United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Room 110
Fairbanks, Alaska 99701
February 24, 2011

Memorandum

To: Timothy J. Van Norman, Branch Chief, Permits

From: Ted Swem, Branch Chief, Fairbanks Endangered Species

Subject: Endangered Species Act conclusion regarding issuance of Marine Mammal Research Permit MA046081-3

Cc: Monica Farris, Division of Management Authority (DMA)
Lisa Lierheimer, DMA
Karyn Rode, Marine Mammals Management, Anchorage

This document represents the U.S. Fish and Wildlife Service's (Service) review of actions proposed for permitting under Marine Mammal Research Permit MA046081-3. An analysis of potential impacts to Steller's eiders (*Polysticta stelleri*), spectacled eiders (*Somateria fischeri*), polar bears (*Ursus maritimus*), designated critical habitat for the Steller's eider, spectacled eider, and polar bear was conducted per section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). The permit applicant is the Marine Mammals Management (MMM) office of the U.S. Fish and Wildlife Service in Anchorage, AK.

THE PROPOSED ACTION AND ACTION AREA

A full description of the proposed action is in the project record in the Fairbanks Field Office. The permit would annually authorize *non-lethal take* as defined by the Marine Mammal Protection Act (MMPA) of polar bears in the following manner:

Level A harassment (as defined by the MMPA):

1. DMA proposes to permit MMM to use immobilizing and tranquilizing drugs to capture up to 100 polar bears. Captured bears may be fitted with Telonics GPS or ARGOS collars, ear-tag or glue-on transmitters, plastic identification eartags, and/or ink lip tattoos for identification. Collars will be attached to adult females only and include an automatic release device pre-programmed to drop off the bear within 1-2 years (when the battery is expected to die). Glue-on and ear-tag transmitters may be deployed on bears of any sex/age class except cubs-of-the year. No bear will be outfitted with more than 2 types of tracking devices (e.g., collar and an ear-tag or ear-tag and a glue-on).

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2. MMM proposes to biopsy dart up to 20 polar bears annually.

Level B harassment (as defined by the MMPA):
1. MMM proposes to aerial survey a maximum of 400 polar bears annually. Surveys will be conducted at altitudes of 300 feet or greater, with descents to 100 feet as needed to verify sex/age class and assess body condition.
2. MMM also proposes to survey maternal dens using Forward Looking Infra-red (FLIR) equipment from the air and/or ground, and scent-trained dogs (up to 10 adult female polar bears and their cubs [up to 20] annually).

The permit would also authorize incidental harassment of marine mammals managed by the Service, transport of up to 100 of polar bear tissue samples to Canada annually, and up to **four** injuries or lethal takes during the life of the permit. The permit expires December 2014.

Pacific walrus minimization measures

The proposed action includes protocols recommended by MMM's walrus research and management program to minimize effects of disturbance on Pacific walrus if encountered during polar bear research. For aerial surveys they include the following:
1. Aircraft will increase distance from and altitude above observed walrus as quickly as possible and maintain a ½ mile radius from any known location of walrus.
1. Known or observed walrus congregations will be avoided by flying above 1000 ft altitude and moving 0.5 miles inland from the coast.
2. Flight patterns will avoid sections of the coast and will include an appropriate buffer distance in the vicinity of known walrus congregations.
3. If a COMIDA survey (surveys conducted by the National Marine Mammal Laboratory; Chukchi Offshore Monitoring in Drilling Area) was flown along the coast within three days prior to the polar bear survey, polar bear researchers will fly the polar bear survey at the standard flight parameters of 300 ft altitude and 70 knots, and avoid walrus congregations (if any) as indicated above.
4. If a COMIDA survey was not flown three days prior to the polar bear survey, polar bear researchers will modify their flight parameters to reduce the chance of disturbing previously-unknown walrus congregations.
5. For the section of coast and barrier islands between Wainwright and 158W longitude (i.e., including Peard Bay), polar bear researchers will perform an initial over-flight at 1000 ft altitude. Subsequently, they will repeat this portion of the survey at standard flight parameters and avoid walrus congregations (if any) as indicated above. The researchers will follow standard flight parameters for the section of coast and barrier islands between 158W longitude and Barrow because walrus congregations are less likely to occur in this region.

Minimization measures for capture work include the following:
1. Aircraft will increase distance from and altitude above any observed walrus as quickly as possible and maintain a ½ mile radius from any known location of walrus.

THE ACTION AREA

For the purposes of this BO, the 'action area' is defined as the coast, barrier islands, and marine waters where surveyed or captured polar bears carry out essential life functions.

EFFECT OF THE ACTION ON NON-POLAR BEAR LISTED SPECIES AND CRITICAL HABITAT

Project effects on Steller's and spectacled eiders

The spectacled eider was listed as threatened on May 10, 1993 (58 FR 27474) and the Alaska-breeding population of Steller's eider as threatened on June 11, 1997 (62 FR 31748). Some project activities will occur from August through October while newly-hatched broods and other age classes are molting and migrating in the action area. Spectacled eiders molt in a large flock in Ledyard Bay from late June until late October (Larned et al. 1995, USGS 2009) and cannot fly. This flightless condition may make them more sensitive to disturbance than at other times of the year.

Some research activities occurring in May in the Chukchi Sea each year may overlap with the presence of eiders as they return to the North Slope to commence breeding activities. Eiders use leads created in the melting sea ice by wind. These leads are often ephemeral, opening and closing with changing winds. Polar bear capture and immobilization activities may temporarily disturb eiders (i.e., interrupt their activity by causing them to flush or dive) using leads. While researchers may fly over leads, they generally avoid capturing bears near open water to reduce the potential drowning of tranquilized bears. Also, research activities that will affect eiders (helicopter pursuit of a bear) will only last about 30 minutes. Therefore, at most the proposed action could temporarily disturb a few eiders in localized areas of the spring leads. However, because of the short duration of the activities, and because any flushed eiders will likely return after the helicopter and researchers have left the area, no significant disruptions to their normal behavior are likely and no significant adverse effect are anticipated.

