are negotiated with each community by the Nunavut Department of Environment (within which the Wildlife Management Service is found), which works with an MOU Working Group. The MOU Working Group includes Nunavut Tunngavik Inc. (the organization representing all Nunavut Inuit land claim beneficiaries), the three RWOs, the Nunavut Department of Environment, and the Nunavut Wildlife Management Board (the co-management board responsible for wildlife and fisheries management decisions in Nunavut; this board represents Nunavut users and territorial and federal departments).

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[47] Much of the material in this section was provided by Milton M.R. Freeman, Canadian Circumpolar Institute, University of Alberta, Edmonton.

[48] M. M. R. Freeman and G. W. Wenzel, "The Nature and Significance of Polar Bear Conservation Hunting in the Canadian Arctic," *Arctic*, v. 59, no. 1 (2006): 21-30.

[49] P.L. 103-238, §§4, 5; 16 U.S.C. §1371(a)(1); 16 U.S.C. §1374(c)(5).

[50] MMPA, §104(c)(5)(B).

Table 1: Number of Polar Bear Trophy Import Permits Issued, by Year

	Population	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
Approved Populations (includes bears taken before the 1994 MMPA amendment)[a]	Southern Beaufort Sea	32	12	16	18	9	5	13	14	10	6	135
	Northern Beaufort Sea	41	4	8	9	16	4	13	16	16	16	143
	Viscount Melville Sound	5	4	0	0	1	4	5	4	0	3	26
	Lancaster Sound	17	16	104	31	33	28	29	30	25	37	350
	Norwegian Bay	0	0	1	1	2	4	0	1	2	3	14
	Western Hudson Bay	0	2	2	2	3	3	4	9	4	6	35
Population approval withdrawn (includes pre-amendment bears)	M'Clintock Channel[b]	23	13	10	14	7	0	1	0	0	0	68
Deferred populations (pre-amendment and grandfather bears[c] ONLY)	Gulf of Boothia	3	2	0	0	0	0	1	7	0	0	13
	Kane Basin	0	0	0	0	0	0	0	0	0	0	0
	Baffin Bay	3	2	0	0	0	0	0	8	2	0	15
	Foxe Basin	5	2	0	0	0	0	1	14	2	1	25
	Davis Strait	3	3	1	1	0	0	1	5	0	0	14
	Southern Hudson Bay	0	0	0	0	0	0	0	0	0	0	0
Total by year		132	60	142	76	71	48	68	108	61	72	838

Source: Data provided by U.S. Fish and Wildlife Service, January 9, 2007; bears may have been taken in years before permit issuance.

a. Bears taken before April 30, 1994 (enactment date of MMPA Amendments of 1994); permits issued 1997 to 2003.
b. Approved only for bears lawfully taken on or before May 31, 2000.
c. Grandfather bears are those taken before February 18, 1997 (allowed under the MMPA amendment of November 10, 2003) from deferred (non-approved) populations; permits issued 2004-2006.

Once the MOU is negotiated and accepted by a community, it is the responsibility of the community-based Hunters and Trappers Organization (HTO) to manage the hunt (e.g., quota allocation, dates of the hunting season, how to handle nuisance bears, etc). Quota allocation includes the division of polar bear 'tags' (a hunter must possess a tag before he/she can hunt polar bears) between residents' subsistence hunts and outfitters' sport/conservation hunts. Where there may be more than one outfitter in the community, the allocation among different outfitters is also decided by the HTO.

Northwest Territories. The situation is generally similar in the NWT, the differences being that, in place of the Nunavut Wildlife Management Board, there is an Inuvialuit Game Council (IGC) and a subsidiary body of IGC known as the Wildlife Management Advisory Council — NWT. These two bodies, together with the NWT's Department of Environment and Natural Resources (within which the Wildlife Division is found), negotiate MOUs with each community's Hunters and Trappers Committee.

Economic Impacts. The NWT and Nunavut governments charge non-resident hunters (i.e., U.S. or other non-Canadian resident) a Can$750 trophy fee plus a Can$50 tag fee,[51] and in addition the federal government collects a 6% goods and services tax (GST) on all goods and services (except food and certain other exempt items) purchased in Canada. These monies go to the federal government. In addition, the local outfitter charges for his/her services and, as part of that service, hires guides and assistants, provides transportation (dogs and skidoos), food, and camping gear, and may provide locally made caribou/wolf skin clothing (or this can be custom-made and purchased) and accommodations in the community if bad weather prevents leaving on the hunt.

