Comments to "Proposed Rule to List the Polar Bear (*Ursus maritimus)* as Threatened Throughout its Range. Federal Register, vol. 72, No. 5. Tuesday January 9, 2007".

General comment: The Proposed Rule represents a thorough and clear review of the current knowledge available from both scientific published and unpublished sources, as well as several other sources, of the current status of polar bears. Furthermore, information about various man-made or natural factors that already have affected polar bears - and in the future may further negatively impact on the World's polar bear populations - is presented and evaluated in a fair and balanced way. Based on projections into the future of a continued decrease of Arctic sea ice, scientifically sound studies of the effect on polar bears of an already documented decrease in sea ice, as well as information on polar bear biology and ecology, the Proposed Rule concludes that the reduction of sea ice will lead to a reduction of the polar bear population during the next ca. 45 years, and that this scenario warrants that polar bears be listed in the ESA as "Threatened". In my opinion the evaluation in the Proposed Rule is balanced and sound, and I concur with the conclusion that polar bears are threatened by the reduction in their prime habitat – the Arctic sea ice. I also note that the IUCN's International Polar Bear Specialist Group at its June 2005 meeting on basis of the same type of information and line of arguments unanimously reached a similar conclusion on the fate of polar bears in a warming World.

Specific comments: In addition I have these few, specific comments. They are all minor and do not change my overall evaluation of the Proposed Rule:

(1) p. 1070, 2nd column, line 24: It must be noted that the Canadian Polar Bear Technical Committee at its meeting in February 2007 was informed by scientists of Nunavut (Canada) that the polar bear population of Davis Strait (DS) has been preliminary estimated to ca. 2000 individuals based on 2 years of mark-recapture work (2005, 2006).

(2) p. 1071, 1st column, line 17: The Proposed Rule evaluates the status of the species throughout its entire range. Although the Proposed Rule recognizes that polar bears occur in several more or less discrete populations and that these may be affected at different rates by the reduction of sea ice, the World population is considered. Thus seems to be a fair approach given the fact that it is very likely that the reduction in sea ice and consequent contraction of the range of polar bear populations will lead to changes in distribution and likely "merging" of sub-units into new groups.

(3) p. 1073, 1st column, line 2: Polar bears are transported from East Greenland to Southwest Greenland with the East Greenland pack ice that flows south of Cape Farewell. These bears may end in a "cul de sac" having a long way to the ice covered areas. The way it is stated now indicates that this is a new phenomenon and a result of global warming. However, catch statistics and other information indicates that this is a historical phenomenon (Vibe 1967).

(4) P. 1073, 3rd column, 2nd paragraph: Please, cite the source (Dowsley and Taylor 2006?). Furthermore: During an interview survey of 72 experienced polar bear hunters in Northwest

Greenland in February 2006 it became clear that during the last 10-20 years polar bears have occurred closer to the coast. Several informants were of the opinion that this change in distribution represents an increase in the populations (i.e. Kane Basin and Baffin Bay) although others suggested that it also can be an effect of a decrease in sea ice (Born, E.W., A. Heilmann, L. Kielsen-Holm & K. Laidre. Polar bears and polar bear hunting in Northwest Greenland: An interview survey. Technical report, Greenland Institute of Natural Resources, in prep; in Greenlandic and Danish).

Peer review of petition finding and proposed rule to
list the polar bear as threatened throughout its range

In response to a petition to list polar bears as threatened throughout their range, the U. S. Fish and Wildlife Service (Service) has thoroughly reviewed and appropriately interpreted the scientific literature pertaining to the species and its biotic and abiotic environments. They conclude that polar bears are "threatened by habitat loss and inadequate regulatory mechanisms to address sea ice recession." The petition also called for the designation of critical habitat, but the service concluded that such a designation "will require additional time and evaluation."

The Service accurately summarized the observed and predicted reductions in Arctic sea ice and demonstrated the significant impact those reductions are having and will continue to have on polar bear populations. The importance of sea ice to polar bears, however, is not as well articulated as it might be.

Sea ice is said to be the "primary habitat" (FR 72(5), p.1067) and a "platform" on which they depend "for a number of purposes." While those purposes are listed, the consequences of polar bears using the land as an alternative "platform" could be better developed. The petition finding also states that "polar bears are believed to be completely dependent on Arctic sea ice for survival," cites two unavailable manuscripts, and then lists again the activities bears conduct on sea ice (p. 1071). It is overwhelmingly tempting, however, for naïve readers to assume that, since some populations spend most of their time ashore, land is a suitable alternative habitat. Consistent with that notion, the finding states that "in some locations," bears may switch to using land for 75% of the year as they do in Western Hudson Bay (p. 1079). The discussion continues by questioning how successful that strategy has been, but the sequence of arguments distracts from the essential point that polar bears recently diverged from brown bears as specialists in exploiting the sea ice habitat and its abundant seal populations. Thus, being forced to re-adapt to a terrestrial environment will require polar bears to give up a successful niche and compete with brown bears and other large predators in another niche. Along the same lines, the finding gives deference to the suggestion by "other polar bear biologists" that a "small number of polar bears would survive" even in the complete absence of sea ice. That point might be relevant if the petition sought to find polar bears **endangered**, but a loss of habitat reducing the population to a small number of survivors almost defines a **threatened** status. While the finding, indeed, concludes that polar bears are threatened, a greater effort might be made to help the reader understand the critical differences between factors leading to reduced population viability and to actual extinction.

The finding also would be strengthened by a sharper focus on the importance of rates of environmental change relative to generation time and the potential impact on the species' persistence. The finding points out that polar bears have survived two previous warmings and that previous climate shifts "were rapid." It should be pointed out, however, that the greenhouse gas forcing currently warming the earth is unprecedented in the history of polar bears as a species and, indeed, for at least 100,000 years before they evolved (Petit et al. 1999). Furthermore, the most recent observational evidence indicates that summer sea ice is decreasing in the Arctic substantially faster than the most extreme predictions by climate models used by the IPCC (Stroeve et al. 2007). Thus, the sea ice niche exploited by polar bears is likely to be absent during summer in a few decades. Such a drastic change in habitat over a period so

short in contrast to the generation time of polar bears, suggests it is highly unlikely that the populations will show significant adaptation to the changed conditions.

The finding points out that, as the climate changes, threats to polar bears include mismatches between the denning period and the seasonal timing of ice movements and snow accumulation (p. 1067). It might be useful to point out that such matches and mismatches between life history events and environmental conditions are increasingly understood as important in the responses of many species to climate change (Stenseth and Mysterud 2002; Stenseth et al. 2002; Walther et al. 2002).

The finding summarizes recent observations of polar deaths due to starvation, cannibalization, and drowning. While the observed instances are few, they are unusual and suggestive of responses to diminishing habitat. The finding also points out that a recently documented case of hybridization in the wild. It should be pointed out that such introgression has contributed significantly to previous extinctions (Rhymer and Simberloff 1996) and might well further threaten polar bears as they are increasingly confined to habitats overlapping with brown bears.

The consideration of intraspecific predation (p. 1085) includes the suggestion that "population regulation" is a "reason" for such predation. That statement should be dropped as the idea of individuals decreasing their individual fitness to control populations was long ago discredited.

The apparent shift toward more frequent use of coastal areas for denning in the Southern Beaufort Sea also seems important, but the statement that "high numbers of bears were found to be using coastal areas during some years" (p. 1073) seems weak. What is meant by "high numbers"? Which years? Similarly, in the same paragraph, a more specific statement should replace "a significant relationship between the mean distance from the coast to the edge of pack ice and the numbers of bears observed on the coast."

The importance of snow cover to successful reproduction by polar bears and their primary prey, ringed seals, should receive greater emphasis as, at least in the case of the seals, it likely will negatively impact populations even sooner than will reductions in the extent of sea ice (Kelly 2001; Kelly et al. 2006).

The finding points out that the tropic structure of Arctic seas is likely to change as a consequence of climate change, and an expected decrease in Arctic cod is outlined. That discussion also should point out the importance of Arctic cod in the ringed seal's diet (Bradstreet 1982; Welch et al. 1992; Weslawski et al. 1994).

With respect to ringed seal ecology and the likely impacts of climate change, the finding can be strengthened in a few areas. The statement that "ringed seals in many areas prefer stable, shore-fast ice for construction of birth lairs" (p. 1074) should be omitted. The often repeated assertion that seals favor shore fast ice dates back to pioneering work in the 1950s but, in fact, is not based on any compelling data. In absolute terms, the greatest numbers of ringed seals likely breed in the more extensive pack ice (Kelly 1988).

On p. 1075, it is suggested that reductions in sea ice may "alter ringed seal distribution, abundance, and availability for polar bears." As mentioned above, the advancing date of snow melts is exposing seal pups prematurely to predation. In the short term, that may increase their availability to bears and other predators but, in the long term, it will make seals less abundant. The suggestion that ringed seal distributions might change in response to climate change is more complicated. Recent results from telemetric and genetic studies indicate a high degree of fidelity to breeding sites by ringed seals (Kelly 2006). If that fidelity proves to reflect true philopatry, it suggests a high degree of population structuring and vulnerability to local extinctions. It also should be noted that finely structured populations with minimal gene flow would require revisiting the idea that industrial activities have "not caused serious cumulative effects to ringed seals" (p. 1079).

Overall, the finding presents strong evidence that polar bears depend on sea ice, their numbers likely will decrease as the ice (and snow cover) diminish, and the Service lacks regulatory mechanisms to ameliorate that habitat loss. As such, the Service is obliged to list polar bears as threatened.

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Re: the Federal Register Part II, Department of the Interior, Fish and Wildlife Service, 50 CFR Part 17: Volume 72, No. 5/ Tuesday, January 9, 2007, Pages 1064-1099.

To Whom It May Concern:

I have reviewed the Federal Register Part II, Department of the Interior, Fish and Wildlife Service, 50 CFR Part 17: Volume 72, No. 5/ Tuesday, January 9, 2007, Pages 1064-1099.