Eiders are not usually seen during FLIR activities, as these occur during winter when eiders are not present. We expect that FLIR activities are extremely unlikely to affect eiders and are therefore discountable.

Annual fall aerial surveys occurring from the Canadian border to Point Hope may disturb migrating and/or molting Steller's and spectacled eiders from August to October. This disturbance may occur particularly if surveyors descend to 100 feet (to verify age/sex and body condition of bears) in the vicinity of these species. While surveyors in aircraft may cause Steller's and spectacled eiders to flush, we do not expect that a disturbance will significantly disrupt their normal behavior because the eiders will most likely resume normal behavior after moving a short distance or after the surveyors leave the area. Because any disturbance will be small in duration and extent, we don't expect this activity to adversely affect listed eiders.

Summary
Because effects of the proposed action on Alaska-breeding Steller's and spectacled eiders are insignificant and discountable, we conclude the proposed activities are not likely to adversely affect these species.

Project effects on Steller's and spectacled eider critical habitat
The Service designated critical habitat for the Steller's eider on February 2, 2001 (66 FR 8850). This project does not take place in or near Steller's eider critical habitat; therefore, we expect that proposed activities will have no effect on it.

The Service designated critical habitat for the spectacled eider on February 6, 2001 (66 FR 9146). Some proposed aerial surveys may take place in spectacled eider critical habitat in the Ledyard Bay Critical Habitat Unit. The primary constituent elements (PCEs) of this critical habitat unit are: are marine waters > 5 m and ≤ 25 m deep, along with associated marine aquatic flora and fauna in the water column, and the underlying marine benthic community. Because we can identify no mechanism through which over-flights could affect the PCEs or the ability of spectacled eiders to use Ledyard Bay, no adverse effects to spectacled eider critical habitat are anticipated.

Summary
The proposed action is not likely to adversely affect listed eider critical habitat.

Conference for the pacific walrus
The Service published a *Federal Register* notice on February 10, 2011, determining that the listing of the Pacific walrus as a threatened or endangered species under the ESA was warranted, but precluded by higher priority actions to amend the Lists of Endangered and Threatened Wildlife and Plants (76 FR 7634); the Pacific walrus (walrus) is therefore a candidate species for ESA listing. Although not required by law, Service policy is to consider candidate species when making natural resource decisions. We have therefore evaluated the effects of the proposed action on walrus, including the proposed minimization measures. Because the den detection studies occur during the winter when the southern Beaufort Sea is frozen and thus no Pacific walrus are present, only the spring polar bear captures in the Chukchi Sea and fall coastal aerial surveys have the potential to encounter walrus.

Spring polar bear captures in the Chukchi Sea occur between Shishmaref and Cape Lisburne on the sea ice up to 70 miles offshore. The capture effort occurs between mid-March and early May annually. In the past 3 years of capture work, no live walrus have been encountered. A polar bear was observed scavenging on an old carcass of a walrus that did not appear to be a polar bear kill. We have determined that Pacific walrus do not typically occupy the sea ice region in which polar bear captures are conducted at that time of year due to impenetrable unbroken pack ice. Nevertheless, the proposed action includes minimization measures should walrus be encountered during any future capture work effort.

Between 2000 and 2009, the Service conducted polar bear coastal surveys in the Southern Beaufort Sea between Barrow and the Canadian border between August and October. The Southern Beaufort Sea is not typically occupied by walrus and, during these nine years of

surveying effort, only one walrus was encountered. In 2010, the survey area was expanded to include the section of coast and barrier islands between Wainwright and Barrow. While no walrus were encountered, protocols were developed prior to expansion of the surveys to avoid disturbing walrus that could be hauled out along the coast. These protocols were drafted between the staff of the Service's polar bear and walrus programs and are outlined above in the proposed action.

We expect that the minimization measures included in the proposed action will reduce the risk of causing a stampede or otherwise disturbing hauled-out walrus, and is consistent with guidelines for the incidental harassment of non-target marine mammal species in the Service and U.S. Geological Survey polar bear research permits.

Summary
A conference on a candidate species requires the Service to determine whether or not the proposed action is likely to jeopardize continued existence of the species. We conclude that, because walrus are rarely encountered during research activities and provisions are in place to mitigate any potential effects of disturbance if walrus are encountered, effects of the proposed action on walrus are minimal and are not likely to jeopardize the continued existence of walrus.

POLAR BEAR STATUS

Due to threats to its sea ice habitat, on May 15, 2008 the Service published a Final Rule in the Federal Register listing the world-wide population of the polar bear (*Ursus maritimus*) as threatened (73 FR 28212) under the ESA. In the U.S., the polar bear is also afforded protection under the MMPA and is managed by MMM.

Polar bears are widely distributed throughout the Arctic where the sea is ice-covered for large portions of the year. Sea ice provides a platform for hunting and feeding, for seeking mates and breeding, for denning, for resting, and for long-distance movement. Polar bears primarily hunt ringed seals, which also depend on sea ice for their survival, but they also consume other marine mammals (73 FR 28212).

The total number of polar bears is estimated to be 20,000-25,000 with 19 recognized management subpopulations or "stocks" (Obbard et al. 2010). The International Union for Conservation of Nature and Natural Resources, Species Survival Commission (IUCN/SSC) Polar Bear Specialist Group ranked 11, four, and three of these stocks as "data deficient," "reduced," and "not reduced," respectively (Obbard et al. 2010). The status designation of "data deficient" for 11 stocks indicates that the estimate of the worldwide polar bear population was made with known uncertainty.

