April 10, 2006

Scott Schliebe
Polar Bear Project Leader
U.S. Fish and Wildlife Service
Marine Mammals Management Office
1011 East Tudor Road
Anchorage, AK 99503

Re: Polar Bear 90-day petition finding

Dear Scott:

On behalf of the World Wildlife Fund, thank you for this opportunity to comment on the recent determination by the U.S. Fish and Wildlife Service that formal listing and protection of the polar bear (*Ursus maritimus*) under the U.S. Endangered Species Act (ESA) may be warranted. WWF is an international conservation organization with 1.2 million members in the US. WWF works around the world, including in all of the Arctic countries inhabited by polar bears. One of our priority ecoregions is the Bering Sea, where we have been actively involved in conservation of the Alaska-Chukotka polar bear population.

WWF strongly supports formal listing and protection measures for the polar bear as a Threatened species under the ESA, for reasons outlined herein and with the support of the best available science.

The federal ESA requires the protection of a species as “Threatened” if it “is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” [16 U.S.C. § 1532(20)]. A species is considered “endangered” when it “is in danger of extinction throughout all or a significant portion of its range.” [16 U.S.C. §15320(6)]. We believe that the current situation for polar bears clearly relates to ESA Section 4(a)(1). Factors weighted heavily as listing evaluation criteria that apply to polar bears include:

A. the present or threatened destruction, modification or curtailment of its habitat or range;
D. the inadequacy of existing regulatory mechanisms; and
E. other natural or manmade factors affecting its continued existence.

[See Title 6 U.S. Code, Section 1533(a)(1)(A-E)]

WWF believes that polar bears in the U.S. meet the statutory criteria cited above for protection as Threatened under the ESA, based on the now substantial and growing body of peer-reviewed and published scientific data (discussed below) and the numerous observations of Arctic community members (i.e. Local & Traditional Knowledge). These sources strongly suggest that current and projected global warming is and will continue to negatively and severely impact polar bears' habitat, prey, behavior, reproduction, and survival such that the species faces possible global extinction by the end of this century.

Finally, WWF fully endorses precautionary and proactive conservation principles and argues for application of strong protective measures for this species sooner rather than later, as the observed rate of Arctic ecosystem change (especially reductions in sea ice cover, extent, and duration) is accelerating well beyond that projected by early climate models.

Evidence[1] that the polar bear warrants listing in under the ESA as "Threatened", and that fulfill the listing criteria that the species "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" according to 16 U.S.C. § 1532(20), include:

1. <u>Climate Impacts on Polar Bear Habitat</u>

The most fundamental characteristic of polar bears in relation to their ecology is their utter dependence on sea ice habitats (Derocher et al. 2004). Anything that significantly changes the distribution and abundance, let alone the very existence of sea ice will have profound effects on the persistence of polar bears on Earth. Such habitat loss or fragmentation is well documented to be a primary cause of extinctions (Beissinger 2000, Ceballos and Ehrlich 2002).

Experts agree that the once-characteristic ecotype of the far north is undergoing an unprecedented and accelerating warming trend (ACIA 2004, Serreze et al 2000, Parkinson and Cavalieri 2002, Comiso 2002a, 2002b, 2003), shifting from arctic to subarctic conditions, in some cases profoundly altering the fundamental biological components that are usually associated with the Arctic realm (e.g. Grebmeier et al. 2006). This consensus confirms what has been known for some time by Native peoples inhabiting this region (e.g. ACIA 2004, WWF *Climate Witness Program* testimony www.panda.org/arctic).

Because of increased global temperatures thought to result from accumulated atmospheric pollution, Arctic sea ice is melting at an unprecedented rate (Meier et al. 2005, NSIDC 2005,

[1] Scientific data are better for some regions/populations than for others. However, remote sensing has allowed more homogenous high quality data to be compiled across the Arctic marine ecosystem; these data include crucial sea-ice habitat data and projections relating to polar bear survival prospects across the entire species range.

Overpeck et al. 2005, Stroeve 2005). Scientists estimate that in just the last three decades, the average annual sea ice extent has decreased by nearly 1.3 million square kilometers or 500,000 square miles (twice the size of Texas), at a rate of about 8-9% per decade (Comiso 2002b, NSIDC 2005). It appears that the warming/ melting trend is accelerating (ACIA 2004, NSIDC 2005). Current predictions in the primary literature are that, by the end of this century, annual temperatures in the Arctic will likely rise by 7 degrees C (13.6 degrees F) over oceans (ACIA 2004) and that summer Arctic sea ice might decline by 50-100% (ACIA 2004, Comiso 2003, Gough and Wolfe 2001, NSIDC 2005, Overpeck et al. 2005).