I have read the above document provided to me and I have reviewed it to assess if the proposed rule was based on scientifically sound data, assumptions, and analyses.
Following my review of the above document, I found that the information used was based on scientifically sound data. Further, the document makes logical and reasonable assumptions based on the available scientific literature. The analyses undertaken in the document rely on logical developments from the primary scientific literature and are logical and reasonable conclusions. I have no significant comments or deviations from the findings as outlined by the above document. The material is factual and well supported by the scientific literature. The background material on the ecology of polar bears (*Ursus maritimus*) represents a solid overview of the ecology of the species relevant to the issue of population status.

The Federal Register document assesses the current state-of-knowledge for polar bears in a thorough and considered manner. I find no errors of interpretation and the conclusions reached are logical based on our understanding of the ecology of polar bears. The assessments of the Factors A-E are covered in a factual and objective manner. The conclusion from Factor A "Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range" that polar bears are threatened by habitat loss and inadequate regulatory mechanisms to address sea ice recession concurs with my professional opinion on the conservation status of the species. The timeframe of the assessment (45 years) was deemed appropriate and meaningful for this species.

I believe that, in contrast to the findings under Factor B, there is cause for concern about ongoing management of polar bears in Nunavut relative to non-sustainable take in several populations. The status of the M'Clintock Channel population would likely warrant a higher status than threatened given the large decline in the population from historic levels. The statement that this population is increasing is currently unsubstantiated by scientific data and is based on population projections using demographic data that may or may not be appropriate. The low harvest level in the M'Clintock population may allow population recovery although adequate monitoring is not in place to ensure

recovery. The status of other populations (Kane Basin, Baffin Bay, Lancaster Sound and Western Hudson Bay) require attention to reduce harvest to sustainable levels. Issues pertaining to the harvest issues of the above stated populations does not materially alter the primary finding of the Federal Register document being assessed.

It is a notable issue, and one I will reiterate, that harvest of polar bears by local people is a right that was defined under the 1973 International Agreement on the Conservation of Polar Bears. There are only a few populations of the 19 populations of polar bears worldwide, where excessive harvest issues need to be addressed. In populations where polar bear numbers are substantive and where sustainable harvest could be maintained, it would assist management and meet the intention of the International Agreement if the finding under the Endangered Species Act could permit continued harvest, including sport hunting by U.S. citizens, and importation of sport-harvested animals into the U.S. The economic importance of this species to northern communities is fundamental to the long-term management of these populations. Maintaining the economic incentives associated with careful and sustainable harvesting is beneficial in some jurisdictions for maintenance of research and monitoring programs. I will reiterate that such exemptions should only be permitted when there is clear compliance with the International Agreement (1973) and where the best-available scientific data is used to ensure that the harvest is sustainable. It would be beneficial to monitor harvest levels closely as habitat loss issues arise in the various populations.

Sincerely yours,

Review of the 12-Month Petition Finding and Proposed Rule to List the Polar Bear as Threatened Throughout Its Range, Federal Register, Vol. 72, No 5 dated Tuesday, January 9, 2007.

General comments

, I have primarily focused on the discussion of observed and projected changes in Arctic sea ice in the document. Specific comments on this are discussed below. Overall, I found that the information in the assessment was clearly and concisely presented. I think that some discussion of (and references to) the IPCC fourth assessment report (IPCC-AR4), which is being published this year, should be given. This report discusses results from the most up-to-date climate models, some of which have considerably improved in their Arctic simulations from the older models discussed in the IPCC third assessment report (IPCC-TAR) and ACIA reports. I have noted some of the papers that discuss results from the IPCC-AR4 models below. In general, the discussion of sea ice change is accurate and complete.

Specific comments

P1071, middle column, last paragraph: "The NSIDC reported that the amount of sea ice in 2006 was the second lowest on record ..."

It should be mentioned which month this was for. The September minimum?

P1071, third column, last paragraph: "Observations have likewise shown a thinning of the Arctic sea ice of 32 percent or more"

It is worth noting that there are some issues regarding the temporal and spatial sampling of ice thickness data used in the Rothrock et al., 1999 study (as noted by Holloway and Sou, 2002) but that later work reveals that observations and models show a consistent picture of a thinning Arctic sea ice, although some uncertainty in the magnitude and spatial pattern of the change remains (Rothrock et al., 2003).

P1072, 1st column under "Projected Changes in Sea Ice Cover", 1st paragraph

The latest IPCC assessment report (IPCC-AR4, see www.ipcc.ch) should also be referenced here (and elsewhere in the document when discussing sea ice projections). This report discusses more up-to-date climate models, which have some considerable improvements over the older models used in previous IPCC and ACIA reports. The papers of Arzel et al., 2006 and Zhang and Walsh, 2006 discuss the sea ice results from these models and should be referenced here in addition to the Johannessen paper. While the rate of future ice retreat varies among these models, they all show a decrease and thinning of the sea ice cover in the 21st century and about 50% of the models reach ice-free September conditions by 2100 (Arzel et al., 2006). It should perhaps be noted that the models project decreased ice cover in all months in the Arctic, but that (as has been observed) the projected changes in the 21st century are largest in summer. This is also relevant to the discussion of winter sea ice projections on the 1st paragraph of p1076.

Also of note, a recent study by Stroeve et al. (in press) has compared the observed September Arctic ice cover from 1953-2006 to the 20th century simulations from these models (which are forced with observationally based changes in greenhouse gas concentrations, volcanic activity and solar variability). This comparison shows that all of the 18 IPCC-AR4 models analyzed have a decrease in September ice cover that is smaller than observed. Over the more reliable 1979-2006 satellite record,

only 2 models are consistent with the observed September ice loss and the remaining 16 models have a considerably smaller rate of ice retreat than observed. This suggests that the models may actually be conservative in their projections of future ice loss.

It should also be clarified here, that the NSIDC cautioned that the Arctic will be ice-free **in September** by 2060 if current warming trends continue.

P1072, 3rd column under "Increased Polar Bear Movements"
"Currently, ice thickness is diminishing and there is increased transport of multi-year ice from the polar region."
I would question this statement. Historically (from 1975 or so), there is some strong evidence that the ice thickness decreased and some indications that this was in part caused by an increased export of multi-year ice. However, we do not know if this is happening "currently", especially with regards to the increased export of multi-year ice. As the climate warms, and less multi-year ice is present, we expect to see a decrease in the export of multi-year ice (e.g. Holland et al., 2006). There are indications though that as sea ice thins with a warming climate, the speed of the ice could increase.

P1077, last paragraph
"The most recent study based on updated modeling…"
This Holland et al (2006) study is based on updated modeling (compared to the IPCC-TAR and ACIA reports) and primarily discusses results from one model that submitted simulations to the IPCC-AR4. Other models that participated in the IPCC-AR4 should also be mentioned here. Of these, about 50% reach ice-free summers by 2100 (Arzel et al., 2006). As discussed by Stroeve et al. (in press), based on a comparison to observations over the historical record, these models may actually represent a conservative rate of ice retreat since they all simulate smaller September ice loss than observed (for the 1953-2006 time period).

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Review of: Proposed Rule To List the Polar Bear (Ursus maritimus) as Threatened Throughout Its Range by the United States Department of Interior

Overview:

Overall, this is a well-written and thorough assessment of the literature on the biology, life history, and ecology of polar bears and the possible effects in the "foreseeable future, of a variety of possible factors that may influence individual animals, specific populations, and polar bears as a species throughout the circumpolar Arctic. In particular, the assessment of ways in which the forecasts of continued climate warming in the Arctic is likely to affect sea ice, and consequently polar bears, is both careful and thorough. In my view, given what we know about polar bear ecology as well as about both climate warming and loss of ice in the Arctic to date, it is almost certain that polar bears as a species will be threatened throughout all or most of their range in 45 years, if the projections of the IPCC for continued climate warming are correct. At the same time, there is also general agreement among polar bear scientists that polar bears as a species are not threatened as a species today, although there are problems of various sorts in some individual populations. Thus, if it is decided to list polar bears as threatened within the foreseeable future under the US Endangered Species Act, part of the response plan should include measures to ensure not losing the benefits of existing conservation programs in other countries.

Specific Comments:

p. 1068: The reference to Watts and Stirling 1988 is incorrect. There are no publications authored by Watts and Stirling. It should probably be: Watts, P. D. and S. E. Hansen. 1987. Cyclic starvation as a reproductive strategy in the polar bear. Symp. Zool. Soc. London 57:305–318.

p. 1070: The populations of polar bears in Viscount Melville Sound and M'Clintock Channel were both severely depleted by overhunting. The statement is made in the assessment that these populations are now increasing. In fact, it is not possible to know if that statement is correct or not because there are no data on which to determine the trend of either of these populations. They are being "managed for increase" which means that on the basis of computer modeling, harvest levels have been set by the Government of Nunavut which they feel will allow the populations to increase. Thus, it is only correct to say that they are being managed in this fashion. Meanwhile, the actual trend (increasing, decreasing, or stable) is unknown.

Similarly, on the basis of a computer simulation, it is projected that the population in Norwegian Bay is declining. However, there are no firm data with which to evaluate whether that is correct or not.

Comment on trend: Unless there is some form of monitoring, or estimates of population size at different periods through time, it is simply not possible to say what trend is. In the absence of definitive data, one can state what the trend is suspected to be and, to a large degree, that is what is done for things such as the IUCN Polar Bear Specialist Group Status Table. Thus, for most populations, unless there are data from at least two time periods, and the second is relatively recent, it is probably more accurate to say something along the lines that trend is unconfirmed but thought to be stable, increasing, or decreasing. In general, in this discussion of population size and trend, it would probably be relevant to include the date of each estimate as these vary significantly. The dates of the last assessments are

given in Table 2 but it would be helpful to repeat them in the discussion as they provide the reader with a sense of how reliable the estimates may be, especially relative to trends in other factors, such as climate warming and changes in sea ice.