The amount spent varies by community. A 2002 NWT government report found that, for the four NWT native communities hosting tourist hunters, an average of Can$43,000 was spent for a polar bear hunt.[52] However, this sum includes the airfare to reach the community and the southern-based (often in the United States, but also in Ontario, Alberta, or British Columbia) trip wholesaler's commission.[53] Included in the Can$43,000 are taxidermy charges paid outside of the native community. In a comparable Nunavut study, costs appear to be similar (almost Can$42,000 on average being the cost paid by a visiting polar bear hunter).[54] However, these figures were converted from U.S. to Canadian currency when the Canadian dollar was worth significantly less than today.

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[51] In July 2007, Can$1.00 was approximately equal to US$0.95.

[52] Investments & Economic Analysis, *2001 Hunter Survey Report: General Report on Hunters to the Northwest Territories*, Resources, Wildlife & Economic Development (September 2002), 63 pp.

[53] Only a few native outfitters, with long-established businesses, market their services directly to hunters.

[54] G. W. Wenzel and F. Bourgouin, *Outfitted Polar Bear Hunting, Community Economy and Species Conservation in the Kitikmeot and Qikiqtaaluk Regions of Nunavut*, Final Report to the Dept. of Sustainable Development, Government of Nunavut (2002).

On average, Inuit outfitters received Can$19,300 per hunt (as southern wholesalers may retain from a third to half the client's cost as their commission plus payment of air travel to the community). Thus, in total, the 20 polar bear hunts by non-resident hunters in Resolute (with an Inuit population of about 130) in the spring of 2000 brought Can$460,000 into the community. This was disbursed by the Inuit outfitter within the community as follows: Can$280,000 to hire guides and assistants,[55] Can$50,000 to purchase polar bear tags from the subsistence hunters, Can$19,000 to purchase supplies and equipment from the community-owned store, with other local services costing another $1,000 or $2,000.[56] The outfitter, a local Inuit family-owned business, also receives payment for making all needed arrangements for the visiting hunter. Thus almost all the money that enters the community circulates in the community — even the purchase of supplies from the local cooperative store results in a dividend paid to co-op members (i.e., virtually all community households). The disbursement of cash varies from community to community, but in each case, more than 90% is disbursed and circulates locally. In 2001, the 74 outfitted hunts in Nunavut generated Can$1.221 million, a figure significantly higher than that derived annually from all other tourist/private visitor activities.[57]

Finally, government license fees benefit communities indirectly by supporting polar bear research and monitoring. For example, Nunavut spends about Can$1 million annually on polar bear research and monitoring.

Protection Efforts

On February 17, 2005, FWS received a petition from the Center for Biological Diversity requesting that FWS list the polar bear as threatened under ESA throughout its range and that it designate critical habitat for this species.[58] The Natural

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[55] For example, a dog team-owning guide was paid Can$9000 for his services during a single 14-day hunt, and his assistant received Can$5000 — a sizeable contribution to their seasonal income in the spring.

[56] Other smaller-cost services, often provided by women, include repairs to winter skin-clothing (about Can$500 per outfit), cleaning polar bear hides for shipment (a similar amount), and sewing new skin clothing (from Can$1,000 to Can$1,500 per outfit). Visiting hunters during the 6 to 8 week season enable local hotels to open (in many of the small hunting communities, it's too expensive to keep hotels open outside of the short summer tourist season) so cleaners, kitchen staff, etc. are hired. In addition, hunters are generous tippers, with some giving gratuities of more than Can$1,000 to guides and Can$500 to hunt assistants. Hunters also purchase arts and crafts/souvenirs, averaging more than Can$1,600 per visitor.

[57] This Can$1.2 million is a minimal figure, as the Wenzel and Bourgouin study focused exclusively on the polar bear hunt; some hunters also hunt for a muskox, caribou, wolf, or grizzly bear, incurring additional costs when extending the stay in the community for these additional hunts.