The latest satellite information from the National Snow and Ice Data Center and NASA indicates that the observed temperature increases and ice declines are not anomalies but signal a new and ominous trend: 2005 marked the fourth consecutive year exhibiting the lowest amount of ice cover in more than a century. Mean temperatures in 2001-2005 were 20% warmer than the average of 1978-2000 and the winter recovery of sea ice in 2004-2005 was the smallest on satellite record. These organizations concluded that Arctic sea ice, home to all polar bears on Earth, "is likely on an accelerating, long-term decline" (NSIDC 2005).

2. Climate Impacts on Polar Bear Prey

Sea ice also is the preferred habitat for polar bears' main prey: ringed and bearded seals (Smith 1980). Polar bears are specialists on these phocid seals, only rarely and opportunistically taking other prey, like walrus, small whales, or other seals (Derocher et al. 2002). Of concern is how accessible prey species will be in an altered sea ice environment. Sea ice is the physical platform from which polar bears hunt; they only rarely capture prey successfully in open water (Furnell and Oolooyuk 1980). The emerging warmer climate regime is likely to negatively impact polar bears both by reducing the duration, thickness, and extent of available hunting habitat (as described above) and also by reducing populations of these two obligate prey species, which, like polar bears, are sensitive to perturbations in the sea ice environment and related changes in primary productivity (Derocher et al. 2004). In illustration of this, changes in ice characteristics have been documented to have a significant negative effect on population size and recruitment of ringed seals and subsequently of polar bears (Stirling 2002).
Thus, predicted and observed changes in its distribution, characteristics, and timing of sea ice certainly have the potential to profoundly and negatively affect the species at the population level (Stirling and Derocher 1993, Derocher et al. 2004).

3. Climate Impacts on Polar Bear Reproduction and Survival

Changes to ice habitats also affect polar bear denning opportunities, ultimately reducing population reproductive success. For pregnant bears that den on land, ice must freeze early enough in the fall to allow them to walk or swim to the coast. As the distance from ice edge to coasts increases, it will become progressively more difficult for them to reach their preferred locations (Derocher et al. 2004). For females that den on multiyear ice rather than stable land, increased drift rates of this habitat could mean longer distances to travel with new cubs to reach the core of their normal home range (Derocher et al. 2004).

Such increased energy expenditure by individual polar bears could result in both lower survival and reproductive rates in the long term (Derocher et al. 2004) by reducing stores of adipose tissue, thereby impacting body condition. Much of the life history of polar bears, particularly reproductive females, is tied to storing large quantities of adipose tissue when hunting conditions are favorable and subsequently using these stores when conditions do not allow for hunting (Ramsay and Stirling 1988), such as during the 4-month fast that occurs in many populations during summer when sea ice is in retreat. The earlier bears are forced to come ashore, the less fat they have been able to store. Adult female polar bears lose approximately 4.71 kg/day during fasts (the rate may be 4-fold higher for pregnant females; Derocher and Stirling 1995). Because females apparently cannot reproduce when they drop below 189 kg, and at current rates of ice decline, it has been calculated that most females in the southerly Hudson Bay population will be unable to reproduce as soon as 2012 (Derocher et al 1992). Compromised females will also likely produce fewer, smaller cubs with lower survival rates (Derocher and Stirling 1996, Derocher and Stirling 1998).

Reduced hunting success as a result of compromised habitat integrity will likely result in reduced fat stores because of the increased energy output associated with traveling on more labile ice or swimming across open water for longer distances when ice retreats (Mauritzen et al 2003). If ice conditions are particularly poor, cub mortality may increase as they are forced to swim greater distances in cold water (Derocher et al 2004). Adult mortality can also result from changes in ice condition, timing, and extent: recently, there have been documented accounts of adult polar bears drowning in the Alaskan Beaufort Sea, presumably while swimming unusually long distances across open water in unusually rough weather (Monnett et al. 2005); the authors suggest that such drowning events may increase in the future, as ice continues to melt. Increased adult mortality has also been observed in recent years on Wrangel Island in the Chukchi Sea, home (with nearby Herald Island) to 80% of the region's breeding female polar bears. In 2002, a year of exceptionally early ice retreat, the Island's resident polar bear biologist reported the highest proportion of skinny bears ever and a very high mortality rate (Ovsyanikov 2003) .