The statement is made that the Foxe Basin population "comprises" 2,197 bears. It would be more accurate to say that the population was estimated to number 2,197 in 1994. Trend is unknown but projected by the Government of Nunavut to be stable. The date of breakup of the sea ice is significantly earlier in that area than it was 30 years ago but whether or not that is having an influence on the population is unknown. Similarly, for the North Beaufort, the estimate was 1200 but was made in 1988 and, while it has been managed as stable, actual trend is not known. Hopefully, there an analysis of data collected on this population from 2003-2006 will be completed in time for the final assessment for the listing process.

The new information (2006) on Davis Strait gives a preliminary estimate of roughly 2100-2200. FWS staff are aware of this and this information will likely be included in the final listing assessment. The present trend is unknown but everyone is in agreement that the present estimate is an increase from levels that prevailed through the late 1970s or early 1980s.

New information for southern Hudson Bay (Obbard et al. 2006) confirms that weights of polar bears from Southern Hudson Bay have declined and there is strong evidence of a significant trend towards both later freeze-up and earlier break-up (Gough et al. 2004, Gagnon and Gough 2005). Obbard et al. (2006) go on to report a non-significant negative correlation between their body condition index (BCI) value and date (as Julian day) of break-up or duration of ice cover in the previous winter. Thus, they speculate that other factors (such as those affecting ringed seals) may be having an effect as well as changes in ice duration and breakup time. While obviously other factors may be involved, I suspect that the present non-significant trend in the relationship between BCI and breakup or ice duration is more likely simply reflects that the data set is not yet long enough. In time, the relationship will become significant if the climate continues to warm. The trends documented in SH appear very similar to those documented over time in WH but just a decade or so later because of the timing of breakup occurs later in SH.

p. 1071. Laidre et al. cited as "in prep" is now in press. The citation is given below in the references.

p. 1072. More recent projections about possible effects of climate warming on polar bears in specific polar bear populations are included in Stirling and Parkinson (2006), including the statistically significant decline in the average weights of lone and suspected pregnant adult female polar bears.

p. 1073. Reference is made to people on the eastern coast of Baffin Island, Nunavut, experiencing more encounters with polar bears and seeing bears in areas where they had not seen them before. Is there a reference for these comments?

p. 1074. It is stated that Ferguson et al. (2005) "demonstrated" … . That should be corrected to "speculated". A bit lower in the same para, a better reference than Ferguson et al. 2005, p. 131 with respect to an inverse relationship between the thickness of snow over a birth lair and the probability of it being successfully predated is Hammill and Smith (1989).

p. 1075-76. Reference is made to an approximate prediction made by Derocher and Stirling (1995) that females would have lost enough weight to have cease cub production by 2012. Judging from the rate of decline of lone (and suspected pregnant) females in the fall reported by Stirling and Parkinson (2006) the date of 2012 is probably premature. However, the trend of continuing loss of weight by adult female polar bears in the fall is clear and continuing so the production of cubs will probably be negligible within the next 15-25 years.

p. 1082. It is noted that Greenland instituted a quota in 2006. While that is correct, the quotas were not based on any scientific information. For example, the quota (100) for west Greenland, which mainly comes from the Baffin Bay population, was not estimated in relation to the estimated population size in 1997 of 2100 (Taylor et al. 2005), the projected sustainable harvest of 88, or the ongoing harvest by Inuit from Nunavut. At the same time, the quota for the polar bear harvest for Baffin Bay in Nunavut was 105 (making a total of 205, well over the projected sustainable level in 1997). The status report of the IUCN polar bear specialist group in 2006 concluded the Baffin Bay population was declining. However, at the same time, it was reported by Nunavut that people were encountering more bears in settlements and hunting camps, leaving open the possible interpretation that bears were losing condition as a result of earlier breakup of the sea ice (Stirling and Parkinson 2006). All aspects of what is happening with population trend and condition are unresolved at present. Thus, the apparent implication in that section, that things may be alright now because there is a quota is not correct. Enforcement of quotas in Greenland is also thought to be a problem.

p. 1086: The Polar Bear Agreement was ratified in 1976, not 1978.

p. 1089. (column 3) Reference is made to 12 Canadian populations. It should be 13 populations, 3 of which are shared with Greenland and one with Alaska. The offshore marine areas along the coast of Newfoundland and Labrador are under Federal, not NWT (or Nunavut) jurisdiction.

p. 1090. (column 1, near the end of the last para). As well as residents of Quebec and Ontario, management agreements within Nunavut are not binding on residents of Manitoba or Newfoundland and Labrador, both of which also share populations with Nunavut.
Another recent concern with respect to the signed management agreements between the Government of Nunavut and the user groups is the suggestion that those agreements may not actually be legally binding on the users, which is contrary to what was previously thought. This detail should probably be confirmed one way or the other before it is stated in this review.

p. 1091 (column 3, para 1). It is not correct that the Greenland Home Rule Government signed an agreement with the Government of Nunavut concerning management of shared polar bear populations. Only one preliminary meeting between Canada (with the participation of Nunavut) and the Greenland Home Rule Government has taken place.

p. 1092. (column 1). The statement is made that it is not known whether polar bears would avoid oil spills. That is correct. However, it is also generally known that polar bears are attracted to various refined hydrocarbon products and may consume them, which probably results in their death. Under

some circumstances, it has also been documented that polar bears are attracted to offshore drilling platforms (Stirling 1988).

p. 1094 (column 2). From my own subjective observations of ecotourism in both the Churchill area and Svalbard, I think it is unlikely that properly regulated ecotourism will have a negative effect on polar bear populations, although some individual bears may be displaced or have minor behavioral modifications caused by the presence of humans or their vehicles. Conversely, the dramatic increase in the world-wide constituency of people with an interest in polar bears and their conservation, as a consequence of ecotourism, is probably a reason to encourage further development of this activity.

p. 1095 (column 3). The statement that the polar bear population is not in danger of extinction throughout all or a substantial portion of its range today is correct. It is noted earlier in the review that there are no subspecies of polar bears so they should be considered one population. However, as a result of more than 30 years of research, 19 different subpopulations of polar bears are presently recognized throughout the circumpolar Arctic. Polar bears in different kinds of habitats, such as the polar basin from the western Beaufort and Chukchi seas to East Greenland, the seasonally ice-free areas of Hudson Bay/Foxe Basin/Davis Strait/Baffin Bay, or the northern Canadian Arctic Archipelago, are likely to be affected differently and on different time frames, although if the climate continues to warm, ultimately, all will probably be negatively affected. It may be important to recognize these as it could influence how a final determination might be written.

While there are some populations that are not doing as well as others, because of overharvest, environmental factors, or both, the global population is not threatened and, with the exception of anthropogenic climate warming, it would be possible to mitigate the negative effects of most other human activities fairly promptly through legal mechanisms in countries that have polar bears. At present, for example, the USFWS allows the importation of polar bear trophies from Canada from populations that have been reviewed, meet specified conditions, and are classified as "approved" (as described earlier in this listing review). The desire of aboriginal hunters in some areas of Canada to have their populations classified as "approved" has had a strongly positive effect on the conduct of scientific research and the implementation of appropriate conservation measures. Some of this benefit to the conservation of polar bears in Canada might be lost if it was no longer legal to import trophies legally taken by guided US hunters back into the United States.

Other factors: I concur that, at the present time, factors such as hunting, disease or predation, industrial development, shipping, scientific studies, or contaminants do not constitute a threat to polar bears as a species over all or a significant portion of their range. This does not imply that there are not significant problems related to one or more such threats in some individual populations, because there are. Any or all of these other factors could be important in the future.

Projections of increased global temperature and continued loss of sea ice: The crux of the argument for listing is that, as a consequence of loss of sea ice because of climate warming, enough critical habitat for polar bears will be lost to result in the species being threatened thoughout all or most of its range in 45 years. Overall, I agree with that projection. I think one of the most important points to note in this context is that the most recent assessment of the IPCC predicts that the climate is likely to

continue to warm for the next 50-100 years, even if anthropogenic greenhouse gas production is reduced. While there is variation in the amount of warming predicted, or where warming will be greatest, none of the models used predict stability at present levels or cooling in the foreseeable future. This is an important point that should be made in the assessment. Similarly, the projections are in agreement that the total amount of sea ice, and its thickness, will both decline, though the time frames and extent differ. I think in some cases, there has been some confusion, especially in media reports, of what the term "an ice-free Arctic" means, and by when. As I understand it, most ice scientists at present are talking about being ice-free (or nearly so) in summer only. These points will likely be brought up by the reviewers with that expertise but I think the eventual listing document should probably note the likelihood of a refugium, even in summer, for a variable period of time (although that does not change the projection of being endangered throughout most or all of their range in 45 years). Similarly, although there seems to be a strong amount of agreement on the direction of the trend in abundance and thickness of sea ice, there are still some uncertainties about timing and other factors (e.g., see Serreze et al. 2007). Recent studies such as those by Holland et al. (2006) and Dumas et al. (2006) suggest that although there is likely to be little sea ice remaining in the Arctic in summer in 45 years or more, the last refugium is likely to be in the northern Canadian arctic islands and northern Greenland.

Adaptation: The suggestion has been made by some scientists and journalists that somehow polar bears will simply "adapt" or "move north when conditions there improve there as a result of a warming climate'. An even more nefarious hint underlying such media statements is that somehow climate warming is going to be good for polar bears. While superficially attractive, such suggestions are not supportable with the available scientific evidence. Although aspects of that conclusion are discussed in places in the listing document, it would be appropriate to address that shortcoming specifically and clearly as a specific topic in the final assessment.