[58] A species may be designated as either endangered or threatened, depending on the severity of its decline and threats to its continued survival. The prohibitions and penalties of ESA

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Resources Defense Council and Greenpeace, Inc., joined as petitioners on July 5, 2005. On December 15, 2005, the petitioners filed a complaint, challenging FWS's failure to issue a 90-day finding on the petition. On February 7, 2006, FWS announced a finding that the petition presented substantial scientific information indicating that listing the polar bear might be warranted, and subsequently announced the initiation of a formal status review.[59]

In a settlement agreement, approved on July 5, 2006, FWS agreed to submit a 12-month finding on the petition by December 27, 2006. On January 9, 2007, FWS announced its 12-month finding on the petition — concluding that, after a review of scientific and commercial information, listing the polar bear as a threatened species under ESA was warranted — and formally proposed such listing.[60] This proposed rule does not designate critical habitat for the polar bear. A 90-day period (through April 9, 2007) was announced to receive data and comments, with requests for a public hearing accepted for 45 days (through February 23, 2007). A decision on whether to list polar bears is due from FWS in January 2008.

The Secretary of the Interior must decide whether to list polar bears under ESA based only on the best available scientific and commercial (i.e., trade) information,[61] after an extensive series of procedural steps to ensure public participation and the collection of relevant information. The listing decision considers information relating to five factors: habitat destruction, overutilization, disease or predation, inadequacy of other regulatory mechanisms, and other natural or manmade factors.[62] At this point in the ESA process, the Secretary *may not* consider the economic effects that listing may have. The listing determination is the only place in ESA where economic considerations are expressly forbidden; such considerations may enter in other stages, including critical habitat designation.

Economic factors cannot be taken into account at this stage because Congress directed that ESA listing be fundamentally a scientific question: is the continued existence of the species threatened or endangered? If polar bears were listed under

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[58] (...continued)
apply primarily to those species listed as endangered. Under § 4(d) of ESA, the Secretary may promulgate special regulations to address the plight of species listed as threatened. Protections and recovery measures for a particular threatened species can be tailored to particular situations. 50 C.F.R. §17.31 also affords threatened species for which a special rule has not been promulgated the same protections as endangered species. For additional background on ESA as well as regulatory procedures under this act, see CRS Report RL31654, *The Endangered Species Act: A Primer*, by M. Lynne Corn, Eugene H. Buck, and Pamela Baldwin.

[59] 71 *Fed. Reg.* 6745 (February 9, 2006). Information on the status of the polar bear was solicited from the public in this notice and again in 71 *Fed. Reg.* 28653 (May 17, 2006).

[60] 72 *Fed. Reg.* 1064-1099 (January 9, 2007). The polar bear status assessment document is available at [http://alaska.fws.gov/fisheries/mmm/polarbear/pdf/Polar_Bear_%20Status_Assessment.pdf].

[61] 16 U.S.C. §1533(b)(1)(A).

[62] 16 U.S.C. §1533(a)(1).

ESA, federal agencies would be required to ensure that anything the federal government authorized, funded, or carried out that is likely to affect polar bears or their habitat would not jeopardize the survival of these bears or destroy or adversely modify their habitat.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is also reviewing the status of the polar bear in Canada. In addition, many would cite the multilateral 1973 Agreement on the Conservation of Polar Bears as a significant and substantive protection effort that provides international oversight of various national research and management programs.[63]

Controversy

Supporters of increased protection for polar bears argue that polar bears are the most iconic Arctic species, representing the Arctic as lions represent Africa. They further assert that it would be irresponsible to let the polar bear become extinct as a result of human action, and would be a terrible blow to the psyche of humankind. However, some critics suggest that the current proposal to list polar bears as threatened is premature, with this species being used as a "poster child" for the evils of climate change by the popular press in recognition of polar bears' charismatic appeal; some believe the less-glamorous walrus could be facing similar or greater immediate risk.

Some scientists also point out that, since polar bears have survived at least two major warming periods over the last 10,000 years, including the intense warming event that ended the Last Glacial Maximum about 8,000 to 9,000 years ago (when temperatures were believed to have been much warmer than now), polar bears and other Arctic mammals could be capable of adjusting, adapting, and coping with the current climatic change. At the end of the last Ice Age, the Northern Hemisphere entered an extended period of rapid warming, with temperatures in Arctic regions eventually reaching levels several degrees warmer than today. At that time, the sea ice above North America is known to have retreated substantially, allowing Arctic species such as bowhead whales and walrus to move northward into areas of the Canadian Arctic that they cannot reach today. The Mid-Holocene Warm Period peaked about 11,000-9,000 years ago near Alaska and about 8,000-5,000 years ago near Greenland and Northern Europe. In both areas, temperatures rose rapidly 10-15 degrees Centigrade to a point significantly warmer than present (about 2.5 degrees Centigrade warmer; but less than the temperatures projected by the Intergovernmental Panel on Climate Change for 2100), and about 5-10 degrees Centigrade of that warming took place within 30 years or less.[64]

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[63] P. Prestrud and I. Stirling, "The International Polar Bear Agreement and the Current Status of Polar Bear Conservation," *Aquatic Mammals*, v. 20, no. 3 (1994): 113-124.