Case Study: Southwestern Hudson Bay Population

In southwestern Hudson Bay, increasing temperatures have already increased the duration of the ice-free period (thus increasing the fast) by approximately 2.5 weeks (Stirling et al. 1999). A recent study of this well-known population, which alone constitutes roughly 5-10% of the total estimated world population, has established, for the first time, a negative population-level effect of climate change on polar bears (Regehr et al. 2005). The study documented that the size of this population had declined from approximately 1200 bears in 1987 to fewer than 950 bears in 2004.

The authors also established a statistical correlation between earlier summer ice break-up and decreased survival for all but prime-aged bears.

Some experts believe that, at the current rate of decline and unless climate change trends and impacts are swiftly reversed, this self-sustaining population of wild polar bears could become extirpated by 2050 (i.e., only 3 polar bear generations from now – using the IUCN-recognized range for polar bear mean generation time of 12-17 years). It is widely recognized, based on sea ice remote sensing and oceanographic monitoring, that similar rapid reductions of sea ice (and hence polar bear feeding and denning opportunities) are probably affecting other populations (such as the Alaska-Russia population), although these have not been as intensely studied as those in southwest Hudson Bay.

4. <u>Threats to Polar Bears Due to Their Life History and Distribution</u>

Polar bears are a classic K-selected species, exhibiting delayed maturation, small litters, and high adult survival rates (Bunnell and Tait 1981). Potential extinction risk for polar bears is heightened because of these characteristic features of their life history, and other traits such as their specialized diet, large body size, long life span, and low genetic diversity (McKinney 1997, Beissinger 2000). Also, because of their long generation time (mean 12-17 years in most regions), polar bears are not well suited to rapid evolution and therefore are unlikely to adapt successfully to the rapidly changing climate and the related effects on habitat and prey. Finally, although polar bears occupy virtually all available sea ice habitats throughout the vast circumpolar Arctic and number between 21,500-25,000 individuals worldwide (the IUCN/SSC Polar Bear Specialist Group recognizes 20 distinct subpopulations), the species is nevertheless vulnerable to the effects of disappearing and/or fragmented habitat because it occupies a range that, with few exceptions, cannot simply expand further north.

5. <u>Other Threats to Polar Bears</u>

The existence of polar bears is further threatened by a number of other factors, many of which are likely to be exacerbated by the effects of climate change.

a. Oil and Gas Development and Transport
Active oil and gas exploration, extraction, and transportation occur throughout the range of the polar bear. Polar bears are sensitive to oiling in the event of a spill (Stirling 1990), and their behaviors can be affected by disturbances related to hydrocarbon development (such as seismic blasting and infrastructure development; Derocher et al. 1998). Currently proposed offshore extraction activities pose the greatest threat to polar bears, especially if a spill occurred near a polar bear denning site (Isaksen et al 1998). Also, spills in frozen or partially frozen Arctic waters are hard to detect and no method has proven effective for clean up in this environment. Finally, should climate warming lead to an open northern shipping route, the threat of a spill would be presented to more northerly polar bear populations, such as Alaska's bears in the Chukchi Sea.

b. Pollutants and Disease

Many persistent organic pollutants, such as heavy metals, radioactive elements, and persistent organic pollutants, can reach high levels in polar bears due to their high fat diet and high trophic position (Norstrom et al 1998). Studies have demonstrated that such chemicals can negatively impact endocrine function (Skaare et al. 2001), immune function (Bernhoft et al 2000), and subsequent reproductive success (Derocher et al. 2003). Immune compromised, not to mention hungry, bears may be more susceptible to disease or parasites. The northern expansion if range of disease organisms and the nearly complete lack of such organisms in polar bears' evolutionary past also make them vulnerable to novel pathogens (Derocher et al. 20004). Finally, environmental pollutants can cause pseudohermaphroditism in female bears, as has been observed in Svalbard (Wiig et al 1998) further reducing population reproductive rates.