Polar bears have been documented successfully predating a wide range of prey species (marine mammals, birds, occasional ungulates), eating berries and other vegetation, as well as scavenging, and will likely continue to do so. However, whether these alternate prey species and plants are capable of migrating, surviving, and becoming abundant further north than their present distributions, in such short period of time, is presently unknown but may not be likely. More importantly however, there are no data that even begin to suggest that an increased use of alternate prey species might substitute for the enormous number of calories required to sustain an estimated population of 20-25,000 polar bears, that are presently provided principally by ringed seals and, to a lesser degree other species. Similarly, there are no data that suggest possible prey species would continue to be sufficiently abundant in an Arctic with greatly reduced sea ice to sustain more than a remnant population in a possible northern refugium. In fact, ringed seals, the most important single prey species, are likely to be similarly reduced in total numbers by loss of sea ice and snow cover in spring. Although it is well known that some polar bears eat berries and other terrestrial vegetation when available, from stable isotope analyses, they do not appear to receive any significant long-term nutritional benefit. Similarly, the relatively small size of terrestrial black bears in northern Labrador or brown bears along the northern arctic coast, compared to more southerly areas of North America or the west coast of Alaska respectively, where terrestrial food and fish are considerably more abundant than they are in the Arctic, suggest that evolving to a more

terrestrial environment does not offer a viable alternative to the morphologically large, marine-dependent, polar bears.

Some comments along these lines are made on p. 1074 but the subject is important enough to warrant its own section and full evaluation.

Summary: In conclusion, while it is possible and maybe even likely, that a small population of polar bears may persist in the area where the last sea ice is presently projected to persist, it is extremely unlikely the total number would be more than a fraction of the current circumpolar population. Thus, to conclude, the projection that ultimately, as a consequence of continued climate warming and loss of sea ice, polar bears would be endangered throughout all or most of their range is almost certainly correct in my judgement.

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Peer Review Comments on *50 CFR Part 17*, Listing of Polar Bears as Threatened

. I have read the Proposed Rule and concur with the Finding and Status Evaluation with respect to Risk Factor A, threatened modification of habitat or range. This modification consists of loss of sea ice cover and earlier summer snow melt within the foreseeable future, defined as 45 years. In reviewing the sections on Overview of Arctic Sea Ice Change and Observed and Projected Changes in Arctic Sea Ice, I find the information accurate and clear.

There is, however, a new information resource that strengthens the case for Threatened under Risk Factor A. That resource is the results of the Fourth Assessment Report of the International Panel on Climate Change (IPCC AR4), which is currently coming to completion. In contrast to the Third Report, results from over 20 climate models were made available to the science community for independent evaluation. Both the spatial resolution and physics of the climate models have improved, e.g. less or no reliance on prescribed ocean conditions, mobile sea ice, clouds/radiation, and land/atmosphere exchanges. For projected changes, the Proposed Rule now relies primarily on the ACIA document, based in turn on the Third IPCC Report which is out of date. While the conclusions of both the Third and Fourth Reports are similar with respect to the Arctic, the confidence level associated with independent reviews of the Fourth Report models is greater. Evaluation of the IPCC AR4 models supports the conclusion of greater than 50% sea ice loss during summer by 2050 in the Beaufort, Laptev, Chukchi, and East Siberian Seas. Further, temperature increases of 3°C by 2050 suggest early snowmelt, impacting the dens of ring seals.

The evaluation of the IPCC AR4 models is on-going both for how well they represent conditions in the 20th century and comparison of results for the 21st century (Zhang and Walsh 2006[ZW], Arzel et al. 2006[A], Stroeve et al. 2006[S], Holland et al. 2006[H], Wang et al. 2007[W]). Past studies indicate that one method to increase confidence in possible future climate projections is to constrain the number of models by validating their simulations against observations (Knutti et al. 2006). This appears true for projections of Arctic sea ice (ZW, A). Therefore the large range of IPCC AR4 Arctic summer ice projections from all the models, from total loss by 2020 to little loss by 2100, is probably too broad. The idea here is to create a short list by removing outlier model projections based on their performance compared to 20th century data. My group has done this for temperatures [W] and sea ice, Stroeve (S) for sea ice, and Walsh and Chapman (personal communication 2007) for temperature, sea level pressure and precipitation. For example the FGOALS1.0 model has values well out of range and the GISS model underestimates the range of natural variability (W).

For this peer review we have calculated the future reduction in September sea ice area south of 80°N for the Beaufort Sea based on the subset of models that match sea ice coverage for 1979-1999 to within 20 %. Of these ten remaining models, seven show an area loss of 50 % or greater by 2050 (Figure 1). The NCAR model studied by (H) is model 2 that projects near complete ice loss by 2040-2060. Since sea ice is thinner on the Siberian side, the losses there are greater. This conclusion contrasts with earlier model results in which the projected major ice loss is closer to the end of the century.

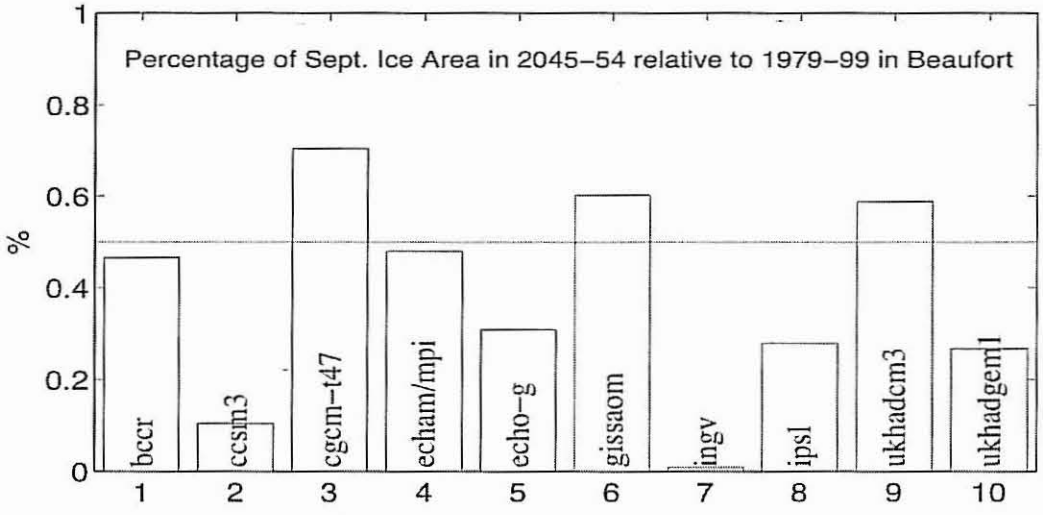

Figure 1. Fractional reduction of Beaufort Sea ice area in September by 2050 from ten IPCC AR4 climate models.

We have also projected Arctic land temperatures north of 60°N for the 12 models identified in (W) out to 2050. The average from the reduced set of models is an increase in surface temperatures of 3°C, which will have a major impact on snow melt timing. The range of model projections is 2-4 °C, which is an estimate of the range of uncertainly in scientists' ability to model Arctic climate.

What is the credibility of these models overall? The models have known physics in connecting increases in greenhouse gases to temperature increases through radiation processes (Overland and Wang 2007). Increases in greenhouse gases have lag effect on climate with impacts beyond the following 30 years. Thus the influence of greenhouse gases projected for the next 40 years are based on known amounts of CO2. It will only be after 2050 that climate feedback, ocean uptake, or policy changes could contribute major uncertainty to the greenhouse gas projections.

A final comment on natural variability. The Arctic has one of the largest ranges of decadal and regional variability on the planet. The recent warm temperatures over the last 10 years in Alaska have a natural variability component. On a regional basis it will be difficult to predict the extent of sea ice loss over the next 20 years. However, the basic physics of ice loss after that time, i.e. ice albedo feedback from increasingly open water areas, is a process that is included the current IPCC models, even if some of the regional differences caused by changing decadal climate patterns (Arctic Oscillation, Pacific North American Pattern) are not modeled well.

Thus there is considerable confidence in the results of Figure 1 of greater than 50 % loss of sea ice area north of Alaska by 2050, as shown by 7 of 10 of the quality controlled IPCC AR4 climate models. Warmer temperatures will have a major impact with early snow melt.

References:

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REVIEW OF PROPOSED RULE TO LIST POLAR BEARS AS THREATENED

Dear Scott Schliebe,

I refer to your letter dated 29 January 2007 regarding the proposed rule to list polar bears as threatened.

I have reviewed the documentation. Overall I find it clear and concise and I agree in the overall conclusion that polar bears are threatened by habitat loss and inadequate regulatory mechanisms to address sea ice recession. I do not find any major flaws in the information presented and discussed and I think you have presented the state of knowledge in a reasonable way.

I have the following detailed comments to the different parts.

1. Distribution and Movements
    1. P 1066, last paragraph: It is not correct to state that the Barents Sea population remains on land "for protracted periods of time…". It is only parts of the population that remain on land. A more correct description is that given under the heading Polar Bear-Sea Ice Habitat Relationships P 1067.

2. Summary of Factors Affecting the Polar Bear
    1. I agree that 45 years = three generations is an adequate measure for "foreseeable future".
    2. P 1073, first column: Bears are entrapped on unsuitable habitat in Southwest Greenland as a result of the general drift pattern of the sea ice in the area. This is not a result of climate change. However, increased frequency of such events might be the result of climate change, as stated in the text.
    3. P 1074, third column: Note correct spelling of Øritsland.
    4. P 1081, second column: I agree in the conclusion that polar bear populations are threatened by ongoing and projected changes in their sea ice habitat.
    5. Page 1083, third para: It should be clearly expressed that many members of the PBSG are sceptical to the quota increase in Nunavut based on traditional knowledge only. Even in WH the hunting quota was increased based on traditional knowledge while scientific data shows a 22 % decrease in population size during the last 17 years. It should be noted that a resolution agreed upon by the 2005 meeting of the PBSG recommended that: " polar bear harvest can be increased on the basis of local and traditional knowledge only if supported by scientifically collected information".
    6. Page 1085, second column: I agree in the conclusion that overutilization as a single factor does not threaten the species throughout all or a significant portion of its range. However, it should be added that single populations might be depleted by too high hunting quotas if the quotas are not based on scientific knowledge. Article II of the International Agreement states that Each Contracting Party "…shall manage polar bear

populations in accordance with sound conservation practices based on the best available scientific data."