[64] D. S. Kaufman et al., "Holocene Thermal Maximum in the Western Arctic (0-180 Degrees W," *Quaternary Science Reviews*, v. 23, nos. 18-19 (October 2004): 2059-2060; Arthur S. Dyke, et al., "The Late Wisconsinan and Holocene Record of Walrus (*Odobenus rosmarus*) from North America: A Review with New Data from Arctic and Atlantic Canada," *Arctic*,

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Another significant but shorter warm period occurred about 1,000 years ago, when Arctic temperatures were slightly warmer than today. This warming also triggered sea ice reductions in Arctic regions and was accompanied by significant reductions in Greenland glaciers, creating so much arable land that Viking settlers established farms on the west coast of Greenland that were occupied for about 400 years.[65]

There is no evidence to suggest that ice in the Arctic Basin disappeared entirely during either of these warm periods, which were of equal or greater warming than predicted by the Intergovernmental Panel on Climate Change's climate-warming models, nor did any ice-dependent species become extinct.[66] Polar bears and their primary prey existed before the last Ice Age and significant populations of them remain today. The tight association of polar bears and their prey species with moving sea ice may give them a flexibility that land-based carnivores do not have.

Critics, however, counter that polar bears today are not coping with changing climate alone, but also face a host of other human-induced factors — including shipping, oil and gas exploration, contaminants, and reduced prey populations — that compound the threat to their continued existence.[67] In addition, the opportunity for a catastrophic disease event is greater in populations subject to multiple stressors.

Others suggest that there is considerable uncertainty in the estimates of polar bear population numbers and trends as well as in our understanding of polar bear habitat. Much of what we know about the polar bear habitat is confined to regions close to shore that have been studied during long summer days, with little known about what happens on drifting sea ice far from shore, especially in winter when there is little or no daylight. These critics also urge caution in interpreting studies of sea ice change that are based primarily on surveys of nearshore regions, rather than the drifting sea ice environment in the Central Arctic Basin, where ice may be thickest. While the Central Arctic Basin currently is marginal habitat for small numbers of transient bears from other populations, changing climate could cause this area to become more important as a refugium for polar bears.

Under ESA, the Secretary is required to take into account foreign polar bear conservation programs, including conservation hunting programs involving non-local (including U.S.) hunters. However, an ESA listing as "threatened" triggers an

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[64] (...continued)
v. 52, no. 2 (June 1999): 160-181; Arthur S. Dyke and James M. Savelle, "Holocene History of the Bering Sea Bowhead Whale (*Balaena mysticetus*) in its Beaufort Sea Summer Grounds off Southwestern Victoria Island, Western Canadian Arctic," *Quaternary Research*, v. 55 (2001): 371-379.

[65] Willie Soon and Sallie Baliunas, "Proxy Climatic and Environmental Changes of the Past 1000 Years," *Climate Research*, v. 23 (January 31, 2003): 89-110.

[66] D. B. Botkin et al., "Forecasting the Effects of Global Warming on Biodiversity," *Bioscience*, v. 57 (March 2007): 227-236.

[67] A. Shi, A. M. Bell, and J. L. Kerby, "Two Stressors are Far Deadlier Than One," *Trends in Ecology and Evolution*, v. 19 (2004): 274-276.

automatic listing as "depleted" under the MMPA, a listing that would prevent U.S. citizens from importing polar bear products into the United States. Such an import ban, effectively stopping U.S. participation in conservation hunting programs, is likely to seriously compromise successful Canadian community-based conservation programs.[68]

[68] M. M. R. Freeman and G. W. Wenzel, "The Nature and Significance of Polar Bear Conservation Hunting in the Canadian Arctic," *Arctic*, v. 59, no. 1 (2006): 21-30.