Programmatic
Biological Opinion
For
Polar Bears (*Ursus maritimus*)
On
Beaufort Sea Incidental Take Regulations

Photo by Susanne Miller, USFWS

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List of Abbreviations

AOGA = Alaska Oil & Gas Association
BLM = Bureau of Land Management
BO = biological opinion
BOP = blowout preventer
BPXA = BP Exploration (Alaska), Inc.
CFR = Code of Federal Regulations
COE = U.S. Army Corps of Engineers
CS = Chukchi Sea polar bear population
DLP = defense of life & property
EA = Environmental Assessment
EIS = Environmental Impact Statement
ESA = Endangered Species Act of 1973, as amended
FFWFO = Fairbanks Fish & Wildlife Field Office (of the Service, Fairbanks, AK)
FLIR = Forward Looking Infrared imagery
FR = Federal Register
Industry = oil and gas industry
ITS = Incidental Take Statement
IUCN = International Union for the Conservation of Nature
LOA = Letter of Authorization (under sec. 101(a)(5) of the MMPA)
MMM = Marine Mammal Management Office (of the Service, Anchorage, AK)
MMO = marine mammal observer
MMPA = Marine Mammal Protection Act of 1972, as amended
MMS = Minerals Management Service
NB = Northern Beaufort Sea polar bear population
NEPA = National Environmental Policy Act
NPR-A = National Petroleum Reserve-Alaska
NWT = Northwest Territory
OCs = organochlorine compounds
OCS = outer continental shelf
PBSG = Polar Bear Specialist Group
POC = Plan of Cooperation
POPs = persistent organic pollutants
PVA = population viability analysis
Regulations = incidental take regulations for oil and gas exploration activities in the Beaufort Sea and adjacent northern coast of Alaska
SB = Southern Beaufort Sea polar bear population
SDC = steel drilling caisson
Secretary = Secretary of the Department of the Interior
Service = U.S. Fish and Wildlife Service
USGS = U.S. Geological Survey

1. Introduction

This document transmits the U.S. Fish and Wildlife Service's (Service) programmatic biological opinion (BO) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*., ESA), on effects to the polar bear (*Ursus maritimus*) of existing incidental take regulations for year-round oil and gas exploration, development, and production activities in the Beaufort Sea and adjacent northern coast of Alaska (Regulations). No other threatened or endangered species will be affected by the action. The Beaufort Sea Regulations were finalized on August 2, 2006 (71 FR 43925) and provide authorization under the Marine Mammal Protection Act of 1972, as amended ((16 U.S.C. 1361 *et seq.*, MMPA) for the non-lethal, *incidental take* of *small numbers* of Pacific walruses (*Odobenus rosmarus divergens*) and polar bears (MMPA term definitions provided below). The Beaufort Sea Regulations are in effect for five years from date of issuance and remain effective through August 2, 2011.

The Service proposed to *list* the polar bear range-wide as a *threatened species* under the ESA on January 9, 2007 (72 FR 1064, January 9, 2007) (ESA term definitions provided below). Critical habitat was not determinable at that time. When a species is proposed for listing, the Service utilizes section 7(a)(4) of the ESA that provides a conference mechanism for identifying and resolving potential conflicts between a proposed action and proposed species or proposed critical habitat. While consultations are required when the proposed action *may affect* listed species, a conference is required only when the proposed action is likely to *jeopardize the continued existence* of a proposed species or destroy or adversely modify proposed critical habitat. However, Federal action agencies may request a conference on any proposed action that may affect proposed species or proposed critical habitat. Because it was determined by the Service that activities authorized in the Regulations may affect polar bears, a conference was initiated in January 2008. While the conference opinion was being drafted, the final rule listing the polar bear as a threatened species was published on May 15, 2008 (73 FR 28211). The conference opinion, therefore, was finalized as a BO.

The Regulations were promulgated by the Service's Marine Mammal Management (MMM) office. ESA section 7 conferences/consultations on proposed/listed species that primarily inhabit northern Alaska are conducted by the Service's Fairbanks Fish and Wildlife Field Office (FFWFO). Therefore, this consultation for polar bears on the Beaufort Sea Regulations is an intra-Service consultation, which considers effects of Service actions on listed species.

The Service has responsibility for the polar bear under the MMPA and ESA. Section 101(a)(5) of MMPA allows for the incidental take of small numbers of marine mammals, in response to requests by U.S. citizens engaged in a specified activity (other than commercial fishing) in a specified geographic region; section 7(o)(2) of ESA allows for exemptions, under certain circumstances, to the section 9 take prohibitions for endangered and threatened species incidental to otherwise lawful activities that have Federal involvement or control. If a marine mammal species is listed as endangered or threatened under the ESA, the requirements of both MMPA and ESA must be met before the incidental take can be authorized.