7. P 1086, first column: I agree that disease and predation as a single factor does not threaten the species throughout all or a significant portion of its range.
8. P 1090, first column: Scientists from Norway has not participated in PBTC meetings after 1987.
9. P 1090, second column: It should be clearly expressed that the decision of Nunavut, Canada, to base their management more on traditional knowledge than on scientific data does not comply with the International Agreement Artcle II.
10. P 1091, third column, Conclusion Factor D: I agree in the conclusion. However it should be noted that the decision of Nunavut, Canada, to base their management more on traditional knowledge than on scientific data does not comply with the International Agreement Article II.
11. P 1093, line 13: Andersen not Anderson. P 1093, second column: Derocher et al. 2003 concluded: "The impacts of contaminants on the Svalbard polar bear population are inconclusive but there are suggestions of contaminant-related population level effects that could have resulted from reproductive impairment of females, lower survival rates of cubs, or increased mortality of reproductive females." So there are some suggestions of population level effects of POPs on polar bear populations.
12. P 1094, second column, Conclusion factor E: I agree in the conclusion that contaminants, ecotourism and shipping as singular factors do not threaten the species throughout all or a significant portion of its range.

I thank you for letting me review the document.

Yours sincerely

Ok, here are my thoughts on the proposed rule. I focused on section A since that's my area of expertise.

1) Clarity of information I think there is a lot of redundancy in the proposed rule that should be eliminated. This is particularly true for Section A and the sections prior to section A (which are repeated again in section A).

2) Completeness of Information
-We can update some of the discussion on sea ice decline and future predictions with a recent study by Stroeve et al., 2007 (GRL) which discusses how the IPCC climate model simulations of Arctic sea ice compare with the observations. Results from this study show that Arctic ice retreat is happening more quickly than any of the IPCC models have indicated. This suggests that current model projections may in fact provide a conservative estimate of future Arctic change, and that the summer Arctic sea ice may disappear considerably earlier than IPCC projections.
-Since 45 years is the "foreseable future" for the polar bears, the Stroeve et al., (2007) study suggest the Arctic could be seasonally free of sea ice earlier than the IPCC projected range of 2050 to well beyond 2100, the bears are likely going to face huge changes in their sea ice habitat earlier than 45 years from now.
-Recommend updating ACIA 2005 and IPCC 2001 references with the latest IPCC report.

3) Accuracy of Information
-in the summary, I don't quite understand the statement that "Critical habitat for the polar bear is not determinable at this time". I see on page 1096 there is discussion as to why the critical habitat cannot yet be determined. It seems to me at this time, sea ice is the critical habitat as it provides the means for access to food for the bears and the source of food for the bears (i.e. the seals). But this habitat is shrinking rapidly, and then the critical habitat may become land areas. It seems there are a number of studies\that show the dependence of the bears on sea ice, and thus, I would argue sea ice is a critical habitat for the bears.
-I'm concerned about the studies that show too much sea ice may also lead to declines in the polar bear population. Thus, it seems that we still do not know how much sea ice gives optimal polar bear populations. Folks against this rule could use this knowledge to defend their opinion that polar bears should not be listed as endangered.
-The statement on page 1071 "The latest sea ice measurements are thought to indicate that ice melt is accelerating due to a positive feedback loop" is still debated. If the report is going to state this, at least provide some references supporting that statement. There are several studies currently looking at the contribution of rising atmospheric temperatures, changes in ocean temperatures and changes in atmospheric circulation affecting the sea ice cover. It is true that warmer spring temperatures in the Arctic are resulting in earlier melt, and that there has also been a delay in autumn freeze up. But studies are also now suggesting that the influx of warm water through Bering Strait and Fram Strait are playing a larger role than anticipated in causing declines in the Arctic sea ice.
-Suggest updating rates of decline with the latest observations. Stroeve et al., 2007 show the September rate of decline is -9.1%/decade using data through 2006. The annual rate of decline is -4.3%/decade.
-Again on page 1071, need a reference supporting the statement that ice melt is accelerating due to a positive feedback loop.

-Another study discussing trends in melt onset and freeze-up can be found in Stroeve et al. (2006). This information provides more updated values than given in Comiso (2003) and Comiso (2005).
-I suggest including ocean contribution to the decline. A workshop paper by Stroeve and Maslowski (to be published in 2007) discusses model results analyzed in the Greenland sea and in the western Arctic Ocean that indicate oceanic forcing may be an important overlooked factor in driving the recent sea ice declines. The primary oceanic processes relevant to sea ice variability include advection of heat and melting of sea ice in marginal ice zones and at the ice-ocean interface downstream of the warm water paths. Some references to consider here also include:

W. Walczowski, J. Piechura, *Geophys. Res. Lett.* **33**, L12601 10.1029/2006GL025872 (2006)

W. Maslowski, D.C. Marble, W. Walczowski, A.J. Semtner, *Ann. Glaciol.* **33**, 545 (2001).

-Need to update projected changes in sea ice cover with results from Stroeve et al. (2007) study.

-Page 1072, while there is evidence that in the 1990s, multi-year ice was transported out of the Arctic basin through Fram Strait, the way the text is currently written makes it unclear if it's still happening. To my knowledge, the loss of MYI through Fram Strait in the 1990s is not still happening.

Also, a reference regarding this is needed (i.e. Rigor and Wallace, 2004 and Fowler et al., 2004).

4) How information is presented.

-One thing I would like to comment on here is in the Summary section when we discuss that if the proposed rule is made final, it would extend the Act's protections of this species. I think it would be good to include here as to what the protections would include. I'm a bit skeptical that having them listed as endangered will do any good, since I believe their critical habitat is the sea ice, which is declining quite rapidly at the moment and is likely to continue to decline. Some studies that discuss how well the bears can survive on land, and if there are populations that do just fine without traveling on the sea ice, would help answer some of this.

-On page 1066, regarding reference (Stirling and Parkinson 2006) and the statement that reasons for increase in polar bear populations on land during summer and fall is attributed to changes in sea ice and other factors. I think it's important to list here what those other factors are so that the information is complete.

-On the discussion regarding the known polar bear populations (page 1070), it is indeed unfortunate that much is not known about current population sizes or trends. This information certainly is critical in determining if the bears should be listed as endangered. Perhaps some rewriting of this section could at least help highlight the populations that are known to be declining and also point out that in the areas where the populations are actually increasing, these numbers to not compensate for the loss in other areas. Also, can we give rates of decline and increase, rather than simply stating the populations are increasing or decreasing? Some more quantitative assessment is really needed here to justify listing them as endangered.

-The use of the word recruitment rates is unfamiliar to me. Should this not be reproductive rates?

PEER REVIEW of

Proposed rule to list the polar bear (*Ursus maritimus*) as threatened throughout its range

On December 27, 2006, Secretary of the United States Department of the Interior, Dirk Kempthorne, announced, that the U.S. Fish and Wildlife Service (**USFWS**) was proposing to list the polar bear as a threatened species under Endangered Species Act (**Act**). Considered document "Endangered and Threatened Wildlife and Plants: 12 – Month Petition Finding and Proposed Rule to List the Polar Bear (*Ursus maritimus*) as Threatened Throughout Its Range, Proposed Rule (Federal Register, vol. 72, No. 5 dated Tuesday, January 9, 2007") (**Rule**), is prepared by USFWS to prove that the polar bear may be "threatened species" in the nearest future.

According to the Endangered Species Act Section 4 the Rule has four Procedures based on materials of the Polar Bear Status Assessment, prepared by staff of the Service's Marine Mammals Management Office of Region 7. To prepare the Assessment all available information on the species and threatening factors has been used: published and unpublished data, comments and proposals from researchers, managers, different NGOs etc. Besides, in 2006 the authors of the polar bear Status Assessment solicited information from the public in two separate public comments periods. Consultations with different federal and regional and local authorities and organizations were also performed. Peer review of the draft Status Assessment was sought from 12 independent experts in the fields of polar bear ecology, contaminants and physiology, clime science and physics, and traditional ecological knowledge.

Thus the peer reviewed document is based on comprehensive information on status of the polar bear and factors treating the species in the pas, present and future. The information is presented in accordance with the Endangered Species Act requirements.

All major factors ruling the polar bear life and present and prospective threats are comprehensively considered and the listing of polar bear as threatened under the Act throughout its range is warranted.

At the same time we have some minor comments to the considered document which are not of principal character.

GENERAL COMMENTS:

According to the IUCN requirements the PBSG has agreed that all polar bears in the world comprise *one population* consisting of several *subpopulations*.

Russian language publications on the polar bear are used rarely while some of not considered publications have appropriate information and could be useful. Some of these references are presented in the "Polar Bear Status Assessment"

SPECIFIC COMMENTS:

P. 1065. Polar bears and brown bears evolved from common ancestor.

Ranges of polar and brown (grizzly) bears overlap not only in north Canada and Alaska but also in Chukotka (Russia)

P. 1066. **Distribution and Movements.** They occur throughout the *Chukchi*, East Siberian, Laptev, Kara and *Barents* seas of Russia

P. 1068. **Current Population Status and Trend.** Reference **Lunn et al. 2002** can be substituted by recent PBSG proc.

P. 1070. Basing on extrapolation of aerial den surveys the Chukchi Sea subpopulation was estimated to 2000-5000 (Derocher, A. E., Garner, G. W., Lunn, N. J. and Wiig, Ø. (eds.) (1998). Polar Bears: Proceedings of the Twelfth Working Meeting of the IUCN/SSC Polar Bear Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. v + 159 pp.). However due to recent risks and threats the PBSG corrected the estimate to 2000.