Warming-induced habitat degradation and loss are negatively affecting some polar bear stocks, and unabated global warming will ultimately reduce the wordwide polar bear population (Obbard et al. 2010). Loss of sea ice habitat due to climate change is identified as the primary threat to polar bears (Schliebe et al. 2006, 73 FR 28212, Obbard et al. 2010). Patterns of increased temperatures, earlier spring thaw, later fall freeze-up, increased rain-on-snow events (which can cause dens to collapse), and potential reductions in snowfall are also occurring. In addition,

positive feedback systems (i.e., sea-ice albedo) and naturally occurring events, such as warm water intrusion into the Arctic and changing atmospheric wind patterns, can amplify the effects of these phenomena. As a result, there is fragmentation of sea ice, reduction in the extent and area of sea ice in all seasons, retraction of sea ice away from productive continental shelf areas throughout the polar basin, reduction of the amount of heavier and more stable multi-year ice, and declining thickness and quality of shore-fast ice (Parkinson et al. 1999, Rothrock et al. 1999, Comiso 2003, Fowler et al. 2004, Lindsay and Zhang 2005, Holland et al. 2006, Comiso 2006, Serreze et al. 2007, Stroeve et al. 2008). These climatic phenomena may also affect seal abundances, the polar bear's main food source (Kingsley 1979, DeMaster et al. 1980, Amstrup et al. 1986, Stirling 2002). However, threats to polar bears will likely occur at different rates and times across their range, and uncertainty regarding their prediction makes management difficult (Obbard et al. 2010).

Range-wide threats and uncertainties

Subpopulations of polar bears face different combinations of human-induced threats, making that conservation and management of polar bears challenging (Obbard et al. 2010). The largest human-caused loss of polar bears occurs during their harvest, but for most subpopulations where this occurs, harvesting of polar bears is a regulated and/or monitored activity (Obbard et al. 2010). Other threats include accumulation of persistent organic pollutants in polar bear tissue, tourism, human-bear conflict, increased development in the Arctic (Obbard et al. 2010). How these factors interact with naturally-occurring polar bear loss and climate change create uncertainty regarding our knowledge of the status of the polar bear worldwide.

Summary

Loss of sea ice due to climate change is the largest threat to polar bears worldwide, and uncertainty exits regarding the numbers of bears in some stocks and how other human activities interact to ultimately affect the worldwide polar bear population.

ENVIRONMENTAL BASELINE OF POLAR BEARS

The southern Beaufort Sea and Chukchi/Bering Sea stocks occur in the action area with some intermingling of the two stocks (Figure 1). Declines in sea ice have occurred in optimal polar bear habitat in the southern Beaufort and Chukchi seas between 1985 to 1995 and 1996 to 2006, and the greatest declines in 21st century optimal polar bear habitat are predicted to occur in these areas (Durner et al. 2009). These stocks are vulnerable to large-scale dramatic seasonal fluctuations in ice movements which result in decreased abundance and access to prey, and increased energetic costs of hunting. The Chukchi/Bering seas and southern Beaufort Sea stocks are currently experiencing the initial effects of changes in sea ice conditions (Rode et al. 2010, Regehr et al. 2009, and Hunter et al. 2007).

Southern Beaufort Sea polar bear stock

The southern Beaufort Sea polar bear population is distributed across the northern coasts of Alaska, Yukon, and Northwest territories of Canada. Estimates of the population size of the southern Beaufort Sea stock were 1,778 from 1972 to 1983 (Amstrup et al. 1986), 1,480 in 1992 (Amstrup 1995), and 2,272 in 2001 (Amstrup, USGS unpublished data). Declining survival, recruitment, and body size (Regehr et al. 2006, Regehr et al. 2009; Rode et al. 2010), and low

population growth rates during years of reduced sea ice (2004 and 2005), and an overall declining population growth rate of 3% per year from 2001 to 2005 (Hunter et al. 2007) suggest that the southern Beaufort Sea stock is now declining, and Regehr et al. (2006) estimated the southern Beaufort Sea stock to be 1,526. The status of this stock is listed as 'reduced' by the IUCN (Obbard et al. 2010) and 'depleted' under the MMPA.

Chukchi/Bering sea polar bear stock

The Chukchi/Bering Sea stock is widely distributed on pack ice in the Chukchi and northern Bering seas and adjacent coastal areas in Alaska and Russia. Obtaining a reliable population estimate for this stock is difficult due to vast and inaccessible habitat, movement of bears across international boundaries, logistical constraints, and budget limitations (Amstrup and DeMaster 1988, Garner et al. 1992, Garner et al. 1998, Evans et al. 2003). The size of this stock is listed as 'unknown' and the status of this stock is listed as 'reduced' by the IUCN (Obbard et al. 2010) and 'depleted' under the MMPA.

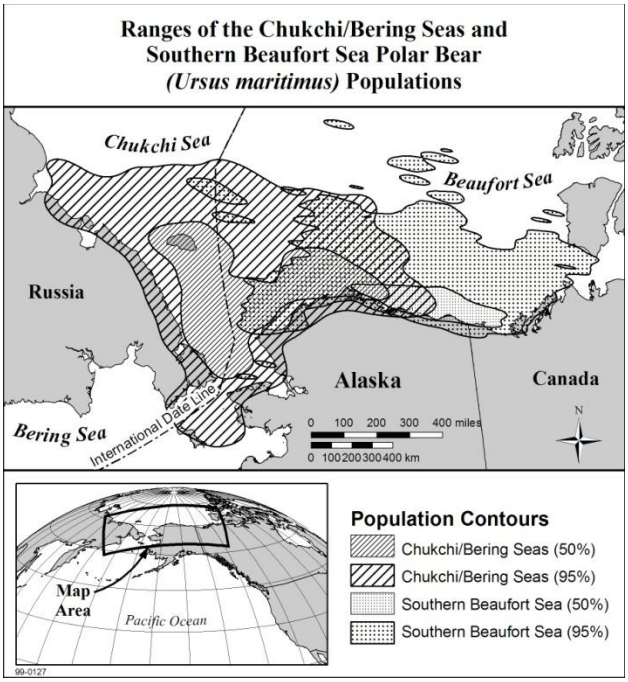

Figure 1. Ranges of Alaska polar bear stocks (USFWS 2009)