For the Service to consider allowing incidental take under MMPA, a written request for specific regulations must be submitted to the Service containing detailed information on the activity as a

whole and impacts of the total potential take. The Service evaluates the impacts resulting from all entities conducting the specified activity, not just the impacts from one entity's activities. If the Service finds total taking expected from the specified activity will have a *negligible impact* on the species or stock and will not have an *unmitigable adverse impact* on the availability of the species or stock for subsistence uses, specific regulations will be issued that establish permissible methods of taking and other means of affecting the least practicable adverse impact on the species. After regulations are issued, individual Letters of Authorization (LOAs) must be obtained from the Service by those conducting projects under the activity (50 CFR 18.27(f)). LOAs may contain project-specific mitigation measures and "will specify the period of validity" (§18.27(f)(4)). LOAs for exploration and development projects are issued under the Beaufort Sea Regulations for up to one year. Production fields are issued LOAs for the duration of the Regulations, where annual monitoring reports are required annually in order for the LOA to remain valid.

For the Service to exempt incidental take under ESA, the Service must conclude that the take associated with a Federal action (1) is not likely to jeopardize listed species, or destroy or adversely modify designated critical habitat, (2) results from an otherwise lawful activity, and (3) is incidental to the purpose of the action. Further, the exemption provided as a result of formal consultation must include measures to minimize take. Therefore, consistent with ESA and regulations at 50 CFR §402.14(i), incidental take statements for marine mammals are not included in formal consultations until regulations, authorizations, or permits under section 101(a)(5) of the MMPA are in effect.

Generally, if an action meets the MMPA standard of negligible impact in a specified geographic area of consideration, there should be little potential for the action to jeopardize the species. Indeed, during early conference discussions, the Service concluded that the Regulations are not likely to pose jeopardy to polar bears under ESA, particularly because the species was proposed range wide, and the negligible impact determination for the Regulations was made at the affected stock level (i.e., Southern Beaufort Sea stock). See Appendix 1 for a summary of consultation activities.

Definitions of key terms used in the Regulations and this BO are listed below. Additional definitions for MMPA terms can be found in 50 CFR Part 18; additional definitions for ESA terms can be found at 50 CFR §402. An administrative record of this consultation is on file at the FFWFO in Fairbanks, AK.

MMPA Terms:

Incidental, but not intentional, taking - take events that are infrequent, unavoidable, or accidental. This does not mean that the taking must be unexpected.

Negligible impact - an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

Small numbers – refers to a portion of a marine mammal species or stock whose taking would have a negligible impact on that species or stock.

Take - to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal. For activities other than military readiness activities or scientific research conducted by or on behalf of the Federal government, the MMPA defines harassment as any act of pursuit, torment, or annoyance which: (1) has the potential to injure a marine mammal or marine mammal stock in the wild (the MMPA calls this Level A harassment); or (2) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (the MMPA calls this Level B harassment).

Unmitigable adverse impact - is an impact resulting from the specified activity (1) that is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by (i) causing the marine mammals to abandon or avoid hunting areas, (ii) directly displacing subsistence users, or (iii) placing physical barriers between the marine mammals and the subsistence hunters; and (2) that cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

ESA Terms:
Incidental take – take of listed fish or wildlife species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by a Federal agency or applicant.

Jeopardize the continued existence - 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.

Listed species – any species of fish, wildlife or plant which has been determined to be endangered or threatened under section 4 of the ESA.

May affect - the appropriate conclusion when a proposed action may pose any effects on listed species or designated critical habitat.

Take - to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. Harm is further defined by the Service as an act which actually kills or injures wildlife, and may include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the Service as 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.

Threatened species – any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

2. Description of the Action

This section provides a description of the Federal action. In this case, the action under consideration is the Service's Beaufort Sea Incidental Take Regulations under section 101(a)(5) of

the MMPA, not the Industry activities themselves (although those activities are described herein). Neither the action nor this programmatic BO provides authorization for the actual activities associated with oil and gas exploration, development, or production. Industry activities included in the Beaufort Sea Regulations will need to acquire all appropriate Federal and/or State permits in order to legally proceed.

The Service will conduct separate consultations as needed on other agency actions and Industry activities in the Beaufort Sea, as they are proposed. For example, the Service notified Minerals Management Service (MMS) that incremental actions associated with Lease Sale 193 in the Chukchi Sea will require a polar bear ESA consultation if the species is listed (USFWS 2007), as would oil and gas development within the National Petroleum Reserve–Alaska (NPR–A). In the Beaufort Sea, although subsequent Federal approvals (such as MMS issuing an exploration permit) would require consultation, we would expect such subsequent consultations to be greatly streamlined as long as the action is fully consistent with the Beaufort Sea MMPA Regulations.

This description of the action is based upon the Final Rule Beaufort Sea Incidental Take Regulations (71 FR 43925, August 2, 2006), the Final Environmental Assessment (EA) of the Final Rule (dated June 2006), and LOAs that have been issued by the Service since the Regulations' effective start date. The action promulgates Regulations for walruses and polar bears, both of which are presented here for completeness because they are frequently inter-related. However, this BO only considered effects of the Regulations on the polar bear.