Summary of factors affecting the polar bear. The paragraph starting with "For another species evaluated for listening..." seems not necessary. It does not have direct and necessary information to the considered problem.

P. 1073. **Polar bear distribution changes**. The first three paragraphs discuss rather general *Effects of sea ice habitat change on polar bears* (page. 1072) than the distribution changes.

P. 1077. **Access to and Alteration of Denning Areas.** In different parts of the polar bear range the denning period beginning varies in broader limits than late October – early November. In Chukotka pregnant females are observed on the coast in late November fro example.

P. 1090. Russian Federation.

- The main governmental body responsible for management of species listed in the Red Data Book is the Ministry of Natural Resources of the Russian Federation.

- the marine zone was not EXTENDED to 24-nm by a decree from the Governor of Chukotsk Autonomeous Okrug in 1999. 24-nm were ADDED (total zone is 36 nm). Protection regime in this 24-nm zone is not so strict as in 12-nm zone around the Zapovednik.
- In 1996 a federal nature reserve (zakaznik) was established on the Severnaya Zemlya archipelago

P. 1091. New edition of the federal law "About Environmental protection" is of 2002.

P. 1095.

- Under Factor D ("Inadequacy of existing regulatory mechanisms") it could be added that recently in Chukotka (Russia) efforts to improve protection of polar bears and their habitats are undertaken: there are plans to establish new natural protected areas covering sites of seasonal aggregations of polar bears

25 June 2007

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USA

Re: Peer Review of the USA Petition Finding and Proposed Rule to List the Polar Bear as Threatened Throughout its Range

Dear Mr. Schliebe,

I would like to thank you for giving me the opportunity to review the petition materials regarding the USA Secretary of Interior's proposal to list the polar bear as a threatened species under your Endangered Species Act (ESA).

Petition Finding is Flawed, Biased, and Incomplete

opposes the listing of polar bears as threatened throughout its range, and we believe that the 12-month *Petition Finding and Proposed Rule* is flawed, biased, and incomplete. We base this position on analyzing the argumentation made in the *Finding* and also on the analyses undertaken by various Inuit or Inuit-related bodies. I understand that you have already received sc- -ponses directly from some of these bodies. Given the broad-based mandate of vill refer -arious elements contained in these inputs, which come from across the Arctic.

I will further elaborate in this letter how finds the proposed rule lacking, but allow me to point out two (2) broad issues that immediately stand out, and that cut across all other comments I make in this peer review:

One is the complete lack of consideration given to how the proposed rule would impact negatively on our constituents – the Inuit of the Arctic. The proposed rule, at the same time, would in my opinion do nothing for reducing (or increasing) the take of polar bears, as quotas are set by competent management bodies that look at all aspects of the hunt, including habitat. If anything, as other evidence suggests below, the proposed rule may in fact have a negative impact on polar bear conservation. Polar bears are part of our culture, our economy, our spirituality, and our folklore. Inuit would do nothing to harm this important relationship. Here is an example of how deeply the polar bear has become part of who we are as a people. The following is from a story told by Laura Raymond from the Inuvialuit Settlement Region in Canada's western Arctic:

> *I always remember ... I try not to forget. The polar bear became a human child. Then they became a part of the people of Tuktuuyaqtuuq. This is an old story that actually happened, it isn't just a tale. ... This woman's name was Kaupqun and the polar bear got her for a mother and she was from around here.*

A second area in which we see lack of rigour and, indeed bias, is the lack of regard given to the management bodies that oversee polar bear harvesting. The argument is made in the proposed rule, for example, that although the management bodies are capable, there are "inadequate regulatory mechanisms to address sea ice recession". We find this to be a very flawed argument and, in fact, a red herring. Dealing with sea ice recession is not the mandate of management bodies and nor should it be; it is to set quotas and issue directives to maintain healthy polar bear populations. It is also not their mandate to set contaminant emission standards; All variables, including the health of polar bear habitats are taken into consideration by the management bodies and, as such, there is no need to address sea ice recession directly. [Of course there is a need to address sea ice recession [illegible] is as concerned as – if not more than – the USFWS about this, and does address it in various forums, but it has nothing to do with the work of the polar bear management bodies. If the polar bear population health is down for any reason, including climate, this will be taken into account by the body]

Five Factors

You point out in your letter that Section 4 the USA's ESA allows for the listing of a species as endangered or threatened on the basis of five factors. I will, in part, address my review with these factors in mind and, therefore, I repeat them here:

A) The present or threatened destruction, modification, or curtailment of its habitat or range;
B) overutilization for commercial, recreational, scientific, or educational purposes;
C) disease or predation;
D) the inadequacy of existing regulatory mechanisms; or
E) other natural or manmade factors affecting its continued existence.

While your assessment bases its finding on only one of the factors (Factor A), I will nevertheless provide you with some comments on your presentation of the other four (4) factors, the language of which indicates bias as well, in my opinion.

"Likely" to Become an Endangered Species

I refer you further to your letter in which you state that, according to the USA's ESA, the term 'threatened' is interpreted as "any species or subspecies ... that is likely to become an endangered species in the foreseeable future throughout all or a significant portion of its range", whereas 'endangered' is interpreted as "any species that is in danger of extinction..." It is my view – and I am sure you would agree – that the ESA's definition is vague and, as such, great care needs to be taken in applying selective data to the notion of "likely to become endangered" and to the vague timeframe of "in the foreseeable future". It is clear from my reading of the *Finding* that it takes too much liberty and applies too little rigour prior to concluding "that it is likely" to become an endangered species. Most importantly, it is my view that if your analysis were truly based upon scientific rigour, you would have had no option but to reply to the Secretary of the Interior that the tool of science is *not able* to respond to a vaguely put question such as is contained in the definition. The document, in fact, hints that not defining "foreseeable" in the ESA is problematic and thus searches elsewhere for such a definition. While we believe the IUCN is a competent organization, we find it difficult to understand how a detailed description of the Yellowstone cutthroat trout, or the greater sage grouse, for that matter, can reliably provide a definition for "foreseeable future" when it comes to the polar bear.

Reliability of Relevant Scientific Models

I am pleased that, as you say in your letter, you are undertaking further analysis to "assess the reliability of the relevant scientific models used" in drafting your proposal. I commend you for your focus on "reliability", for as you will see, much of my review pays detailed attention to this important variable. I conclude that the *Finding*, at least as currently drafted, does not sufficiently question the reliability of scientific models used.

Finally, you ask me to consider various additional points such as the assessment's clarity, completeness, accuracy, presentation, and limitations. You also seek any additional views on the designation.

Process

Before I focus on your proposed analytical elements, let me first make some general statements about the overall process followed by the USA's Secretary of Interior in making his proposal. The following four (4) points are not only general but also cut further across each of the elements and, as such, bear special attention:

1. ***Politicization of the issue***: it is our understanding that the Secretary of Interior came to a decision long before much of the scientific enquiry had been completed. I am sure he took into account many factors in making his decision, including some of the science he had at hand but, also, the views of a very strong and vocal

animal rights lobby in Washington, DC that, in our respectful opinion, does not base its advocacy work on science.

2. ***Science used to support political decision taken:*** it is our understanding that the Secretary of Interior made his decision to propose a threatened status for the polar bear before the 12-month petition find was even released. You mention in your letter, as way of background, that the Secretary made his decision on December 27, 2006 while the Petition Finding was released after this date. It is our hope that "selective science" is not simply being used to further a political decision that was not based upon science in the first place. We fear that it is.

3. ***Jurisdictional Issues:*** we find it troubling that it appears the USA Secretary of Interior has completely disregarded the international component of his decision and is, *de facto*, meddling in jurisdictions outside of the USA. The polar bear listing completely disregards the existing legislative and sustainable management arrangements that exist outside of the USA's mandate, for example, in Canada where wildlife biologists, various levels of government and indigenous peoples determine the health of a particular population and the degree to which sustainable hunting should be allowed. The proposed listing, in fact, would in our opinion contravene other international agreements to which the USA is a party, such as the World Trade Organization.

4. ***Processing the Petition – Greenpeace Added:*** We note in the *Finding* that initially the petition as first filed by the Center for Biological Diversity was not processed by you in early 2005. It was only when Greenpeace Inc. and the Natural Resources Defense Council joined the petition that you responded. We find this process matter suspect. We have great respect for some of the work done by these two organizations, but it must be noted that great economic, social, and spiritual harm has been done to Inuit in the past by their unthinking actions. It must be further noted that Greenpeace Inc. eventually apologized to Inuit for the harm they caused. Please do not let the high and important profile of Greenpeace Inc. to persuade you to make another mistake that will hurt Inuit badly. It is in the interests of these organizations – with vast resources – to make polar bears appear vulnerable; it is neither in their interests nor within their mandates to protect Inuit.

Conclusions for ESA's Section 4 'Listing Factors'

Of the five (5) factors affecting the polar bear (according to the USA's Endangered Species Act), you came to the conclusion by applying only Factor A that the polar bear is "likely" to become an endangered species in the "foreseeable" future. You acknowledged that in your analysis of Factors B, C, D, and E, there was no reason to consider listing the polar bear as a threatened species.

I would like respond to your argumentation and conclusions regarding Factor A, but first allow me to briefly reply to the bias and predetermined tone (in my opinion) of the language contained in your discussion of the other Factors as well.

FACTOR B – Over-utilization Does not Threaten Species

You recognize that Factor B is not an issue. It troubles me, however, that the *Finding* proceeds to state "continued efforts are necessary or other forms of removal do not exceed sustainable levels and thus do not threaten the species in the foreseeable future". We find this statement on its own, without commenting on the successful management practices of various bodies, unbalanced at the least. It reveals the bias of the report. The comment seems to imply that harvesting levels are close to the brink, when in fact they are at the moment, sustainable. A report on the facts would have stated that levels are sustainable, rather than issuing a warning that "continued efforts" are needed so as not to "exceed sustainable levels".