Use of subsistence-killed whale carcasses

Bowhead whale carcasses have been available to polar bears as a food source on the North Slope since the early 1970s (Koski et al. 2005). As many as 65 polar bears have been observed feeding at a single bowhead whale carcass (Miller et al. 2006). Barter Island (near Kaktovik) has had the highest recorded concentration of polar bears on shore (17.0 $\pm$ 6.0 polar bears/100 km) followed by Barrow (2.2 $\pm$ 1.8) and Cross Island (2.0 $\pm$ 1.8). This is thought to be due to the proximity to ice edge and higher ringed seal density at Barter Island (Schleibe et al. 2008), rather than the amount of whale harvest as the Kaktovik harvest is lower than that at Barrow or Cross Island.

Stable isotope analysis of polar bears in 2003 suggested that bowhead whale carcasses may have contributed 11-26% (95% CI) of the late winter (i.e. Febrary throughMarch) diet of the sampled

population (Bentzen et al. 2007). In the winter of 2003-2004, the proportion was lower, at around 0-41% (Bentzen et al. 2007). A wide range of isotope values further suggested that consumption of bowhead whales varied widely among individual bears (Bentzen et al. 2007). Because most bears feed on bowhead whale during the fall harvest and sampling from this study represented only the late winter diet, consumption may differ from what was determined in this study.

Subsistence harvest

The largest loss of polar bears from humans in the action area is from subsistence hunting. Harvest quota levels are set by the Inuvialuit-Inupaiq (I-I) council and the U.S. – Russia Polar Bear Commission (Commission) for the southern Beaufort Sea and Chukchi/Bering Sea stocks, respectively. The I-I council recently set a quota of 70 polar bears (email T. DeBruyn, August 13, 2010) based on a population estimate of 1,526 (Regehr et al. 2006; email T. DeBruyn, August 13, 2010). Recently (June 2010), the Commission adopted an annual take limit of up to 58 polar bears with no more than 19 females (DeBruyn et al. 2010). The reported annual average combined (Alaska-Canada) harvest for the southern Beaufort Sea from 2004 to 2009 was 44, and the 2008/2009 reported harvest for North Slope villages was 25 polar bears (DeBruyn et al. 2010).

Polar bear research

Currently there are several ongoing polar bear research programs studying polar bears in the action area. The long-term goal of these research programs is to gain information on the ecology and population dynamics of polar bears to help inform management decisions, especially in light of climate change. These activities may cause short-term adverse effects to individual polar bears targeted in survey and capture efforts and may incidentally disturb those nearby. In rare cases, research efforts may lead to injury or death of polar bears. Polar bear research is authorized through permits issued under the MMPA. These permits include estimates of the maximum number of bears likely to be directly harassed, subjected to biopsy darting, captured, etc., and include a condition that halts a study if a certain number of deaths, usually four to five, occur during the life of the permit; permits are usually for five years.

Other threats

Polar bear viewing at sites such as the whale bone piles may result in disturbance of polar bears by humans on foot, ATVs, snow machines, and other vehicles. Activities associated with the oil and gas industry have the potential to impact polar bears and their habitat. These activities are regulated and authorized through the issuance of Incidental Take Regulations (ITRs) under the MMPA, and since the ITRs went into effect in 1993, there has been no known instance of a polar bear being killed as a result of industrial activities (USFWS 2008).

Summary

The primary concern for polar bears in the action area is loss of sea ice. While other threats are managed and not currently thought to be significant threats to polar bear populations, each could become more significant in combination with future effects of climate change and the resultant loss of sea ice.

EFFECTS OF THE ACTION ON POLAR BEARS

This section of the BO provides an analysis of the effects of the proposed action on polar bears. Direct effects (those immediately attributable to the action), indirect effects (those caused by the proposed action, but which will occur later in time, and are reasonably certain to occur) are considered. Finally, the effects from interrelated and interdependent actions are also considered. These effects will then be added to the environmental baseline in determining the proposed action's effects to the species or its critical habitat (50 CFR Part 402.02).

Beneficial effects

Beneficial effects are those effects of an action that are wholly positive, without any adverse effects, on a listed species or designated critical habitat. Although the proposed research will contribute beneficially to polar bear management, the positive effects will be accomplished by expected adverse effects, and therefore do not meet the definition of beneficial effects.

Direct effects

Aerial surveys

Noise from aircraft overflights, and landings may adversely affect polar bears through disturbance. The USFWS reported that 14.2 to 28.9% of polar bears were observed to change their behavior during aerial surveys conducted at an altitude of 300 feet (Rode 2008, 2009, 2010). Therefore, we conservatively estimate 29% of non-denning polar bears observed during these aerial surveys are disturbed. For this project, we estimate that of the 400 polar bears permitted at Level B harassment by low-level flights, **116 bears per year** (400 bears x 29% = 116 bears) will be disturbed enough to temporarily change their behavior. This estimate most likely overestimates ESA take; the threshold for ESA take is lower than that under the MMPA, and delineating where disturbance that causes ESA take begins is difficult. Some unobserved polar bears may also be temporarily disturbed by survey activities. It is difficult to enumerate the number of undetected bears; because adverse effects that would cause large changes in behavior (e.g., running away) would be noticed by observers, we expect that any disturbance caused by research activities on unobserved bears would be minor and temporary.