c. Increased Aggressive Human-Bear Interactions

It has been predicted that human-bear interactions would increase as a result of climate-induced changes to polar bear habitat (Stirling and Derocher 1993). There is a documented correlation between date of ice break-up in spring and number of "problem" bears reported in some communities (Stirling et al 1999). More bears on land, especially if they are hungry, can lead to more attacks on humans and, correspondingly, more "defense of life and property" killings of bears. Just this year, in a remote village on Russia's Chukotka Peninsula, a young woman was killed by an unusually aggressive bear; this was the third reported bear shooting in Russia this winter.

d. Illegal Harvest of Polar Bears

Harvesting of polar bears has historically been the main threat to the species, but this has been largely mitigated through various management regimes (Prestrud and Stirling 2002). However, in some parts of the bears' range, poaching is still a problem that can have profound effects on population persistence. For example, the unregulated harvest of Chukchi Sea polar bears in Russia appears to be significant and raises concern about the status of this population. Notably, large numbers of polar bear hides have been offered for sale on the internet in Russia. Although it has not been proven that the source of these hides is Chukotka, we do know this population is vulnerable to illegal hunting. Although actual harvest levels are unknown, an estimated 250-300 polar bears were illegally taken on Russia's Chukotka Peninsula in 2002. Experts believe this harvest was at least twice the level experienced in previous years and likely resulted from the large number of bears that were stranded on land by an early ice retreat (Ovsyanikov 2003). A recent population viability analysis indicated that, even at a harvest level of 180 bears/year, there would likely be a 50% reduction in this population (which is shared with the U.S.) size within 18 years (Schliebe 2003).

6. Insufficient Current Protections for Polar Bears Under U.S Legislation.

Currently, polar bears in the U.S. are protected under regulations of the Marine Mammal Protection Act ("MMPA"). The primary focus of this legislation, with respect to polar bears, has been the management and reporting of the limited legal harvest of polar bears by Alaska Natives. The MMPA also sets the conditions for specific activities in polar bear habitats, such as oil and gas exploration, development, and production. The MMPA regulations have led to a marked decline in the harvest of bears in the U.S.; this Act does not address the take from this same population by poachers in Russia, nor does it address habitat loss caused by human-induced climate warming. A "Threatened" listing under ESA corresponds to and would automatically result in the listing of polar bears as "Depleted" under MMPA.

A potential form of additional protection for U.S. polar bears will be the "Agreement on the Conservation and Management of the Alaska-Chukotka Polar Bear Population". This treaty was signed by the governments of the U.S. and Russia in October of 2000, but now awaits the reconciliation and passage of implementing legislation by the U.S. Senate Commerce Committee and the House Resources Committee. Under the terms of the Agreement, an international U.S.-Russia Polar Bear Commission (with both federal and native representatives) will be formed to oversee a polar bear conservation program. The primary focus of this Agreement is the regulation of the limited subsistence hunt (e.g. setting harvest limits), which the group will have the authority to enforce as a matter of law. While the group will also address habitat issues related to oil and gas development, shipping, and other human activities, its role in this regard will be consultative and advisory only and will not carry the force of law. The Agreement will not explicitly address the mitigation of threats related to global warming.

Conclusion

In light of the documented uncertainties in the face of a warming Arctic, in 2005, the IUCN/SSC Polar Bear Specialist Group concluded that the IUCN Red List classification of the polar bear should be upgraded from "Least Concern" to "Vulnerable". These experts based their reclassification on their projection for a 30% overall decline in the size of the total population within the next 35 to 50 years. The principal cause of this decline, according to their own experts, is climatic warming and its consequent negative affects on the sea ice habitat of polar bears.

The weight of scientific evidence supports the contention that polar bears' habitat is fast disappearing and that predicted individual and population level effects are already occurring. According to Derocher et al. (2004):

> "…polar bears are constrained in that the very existence of their habitat is changing and there is limited scope for a northward shift in distribution. Due to the long generation time of polar bears and the current pace of climate warming, we believe it unlikely that polar bears will be able to respond in an evolutionary sense. Given the complexity of the ecosystem dynamics, predictions are uncertain but we conclude that the future persistence of polar bears is tenuous."

Due to the well-documented and accelerating warming of the Arctic and subsequent loss of polar bear habitat, the potential for such changes to negatively impact polar bear reproduction and survival, and the existing gaps in protection under current polar bear management regulations, WWF supports immediate listing of the polar bear as Threatened under the ESA.

Sincerely,

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Lara J. Hansen, Ph.D.
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Enclosures:
CV for Margaret Williams
CV for Lara Hansen
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