It is interesting to note that you mention in the context of additional cooperative management agreements "not yet implemented", such as in the case of USA-Russia and Canada-Greenland that you did not rely on them for Factor B. Given that you rely on models regarding polar bear habitat that are not yet proved, why would you not comment on the essence of these polar bear management agreements? They can only improve the current state of regulation, yet you choose to ignore them in your analysis.

Another, albeit minor point and more related to the *tone* of the document, is the way in which you state that "over-utilization" is not a threat. It would be better stated unequivocally that there is no "over-utilization", rather than it (over-utilization) not being a threat.

FACTOR C – Disease and Predation do not Threaten Species

You conclude that disease and predation do not threaten species. If a polar bear population were indeed under stress, from whatever cause, would science not show or predict increased disease? Although your conclusion may be correct, again it would have been more accurate if you had underscored the current excellent health of the polar bear populations.

FACTOR D – Regulatory Mechanisms Adequate

Your analysis of the various national and international regulatory mechanisms indicate that they are adequate with respect to polar bears. What is somewhat incredulous is the added statement that there may not be adequate regulatory mechanisms in place to deal with polar bear habitat destruction. Why then does the report not take a stand on this and state that they are not sufficient? Why add this comment if they *are* sufficient? As noted earlier, [illegible]s the issue of climate change very seriously. We fight as hard as anyone to combat it, to mitigate damages, and to find ways for Inuit to adapt. If, as we suspect, climate change will affect polar bear habitat, it is Inuit who will be most affected. We will take climate change into account when we (along with the regulatory mechanisms procedures you mention) set polar bear harvesting quotas. The point that you make in this section is a red herring. Like all the other discussions, the "on the other hand" approach to ending each conclusion section tends to favour the position that polar bears are indeed threatened, even though you have no option but to conclude (on 4 of the 5 factors) that

they actually are not. In the conclusion of Factor D, reference is made to Factor A, which you have argued already is sufficient evidence to label polar bears as threatened. Why does the report not also then refer to other Factors in which you find there is no cause for concern?

FACTOR E – Natural and Manmade Causes Not an Issue

You conclude that contaminants, eco-tourism, and shipping do not threaten the existence of polar bears. Then your report adds that "future impacts" are "a concern" and warrant continued monitoring." I would agree with both the conclusions and the additional caveat. It will be very important to monitor contaminants, eco-tourism and shipping. [albeit, it should not be the polar bear management regimes that do this]. This is a sensible approach: i.e., state the *current* state of affairs and provide some context for what *may* happen. This was not done in the conclusions of the other FACTORS, and certainly not in FACTOR A, the factor upon which the *Finding* bases its conclusion to mark polar bears as threatened.

FACTOR A – Threatened Destruction of Habitat is an Issue

Your conclusion need not be stated here. And much of my analysis is contained in the cross-cutting themes above, as well as in the discussion of the other four (4) Factors. However a few additional facts need to be pointed out:

1. As noted earlier, the way in which FACTOR E is less flawed than the way in which arguments are made within FACTOR A. It would have been more helpful to note that the current habitat is supporting the polar bears and that continued monitoring of its habitat is necessary, just as you state that continued monitoring of contaminants, eco-tourism, and marine shipping must be done (FACTOR E).

2. It bears repeating: we believe that the Secretary of Interior should have been made aware that science is not capable of responding to vaguely written questions that contain language such as "is it likely" and "foreseeable future", etc. The process, therefore, smacks of using "pseudo-science" to support a political decision'.

3. You note that "some scientists conclude that the 'future persistence of polar bears is tenuous'". You later admit that "[t]his opinion is not universally shared." You provide the reader with some of their arguments including, among others, "polar bears have survived at least two warming periods" and that "the climate was much more variable in the past", as revealed by Greenland ice core studies. You simply take the view of one side of the story, however, without clearly stating why you take that side.

Most other responses to my position on your conclusion regarding FACTOR A are found in earlier areas of this review, including a few additional comments below.

A Comment on the "Precautionary Principle"

Although only one reference is made to the "precautionary principle", the tone and examples one notes in the *Finding* leaves the reader with the sense that this "principle" was front and centre of its argument.

It is unfortunate that the "precautionary principle" is rarely, if ever, used in the context of humans, in this case the Inuit of the Arctic. The report would have been much more balanced if it had recognized that putting the polar bear on a 'threatened' list would in all likelihood produce significant and direct negative impacts on Inuit. I would suggest that in your subsequent drafting of the *Finding* you use the "precautionary principle" in this manner. Inuit will be hurt. That is a fact. The climate will in all likelihood continue to change. That is a fact. What is *not* a fact is the degree to which polar bears will be affected and, as importantly, that the *existing* polar bear management regimes will not be able to take this into account. They do not have to have the power, as the document seems to conclude, to prevent sea ice from receding. They have to have the power – and they do, even as you conclude – to act if polar bears are threatened. They need to act (in that case) by either reducing or eliminating the take of polar bears. Let them do their job.

Sport Hunting Factor

Strongly related to the need to address impacts on people, is the matter of sport hunting. As you are aware, quotas (in the case of my people) are set *for* Inuit. The fact that part of this quota is "shared" with outsiders is not an issue, nor should it be an issue. You should have proved that by eliminating the *import* of polar bear hides (which is essentially what this proposed rule *de facto* aims to do), there will in fact be fewer polar bears taken across its range. It will not and I trust that you are quite in agreement with my assessment.

The quotas are set based upon the *sustainability* principle, not on any moral or ethical matter that Greenpeace Inc. and other organizations (and governments) seem to have in mind when addressing one of our most important resources.

As you are aware, some American sport hunters accompany our Inuit hunters in their harvest of the set polar bear quotas on an annual basis. They are allowed to shoot the polar bear in some instances. They take the hide back to the USA and the rest is left for our people – for food, for handicraft production, and for other uses. This hunt provides enormous income for our hunters, their families, and the whole community. The hunter pays a substantial fee to experience the guiding and camaraderie of being with an Inuit hunter and community. Many times, a polar bear is not taken. Even in those instances, the economic benefit to the community is great.

The proposed rule will, therefore, only reduce the important economic advantages to Inuit but will do *nothing* with respect to the number of animals taken by Inuit. They will continue to hunt sustainably, and the hide will be left in Canada, as the proposed rule will not allow an American hunter to go back with it. We believe that this will virtually eliminate most such hunts. We fear that this is the true motive of the political impetus behind the proposed rule.

Other Inuit Comments re Proposed Rule

You have received several additional comments directly provided to you by other Inuit bodies. We too have relied on the input of other Inuit bodies, which we represent on an international level. I repeat only a few of their comments here:

Inuvialuit Game Council:

These populations of polar bears have helped sustain the Inuvialuit for generations and continue to do so.

Currently, these populations are healthy and thriving.

Management agreements with the Inupiat of Alaska for the Southern Beaufort Sea population and with the Inuit of Nunavut for the Northern Beaufort Sea and Viscount Melville Sound populations also demonstrate the commitment of the aboriginal user groups to the conservation of these populations.

The Council uses the best available information when considering harvest levels ... and incorporates any new information into management decisions as it becomes available through the integrated management process.

...based on our knowledge of these populations and the information we have from the research, ... we see no justification for up-listing polar bears to "threatened status" under the US Endangered Species Act.

The Inuvialuit do acknowledge that climate change is occurring ... [h]owever, at this point in time, there is not enough information to say that polar bears are in danger.

[A]ppropriate actions will be taken in the interest of conservation if and when needed.

Nunavut Government Department of Environment:

We oppose the listing of polar bears as threatened throughout its range because it is currently unwarranted, highly speculative, and may harm our constituents.

We suggest that the proposed listing is more about the politics of climate change than it is about polar bears.

[W]e do not feel that the scientific or traditional ecological knowledge (TEK) supports listing all of the world's populations of polar bears (entire species) as threatened based on the criteria published in the US Endangered Species Act.

We suggest that the review of information associated with the proposed rule is not an objective or balanced treatment of arguments for and against listing polar bears as "threatened".

We are at a disadvantage when the science of [Traditional Ecological Knowledge] are not summarized (or reviewed) objectively.

[O]ur past practice has been to work closely with all organizations ... throughout the circumpolar basin, including USFWS. This is the direction of the International Agreement for the Conservation of Polar Bears, and our respect for all international agreements. ... When your conservation process is allowed to be subverted by environmental activists; and when polar bear conservation is allowed to become a strategy or icon within a larger environmental struggle; our options for cooperation and collaboration are reduced.

We are not disputing the observation that climate has warmed and that sea ice has been reduced. ... we do not feel that the current evidence is sufficient to conclude that polar bears will be endangered or extinct within three generations.

The rationale for a species designation of "threatened" derives entirely from an extrapolation in [only] two populations based on a worst case scenario from a climate change model. ... What evidence exists to suggest such an extrapolation is rational?

If the polar bear is listed as 'threatened' ... the species will automatically be considered to be 'depleted' under the US Marine Mammal Protection Act (MMPA)... The only effect will be diminished traditional economy and more harvesting of females.

Eliminating the revenue brought in by US participation in 'conservation hunting' ... will have unknown, but perhaps negative conservation implications.

Makivik Corporation:

[C]ontinued reliance on these food resources and their harvest serves to define Inuit as a unique people.

Over the millennia of hunting polar bears, Nunavik Inuit have acquired a substantive body of information, commonly referred to as "Traditional Knowledge", about bear behaviour, biology and population dynamics. This knowledge transmitted from elders to other hunters has historically permitted sound management decisions to be taken at the community level.

Despite certain dire reports of decreases in polar bear numbers ostensibly due to the impacts of global warming and subsequent climate change, Nunavik hunters have in fact reported increases in bear numbers in recent years.

[W]e are completely opposed to the proposed US listing of polar bears as "threatened throughout its range".

Nunatsiavut Government:

The Nunatsiavut Government is opposed to the proposal listing the polar bear under the Endangered Species Act.

The Davis Strait population ... is by no means showing a decline.