FLIR surveys

Amstrup (1993) studied the response of denning bears to research aircraft flying less than 50 to about 500 meters above the ground and recorded 40 cases of potential disruption of denning by research aircraft (44 dens were located in this study). Two bears left their dens temporarily, but disturbances, did not appear to reduce cub production (Amstrup 1993). Assuming ESA take arises if a female polar bear leaves the den, we anticipate 4.5% (100 x [2/44]) of polar bears will be disturbed as a result of FLIR surveys. For this project, we estimate **that one female and her two cubs per year** (10 female polar bears x 4.5% = 0.45 polar bears, rounded up) will be temporarily disturbed by attempts to locate females in dens.

Capturing polar bears

Although it happens rarely, polar bears may be injured, develop infections, or die from the capture and sampling procedures. Amstrup and Durner (1995) studied survival of radio-collared female polar bears and their dependent young during a 12-year study of the Beaufort Sea population in which survival was estimated from 297 collared female bears. Controlling for

human-related mortality from hunting and poisoning, survivorship was 0.996 (95%, c.i. = 0.990-1.002). Although it is possible for collared bears to suffer severe cuts (Durner 2009), the very high survivorship of radio-collared female bears found by Amstrup and Durner (1995) indicates the collars and tracking has negligible influence on survival once a bear is successfully released from capture and handling.

The applicant has proposed tissue sample collection which will create small wounds. Some of the proposed tissue collection sampling, i.e., those pulling a pre-molar, will cause pain for an unknown, but finite, period after the bear is released. Other polar bear studies have documented infected wounds caused by research activities (Durner 2009), but used methods that were more invasive and created much larger wounds than is proposed in this study. We expect the infection rate from the proposed activities to be negligible. Assuming the permitted capture limit number is reached, **100 polar bears per year** will be captured. This actual number will likely be lower based on similar efforts in 2007, 2008, and 2009, when 35, 39, and 69 polar bears were captured, respectively. We expect that while there is some risk of unintentional injury during capture procedures, the researchers involved have sufficient experience to minimize severe injury or death from collaring and anesthetizing bears. No injuries or mortalities have occurred during the past three years of capture activities.

Biopsy darting

If the applicant reaches the proposed permitted limit, we estimate that **20 polar bears per year** (100%) will be chased, experience disturbance, and have a small wound from biopsy darting. The small wound is expected to cause pain for a short time, but the probability of infection is negligible. Estimates of incidental take for this activity are included in the 10 polar bears per year estimated below.

In addition to successful capture and biopsy darting, some additional individuals may be disturbed in rare cases when pursuit of bears with intent to dart is aborted to avoid unsafe conditions or terminate excessive pursuit. These situations occur approximately two to three times per year, but could, occur as many as 10 times per year. For the purposes of this BO, we estimate that **10 polar bears per year** will be disturbed from unsuccessful dart runs.

Long-term capture and disturbance effects

Capturing, biopsy-darting, and surveying polar bears could have unintended negative effects on polar bear health that extend beyond the time frame of the study. Cattet et al. (2008) investigated long-term effects (persisting $\geq$ 1 month) of capturing and handling of grizzly (*Ursus arctos*) and black (*U. americanus*) bears. They (2008) found aspartate aminotransferase and creatine kinase concentrations (which assess muscle injury) were above normal in 18% of grizzly bears captured by helicopter darting. Daily movements were 57% (c.i. = 45-74%) and 77% (c.i. = 64-88%) lower than those of normal for radio-collared grizzly and black bears, respectively, and returned to normal 3-6 weeks (grizzly bears: mean of 28 days, c.i. = 20–37 days; black bears: mean of 36 days, c.i. = 19–53 days) later. Cattet et al. (2008) also found that for both species, age-specific body condition of bears captured two or more times in a six year period was generally poorer than that of bears captured only once, with the magnitude of effect directly proportional to number of times captured and the effect more evident with age. However, the majority of bears in this study were captured using techniques that differ from those used by the applicant,

including leg snaring and culvert traps which were demonstrated to result in a greater frequency of muscle injury than helicopter darting. Thus, Cattet et al. (2008)'s conclusion that movement was restricted for three to six weeks following capture and that bears demonstrated poorer body condition may be more commonly associated with these methods than the method used by the applicant.

The proposed action involves capturing and possibly recapturing Chukchi/Bering Sea polar bears via helicopter and disturbing southern Beaufort Sea bears previously captured in other studies. While Ramsay and Stirling (1986) suggested that handling polar bears, especially sows with cubs, may have slight but detectable long-term negative effects, Rode et al. (2007) found no evidence that polar bears captured two or more times were smaller or in poorer condition than bears captured only once. This negative finding was consistent for all age groups (Rode et al. 2007). The applicant observes the majority of bears 24 hours post-capture and confirms that bears are walking and behaving normally within this time frame. Some bears have also been observed on seal kills within 24 hours of capture The effect of disturbing previously captured polar bears with aircraft (during survey efforts) is not known, but negative effects are likely much lower than recapturing polar bears. Recapturing polar bears in the Chukchi/Bering Sea occurs at most once per year and more likely once every two to four years. Because the modern method of re-capturing polar bears does not appear to have long-term effects on body condition and time between re-captures is likely greater than a year, we expect long-term capture effects of the proposed action on polar bears to be low.

Indirect effects
Indirect effects of the action are defined as "those effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur" (50 CFR §402.02).

Previously captured (or biopsy darted) bears may perceive a helicopter as a greater threat than bears without previous capture and/or darting experience, and their stress level may increase whenever a helicopter (including for those engaged in non-research activities) flies above it at a similar altitude.

Interrelated and interdependent effects
Interdependent actions are defined as "actions having no independent utility apart for the proposed action," while interrelated actions are defined as "actions that are part of a larger action and depend upon the larger action for their justification" (50 CFR §402.02). The Service can identify no effects from interdependent or interrelated actions resulting from this project.

Summary
Issuance of this MMPA permit would allow activities that <u>will adversely affect</u> polar bears through disturbance and capture.

CUMULATIVE EFFECTS

Under the ESA, cumulative effects are the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the Action Area considered in this BO. Future Federal

actions that are unrelated to the proposed action are not considered because they require separate consultation under the ESA.

Some disturbance of polar bears may occur from residents on the North Slope incidental to activities such as hunting and travel within polar bear habitat. This amount, however, is difficult to estimate due to lack of information.

CONCLUSION

The regulations (51 FR 19958) that implement section 7(a)(2) of the ESA define "jeopardize the continued existence of" as, "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." After reviewing the current status of the polar bear, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the issuance of a MMPA permit and the amendment to authorize activities, as proposed, is *not likely to jeopardize the continued existence of polar bears*.

The following information led us to the conclusion that this action, as proposed, is not likely to jeopardize the continued existence of these species:

1. Disturbance of bears during den detection and aerial surveys is temporary. Therefore, it is unlikely to significantly affect the reproduction, numbers, or distribution of polar bears.
2. Biopsy darting is not likely to lead to serious injury, infection, or death.
3. The researchers are unlikely to kill enough polar bears during captures to appreciably reduce the likelihood of survival and recovery of polar bears because the permit requires research to cease if and when four bears are injured or killed. Thus, there is a finite limit to the potential impacts, and we believe this limit is well below that which would result in significant population-level impacts.

STATUS OF POLAR BEAR CRITICAL HABITAT

The Service designated polar bear critical habitat on November 24, 2010 (75 FR 76086). The PCEs of critical habitat for the polar bear are:

1) **Sea-ice habitat** used for feeding, breeding, denning, and movements, which is sea ice over waters 300 m (984.2 ft) or less in depth that occurs over the continental shelf with adequate prey resources (primarily ringed and bearded seals) to support polar bears.
2) **Terrestrial denning habitat**, which includes topographic features, such as coastal bluffs and river banks, with the following suitable macrohabitat characteristics:
   a) Steep, stable slopes (range 15.5–50.0), with heights ranging from 1.3 to 34 m (4.3 to 111.6 ft), and with water or relatively level ground below the slope and relatively flat terrain above the slope;
   b) Unobstructed, undisturbed access between den sites and the coast;
   c) Sea ice in proximity to terrestrial denning habitat prior to the onset of denning during the fall to provide access to terrestrial den sites; and

d) The absence of disturbance from humans and human activities that might attract other polar bears.

3) **Barrier island habitat** used for denning, refuge from human disturbance, and movements along the coast to access maternal den and optimal feeding habitat, which includes all barrier islands along the Alaska coast and their associated spits, within the range of the polar bear in the United States, and the water, ice, and terrestrial habitat within 1.6 km (1 mi) of these islands (no-disturbance zone).

Critical habitat does not include manmade structures (e.g., houses, gravel roads, generator plants, sewage treatment plants, hotels, docks, seawalls, pipelines) and the land on which they are located existing within the boundaries of designated critical habitat on the effective date of this rule.

As described in the sections, *Polar Bear Status and Environmental Baseline of Polar Bears*, sea ice, including ice designated as critical habitat, is rapidly diminishing. Terrestrial denning locations in Alaska do not appear to be a limiting factor. However, rain-on-snow events may decrease den quality, and later onset of freeze-up in the fall may limit sea ice in proximity and therefore access to terrestrial denning habitat (FR 72 1064). Erosion of barrier islands and the Arctic shoreline, presumably caused by climate change (Mars and Houseknecht 2008), may be affecting terrestrial denning habitat by changing land features.

Human activities such as ground-based vehicular traffic and low-flying helicopters and planes occur in polar bear critical habitat. These activities may temporarily create disturbance between den sites and the coast, and may temporarily degrade the ability of barrier island habitat from being a refuge from human disturbance. However, these activities are usually infrequent and have short-term effects.

Summary

While other activities may diminish the quality of polar bear critical habitat, the primary factor affecting its status is loss of sea ice unit from climate change.

POLAR BEAR CRITICAL HABITAT ENVIRONMENTAL BASELINE

As the action area is a large proportion of the entire critical habitat, the condition of PCEs in the action area is similar to those in the entire critical habitat area.

EFFECTS OF THE ACTION ON POLAR BEAR CRITICAL HABITAT

This section of the BO provides an analysis of the effects of the proposed action on polar bear critical habitat. Direct effects (those immediately attributable to the action), indirect effects (those caused by the proposed action, but which will occur later in time, and are reasonably certain to occur) are considered. Finally, the effects from interrelated and interdependent actions are also considered. These effects will then be added to the environmental baseline in determining the proposed action's effects on critical habitat (50 CFR Part 402.02).

Direct effects

Effects on physical PCEs

The proposed action is unlikely to alter physical features of critical habitat or affect the PCEs to the degree that the habitat no longer can support the essential life functions of the polar bear. Because impacts to the physical environment will be limited to helicopter landings, use of snow mobiles and walking across the land and ice, impacts to the physical environment will be so minor as to be considered insignificant.

Effects of disturbance on the capability of critical habitat to support polar bears

Because the terrestrial denning and barrier island critical habitat units include lack of human disturbance as a PCE, the Service must separately analyze effects of disturbance on polar bears from its effects on critical habitat. The section *Effects of the Action on Polar Bears* included an analysis of possible effects of disturbance on polar bears and whether it rises to the level of take. In contrast, this section contains an analysis of disturbance effects on the ability of critical habitat to hold the value (e.g., lack of disturbance from humans) for which it was designated. Therefore, this section may reference disturbance of polar bears if it is meaningful to the discussion of the capability of critical habitat to support polar bears, but it is not a re-analysis of effects on polar bears and possible take.

Issuance of the permit would authorize southern Beaufort Sea aerial surveys, Bering/Chukchi Sea capture efforts and biopsy darting, and maternal den surveys that may alter the use of critical habitat by polar bears through the mechanism of disturbance. During aerial surveys, polar bears may respond by moving from their original positions, or entering the water if on land or ice. Similarly, capture efforts include a chase component which alters a bear's original location on sea ice. Capture efforts may also prevent other polar bears from using critical habitat occupied by researchers and the anesthetized polar bear. These disturbances could interfere with the capability of small, localized critical habitat areas to provide their intended function temporarily. These studies will be considered separately with respect to effects of disturbance on each critical habitat unit.