[I]f the polar bear were to be listed, how could a possible recovery plan be written to combat the affects of climate change, considering no such document exists in the world right now?

The listing of the US Fish & Wildlife Service may adversely affect traditional hunting practices.

ICC Greenland:

Climate change is real and it is happening. At present, we do not see a decline in polar bear populations because of it. Focusing on hunting of very small numbers of bears annually is misguided and short-sighted. If climate change is to severely impact the health of polar bear populations, then let the world get on with stopping climate change, not our small hunt.

Greenland Government:

[The] Greenland Home Rule thinks it is premature to list polar bears as threatened given the information available now, and why such listing may work against more effective conservation measures.

Besides being a significant natural resource, polar bears play a central role in our mythology and in our culture.

Greenland will... continue to take part in international fora to ensure conservation and sound management practices.

Such stronger bans may negatively affect the income that the Inuit hunters and the tourist industry derive from the sale of mounted skins, skulls, polar bear parts in jewelry and other ornamental products. A stronger ban will also prevent future access to US market for trophy hunting, which in Greenland is recognized as having the potential to constitute an important income in remote areas where polar bear hunting occur.

The polar bear has become an icon for climate change and several environmental groups are advocating for the enlisting of polar bears as a threatened species, with the aim of using the polar bear as a symbol that will help to put pressure on governments to reduce carbon emissions.

[We], ironically, are already being adversely affected by climate change. Greenland therefore finds it utterly unfair to make the Inuit people pay the price of a good publicity campaign.

Listing polar bears as threatened may actually work against our efforts to increase the protection of polar bears.

Wildlife Management Advisory Council (Northwest Territories, Canada):

Based on 20 years of polar bear management utilizing these processes, the Council is of the opinion that [local, regional, national, and international management processes] are able to appropriately deal with changes in the status of polar bears.

[T]here is a possibility that a listing could actually speed up a decline.

ICC Chukotka (Russia):

We have full confidence that the Russia – USA polar bear agreement that manages the shared population between Alaska and Chukotka is capable of dealing with the proper setting of quotas.

Polar bears continue to be an important resource for Inuit and Chukchi in Russia.

Inuit Tapiriit Kanatami (ITK) and ICC Canada:

Polar Bears are an integral part of Inuit life in Canada. We place a high value on the Polar Bear culturally and spiritually. They are a very important food and natural resource.

We view the Petitioners' use of the Polar Bear for political and public campaign purposes under the E.S.A. as misguided and short-sighted. The U.S. Department of Interior (DOI) should acknowledge this intention of the Petitioners...

It is our concern that elevating the listing of the Polar Bear to 'Threatened' will impose arbitrary, and scientifically unfounded, penalties and hardships upon Inuit.

Laura Raymond, Inuvialuit Settlement Region:

I try not to forget. The polar bear became a human child.

Mr. Schliebe, I am grateful that you have given me the opportunity to undertake a peer review of the proposed listing by the USFWS, and also the opportunity to summarize a few comments of other Inuit bodies regarding this matter. I think you will agree that our position is clear. Climate change is hurting our communities and we think that addressing this fact is where efforts should be focused. It is the belief of many that your proposed listing may in fact hurt the successful management of our polar bear resource. And it certainly will hurt all Inuit.

We find the proposed rule lacking in many places as I have indicated above. It is our hope that the listing of the polar bear as 'threatened' will not, upon review, be implemented.

I would be happy to answer any questions you may have.

Yours sincerely,

May 31, 2007

Scott Schliebe
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Marine Mammals
Management Office 1011
East Tudor Road
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RE: Peer Review Comments on USF WS Draft Polar Bear Status Assessment Sent Via Fax (907) 786-3816 and e-mail scottschlicbc(rc;fws.gov

Dear Mr. Schliebe:

The greatly appreciates this opportunity to comment on the U.S. Fish and Wildlife Service's (F WS) Draft Status Assessment in Response to a Petition to List Polar Bears as a Threatened Species Under the U.S. Endangered Species Act (Draft). We fully endorse the excellent comments you have already received from other peer reviewers. They bring considerable expertise to this review, and have rightly praised your Draft while offering constructive edits and suggested additions. As we anticipated and explained when we accepted the invitation to serve as a peer reviewer, our staff biologists and subsistence specialists most capable of performing such a review have been . 1 hese comments will therefore be brief. It is our expectation that our most knowledgeable staff will engage more fully in your review in the coming months.

> Of primary concern to in this review is that the local perspective on all key issues be evaluated and appropriately considered in ultimate decision-making. We agree with other commenters that the Draft fairly well represents the western scientific record with respect to the polar bear and related topics relevant to this review. it does not yet. however, adequately reflect the state of traditional and contemporary indigenous knowledge with respect to these issues, and we strongly that it should. Appropriate effort must be made to integrate in the Assessment the existing sources of' Alaska Native and other indigenous traditional and contemporary knowledge regarding the extent, pace, and effects of' climate change and other factors on polar hear numbers, health, distribution, and behavior. A companion effort should be made to actively solicit such information in a targeted manner.

There is a wealth of such information readily available, especially with respect to arctic warming and its effects on wildlife resources and subsistence practices, from a variety of sources. A great many links to resources that are relevant to your review can be found on the Alaska Native Science Commission (ANSC) website at http://www.nativescience.org/climateehangel. Please especially consider information found through the traditional knowledge and Native knowledge links. Comparable international sites exist as well and should be reviewed for the Assessment. The threat of climate change to the world's indigenous peoples was the subject, for instance, of an April 12-13, 2007 international symposium hosted by the Environmental Change Institute at Oxford University. (See www.eci.ox.ac.uk;news/events/0704 l2copfcrence.php) Similarly, proceedings are available from the International Indigenous Forums on Climate Change. The 12th Forum was held in Nairobi. Kenya November 6-17, 2006.

Given our limited resources, and the press of multiple other critical concurrent planning processes. the cannot take on the full responsibility of compiling existing indigenous knowledge databases or actively conducting appropriate community outreach among the many Alaskan villages within the range of the polar bear. This ought to be done in a thoughtful and culturally sensitive manner, and is the responsibility of the FWS. We can assist you in arranging the necessary consultation with our communities.

We suggest that the information beginning on page 7 of the document be expanded to include this step more clearly within the full review process, including at least some discussion indicating that an Environmental Justice evaluation will be conducted, focusing on any potential disproportionate adverse effects of the ESA listing of polar hears on Alaskan Native populations. While we understand that the Assessment is not where such an analysis must he undertaken, the potential effects of listing on subsistence practices and community services is of paramount concern among our residents, and they must he assured that such concerns will be comprehensively addressed and adequately considered in all decisions resulting from this review. Too often, the human component of land and wildlife management actions is neglected.

With respect to the discussion continuing on page I66 concerning oil and gas development in Alaska, the second paragraph must be updated to reflect that the 2007-2012 OCS Leasing Program has been adopted by the Department of the Interior, and authorizes multiple lease sales in both the Beaufort and Chukchi Seas of Alaska. Also, greater discussion is warranted concerning the sustained high price of oil, widespread projections that it will continue into the foreseeable future, and the resulting dramatic rise in industry interest in Alaskan onshore and offshore oil prospects. In particular, the number of companies bidding in recent sales has risen, and the number and geographic range of offshore open water seismic operations has increased. The expansion of onshore exploration and development westward into the National Petroleum Reserve-Alaska has resulted in the establishment or enhancement of coastal staging areas, with associated increases in barge and other vessel traffic within polar bear habitat. A continuing expansion of coastal facilities and nearshore marine vessel traffic is likely to continue associated with both onshore and offshore exploration and development.

The plans of Shell to explore and develop oil prospects in the Beaufort Sea must he discussed. A multi-year exploratory drilling plan would initially focus on a Camden Bay prospect, but would target other ()CS areas in subsequent years. More than a conventional exploration project, Shell's effort would involve borehole drilling and other activities that seem to indicate a strong possibility of ultimate plans for development. The company also envisions extensive concurrent seismic operations, the use of icebreakers, and extensive vessel traffic originating in both Canadian waters and the Bering Sea. The Assessment ought to acknowledge the risks to polar boos and their prey' species associated with the potential for an oil spill to originate in Camden Bay as the result of Shell's proposed exploration and possible development at that location. The document should also assess the potential for large numbers of' bears to be impacted by contact with oil at marine mammal carcass feeding aggregations, whether such exposure could be the result of marine mammals dying after being oiled or existing carcasses being oiled.

With respect to human-bear interactions, you should note the effects of a changing climate and ice conditions on subsistence whaling patterns during the spring and fall bowhead whaling seasons. With more difficult ice conditions, a shift from spring ice-based whaling to fall whaling has occurred in recent years in the other whaling comm unties. The carcasses of harvested animals are more easily disposed of in the spring by pushing them off the ice edge. This occurs at some distance from communities. In the fall, whales arc processed at beach locations within or close to communities, or, in the case of Nuigsut, at the whaling base at Cross Island. Disposal of carcasses is more difficult, and remains of' subsistence-harvested whales can be an attractant to increasing numbers of shore-bound hears. Without a significant effort to deter such bears, they can become tolerant of human activity, with potential consequences to both bears and humans. [here is little our community can do, or should be required to do, beyond what is already being done to reduce bear attraction to villages and subsistence use sites. The has incurred extraordinary expense annually for more than a decade to deal with increasing numbers of bears observed in proximity to our coastal communities. Polar bear deterrence programs, while coordinated with the F WS, have been undertaken largely at expense. They have included patrols, use of' various

hazing equipment and techniques, changes in the means of disposal of the remains of subsistence harvested whales and other resources, and public education.

It should also he noted that in recent years competition at carcass feeding sites between polar bears and smaller, though more aggressive, grizzly bears has been observed with increasingly frequency. Grizzly bear populations are likely to increase with warming trends, with their range increasing as well.

I hope these comments will be of value as this review

continues. Sincerely,