Chukchi Sea-Spring captures

Terrestrial Denning Habitat: Capture work could affect the use of denning habitat by bears if bears experience disturbance that prevents them from initiating dens or causes them to leave active dens. However, there is no designated terrestrial denning habitat in western Alaska where capture activities will take place. Additionally, of 147 bears captured in the past 3 years in the Chukchi Sea, no cubs-of-the-year have been captured or observed; of 10 collared females that denned during the winters of 2008-2009 and 2009-2010, 9 denned on land in Russia and one denned 400 miles northeast of Wrangel Island on pack ice; and long-term observations indicate denning primarily occurs in Russia. Thus, we expect that capture activities will have minimal effects on terrestrial denning critical habitat because these activities do not occur in this critical habitat unit or near denning bears.

Barrier Island Habitat: Capture efforts do not occur on or near barrier islands in the Chukchi Sea. Over the past 3 years of this ongoing capture effort in the Chukchi Sea, all bears have been caught on the sea ice with the majority of bears being captured more than 30 miles offshore. No bears have been observed on barrier islands and no bears have been captured on land. Land and

the nearshore habitat is avoided during search efforts because bears rarely occur there and subsistence whaling occurs during this time. Whaling by local communities requires that capture efforts occur at least 15 miles offshore. Overland flights from point to point occasionally occur, but bears are never captured bears within 15 miles of the coast. Because the only affect of capture activities on barrier islands are overflights to sea ice, their effects on barrier island critical habitat are minimal.

Sea Ice Habitat: Although the activities may temporarily reduce site specific availability of the sea ice habitat for feeding, mating, and movements and access to prey, these actions would be temporary (no more than three hours) and the sea ice habitat's capability to support feeding, mating, and movements of polar bears would return once the researchers leave. Therefore, the short-term effects of capture work on the availability of sea ice critical habitat are minimal.

Beaufort Sea-Winter Den Detection

All three critical habitat units include a PCE denning component, FLIR activities will occur in all three units and during the denning period; therefore den detection activities could affect the availability of denning habitat in all three units. Three methods are used to detect occupied maternal den sites: 1) Aerial forward looking infrared radar (FLIR); 2) Hand-held FLIR units: and 3) Scent-trained dogs. Typically aerial FLIR surveys are conducted first followed up by verification surveys using the scent-trained dogs and/or the hand-held FLIR units. However, new dens may be discovered by each method.

1) Aerial FLIR surveys are currently conducted at 600-1000 feet at 90 knots from a Twin Otter or helicopter. The relatively high altitude of the surveys minimizes effects of noise that may impact use of dens within polar bear critical habitat. Additionally, once a potential den site is located, measures are taken to stay as far back from the den as possible to further minimize disturbance of the den sites.
2) Hand-held FLIR surveys will occur at a distance no closer than 150 feet from dens. The ideal vehicle speed for this type of FLIR survey is 5-8 mph where a single pass will occur exposing a potential den site to ambient noise for up to 5 minutes. The survey is performed during early winter (December and January) after sows have entered dens. The survey distance is the minimum necessary to use FLIR equipment but also minimizes disturbance of potential den sites. Detecting behavioral changes of polar bears within dens is difficult, but the proposed action most likely minimally disturbs denning polar bears; surveys conducted in 2010 of tracked vehicles as they approached within 150 to 180 feet of two occupied den sites did not cause the sows to emerge from their dens.
3) Another form of detecting maternal polar bear den sites is by scent-trained dogs. Typically, the dog handler works from a snow machine and follows the dog at approximately 90-150 feet at the base of the bluff. An additional handler flanker parallels the dog/handler team downwind on the sea ice at approximately 150-300 feet from the bluff or bank. Once a dog alerts the handler, s/he calls the dog off so it does not disturb the bear more than necessary. In addition to working only when visibility is sufficient to detect non-hibernating bears or open dens, the dogs are not allowed to dig into dens, and the survey team immediately leaves the area once an alert from a dog is confirmed or if an open den or den with a "ventilation hole" is discovered. Nevertheless, there is a small possibility that a denning bear may respond to the noise. As with the hand-held FLIR detection method detecting behavioral changes of polar bears within den dens is difficult; however, Perham and Williams (2003),

Shideler (2007), Shideler and Perham (2008), and Shideler and Perham (2009) conducted a total of nine den surveys with dogs, and no sows emerged from their dens.

Because pregnant sows have already initiated maternal denning when this study commences, none of the den survey techniques will prevent them from initiating use of critical habitat for denning activities. All three surveys, however, might disturb polar bears so that they temporarily stop use of critical habitat for denning. Results from Amstrup (1993) suggest that ground disturbance occurring less than 50 meters to about 200 meters from dens with larger vehicles in March and April may cause sows to leave dens, but that sows will likely return and emerge with young. The experience and the minimization measures noted above will further ensure that polar bears will be able to use denning critical habitat after the researchers leave.

Beaufort Sea-Fall Aerial Surveys

The intent of aerial fall surveys is to census bears using the immediate coast and barrier islands. Some polar bears are disturbed by surveys and may temporarily change the way they are using the habitat units.

Terrestrial Denning Habitat and barrier island habitat used for denning: Aerial surveys occur over a period of 2-5 days, at two week intervals, 4-5 times per year along the coastline of the critical terrestrial and denning habitat. Seldom are flights flown inland from the coast. Aerial surveys are unlikely to impact occupied maternal dens because mean entry dates for land and pack-ice dens were11 November and 22 November, respectively (Amstrup 1995), and the surveys generally conclude by late October. The last survey of the year in mid to late October, does, however occur when pregnant females begin to actively search for suitable den sites, primarily on the coastal bluffs and river banks that are free from human disturbance and away from adult males. Though denning does occur on barrier islands, the majority of dens identified in previous studies occurred inland from the area covered during the aerial surveys. No actively denning bears have been encountered during the previous 6 years of this study. Disturbances from coastal surveys may cause temporary displacement from local den sites, if a denning bear were encountered, but typically these events are periodic, short in duration, and not overly traumatic to the bears and thus have not and are not likely to reduce the long-term availability of the available habitat or restrict movements to potential denning sites in the fall. Because the likelihood of encountering bears using critical habitat for denning activities is low, and if they are prevented from using the habitat in this manner it will only be for a short time, the effect of aerial surveys on the ability of critical habitat to support denning bears is minimal.

Barrier Island Habitat: While polar bears use barrier island critical habitat most frequently during the open water period in summer and early fall, sea ice is the polar bears preferred habitat and is used when available rather than barrier islands. Because they prefer sea ice and current climate conditions still allow for sea ice in Arctic regions during the fall, only a few bears of the southern Beaufort Sea stock will likely be using barrier island critical habitat during these surveys. Thus, if surveys prevented use of barrier island critical habitat, it would only be for a small proportion of the southern Beaufort Sea stock. Further, most bears are minimally disturbed by aerial surveys, a few run and/or enter the water and start swimming; thus they stop using the habitat for the value which it was designated (i.e., resting, feeding, or movement along the coast). Evidence that bears are very likely to be re-sighted during repeated surveys in one fall

season indicates that these disturbances are temporary (e.g., likely lasting a few moment to about five minutes) and the value of critical habitat will return to a zone free of human disturbance once the helicopter leaves. Thus, we expect that fall aerial surveys will have no long-term effects on the intended purpose of designated barrier island critical habitat and the no disturbance zone.

Sea Ice Habitat: Sea ice habitat is used primarily for feeding, long-distance movements, and resting. The fall is a significant feeding period, as bears move from the offshore pack ice or from the shore to the newly formed ice over the shallower waters over the continental shelf where seal densities are higher (Durner and Amstrup 1996). Because aerial surveys occur during this period and over newly-formed ice, these surveys can affect the ability of sea ice to provide feeding and resting habitat. Sea ice, however, is normally only present during the last few surveys. Additionally, because surveys are focused on the immediate coastline and barrier islands, only an extremely small proportion of sea ice critical habitat will be affected by disturbance. While disturbances may temporarily displace bears from local areas, disturbances are typically short in duration (up to five minutes) and extent (bears typically move up only short distances). Because only a portion of aerial surveys will occur during the presence of sea ice, surveys will take place in an extremely small portion of sea ice, duration of disturbance is extremely small, and bears typically are only displaced a short distance, effects of aerial surveys on sea ice critical habitat are minimal.

Indirect effects

Indirect effects of the action are defined as "those effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur" (50 CFR §402.02). Because we expect disturbance within polar bear critical habitat to occur only when researchers are present, we do not expect indirect effects to occur.

Interrelated and interdependent effects

Interdependent actions are defined as "actions having no independent utility apart for the proposed action," while interrelated actions are defined as "actions that are part of a larger action and depend upon the larger action for their justification" (50 CFR §402.02). The Service can identify no effects from interdependent or interrelated actions resulting from this project.

CUMULATIVE EFFECTS

Under the ESA, cumulative effects are the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this BO. Future Federal actions that are unrelated to the proposed action are not considered because they require separate consultation under the ESA.

Some private citizens may create a disturbance as they travel in the area while hunting, camping, etc., within polar bear critical habitat that temporarily precludes its use. Because of the remoteness of most of the action area, the cumulative effects from these activities are likely low.

CONCLUSION

The regulations (51 FR 19958) that implement section 7(a)(2) of the ESA define "jeopardize the continued existence of" as, "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." After reviewing the current status of the polar bear, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the issuance of this permit, as proposed, is *not likely to adversely modify polar bear critical habitat*.

We conclude that authorization of the permit will not adversely modify critical habitat. We based our conclusion on the following:

1. The proposed action does not include changes to the physical features of critical habitat.
2. The reduction in use of the habitat as a result of disturbance in all critical habitat units is temporary, short lived and of small geographic scale; researchers will only be present for portions of the spring and fall. Therefore, the habitat and its conservation value to polar bears will recover when the research is completed.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. *Take* is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. *Harm* is further defined by FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. *Harass* is defined by FWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Polar bears

Under the authorization of section 4(d) of the ESA, the Service amended regulations at 50 CFR part 17 to create a final special rule for polar bears so that if an activity is authorized or exempted under the MMPA or CITES, the Service will not require any additional authorization under the ESA regulations associated with that activity (73 FR 76249). Intentional and incidental take for polar bears will be authorized under the MMPA permit analyzed in this BO.

REPORTING REQUIREMENTS

The Fairbanks Endangered Species Office requests a report, due at the same time as reporting requirements under the MMPA permit, containing the following:

1. Annual reports provided to DMA for all study components as required by the MMPA permit;
2. The number of polar bears pursued in abandoned dart runs; and
3. Number of flush events caused by disturbance during den detection surveys, whether or not the female(s) returned to the den(s), and whether or not the disturbance caused early den abandonment;
4. Incidental disturbance of polar bears during captures (e.g., polar bears observed but not pursued in capture runs) and den detections (e.g., transient polar bears).

Reinitiation Notice

This concludes formal consultation on the actions outlined in Permit MA046081-3. As provided in 50 CFR 402.16, initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the action agency that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the action agency is subsequently modified in a manner that causes an effect to listed species or critical habitat not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation of consultation. The DMA should also re-initiate consultation if it becomes evident that any additional activity not described in their permit may take place without separate consultation on that action.

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