Summary of Proposed Regulations

The Regulations authorize the non-lethal, incidental, unintentional take of small numbers of Pacific walruses and polar bears during year-round oil and gas industry (Industry) exploration, development, and production activities in the Beaufort Sea and adjacent northern coast of Alaska. The rule is in effect for up to five years from the date of issuance. The Regulations include permissible methods of non-lethal taking, measures to ensure the least practicable adverse impact on the species and the availability of these species for subsistence uses, and requirements for monitoring and reporting. The action also includes subsequent issuance by the Service of LOAs to conduct specific projects under the provisions of these Regulations when requested by citizens of the United States. In the Regulations, the Service finds the total expected takings of walruses and polar bears during Industry activities will have a negligible impact on these species and will not have an unmitigable adverse impact on the availability of these species for subsistence use by Alaska Natives.

History of Marine Mammal Incidental Take Regulations in Alaska

Industry conducts activities, such as oil and gas exploration, development, and production, in marine mammal habitat that could result in the taking of marine mammals. Although Industry is under no legal requirement to obtain incidental take authorizations, since 1991, Industry has requested, and the Service has issued regulations for, incidental take authorization for conducting activities in areas of walrus and polar bear habitat. Incidental take regulations for walruses and polar bears in the Beaufort Sea were issued previously from 1993 to present: November 16, 1993 (58 FR 60402); August 17, 1995 (60 FR 42805); January 28, 1999 (64 FR 4328); February 3, 2000 (65 FR 5275); March 30, 2000 (65 FR 16828); November 28, 2003 (68 FR 66744); and August 2, 2006 (71 FR 43926). In the adjacent Chukchi Sea, incidental take regulations have been issued

previously for the period of 1991–1996 (56 FR 27443; June 14, 1991) and currently for the period of 2008-2013 (73 FR 33211, June 11, 2008).

Current Industry Incidental Take Regulation Request

On August 23, 2002, the Alaska Oil and Gas Association (AOGA), on behalf of its members, (Alyeska Pipeline Service Company; Marathon Oil Company; Anadarko Petroleum Corporation Petro Star, Inc.; BP Exploration (Alaska), Inc.; Phillips Alaska, Inc.; ChevronTexaco Corporation; Shell Western E&P, Inc.; Cook Inlet Pipe Line Company; Tesoro Alaska Company; Cook Inlet Region, Inc.; Total E&P USA; EnCana Oil & Gas (USA), Inc.; UNOCAL; Evergreen Resources, Inc.; Williams Alaska Petroleum, Inc.; ExxonMobil Production Company; XTO Energy, Inc.; and Forest Oil Corporation) requested that the Service promulgate regulations to allow the non-lethal, incidental take of small numbers of walruses and polar bears in the Beaufort Sea for a period of five years. AOGA, on behalf of its members, provided an addendum in August 2004. In July 2004, BP Exploration (Alaska), Inc. (BPXA) requested regulations to cover its operations. As, the BPXA request was encompassed by the scope of the AOGA request, the petitions were combined.

The combined requests were for regulations to allow the incidental, non-lethal take of small numbers of walruses and polar bears in association with oil and gas activities in the Beaufort Sea and adjacent coastline projected out to the year 2011. The information provided by the petitioners indicated that projected oil and gas activities over this timeframe will include offshore and onshore exploration activities and new and ongoing development and production activities. The petitioners specifically requested that these regulations be issued for non-lethal take. Industry has indicated that, through implementation of the mitigation measures, it is confident lethal take will not occur.

Description of Geographic Region

The Regulations allow Industry to incidentally take small numbers of walruses and polar bears within the same area, referred to as the Beaufort Sea Region (Figure 1), as covered by previous regulations. This region is defined by a north-south line through Point Barrow, Alaska, and includes all Alaska coastal areas, State waters, and all Outer Continental Shelf (OCS) waters east of that line to the Canadian border. The onshore region is the same north-south line at Point Barrow, 40 kilometers (25 miles) inland, and extending east to the Canning River. The Arctic National Wildlife Refuge is not included in the area covered by these regulations. It is noteworthy that the north–south line at Point Barrow is the eastern border of the geographic region of the current Chukchi Sea incidental take regulations.

The area described above also constitutes the “action area” for the purposes of this BO. The “action area” is the area that encompasses all direct and indirect effects of a proposed action.

Description of Industry Activities

This section briefly describes the types and scale of oil and gas activities projected to occur in the Beaufort Sea Region over the specified time period (2006–2011). This information is based upon information provided by the petitioners and LOAs issued since the effective date of the Regulations. The Service has used these descriptions of activity as a basis for its findings. If requests for LOAs exceed the projected scope of activity analyzed under the Regulations, the Service would reevaluate its findings to determine if they continue to be appropriate before further LOAs are issued.

The Service does not know all specific locations where oil and gas activities will occur over the regulatory period. The location and scope of the specific activities will be determined based on a variety of factors, including the outcome of future Federal and State oil and gas lease sales and information gathered through subsequent exploration activities.

Incidental take regulations do not authorize the placement and location of Industry activities; they can only authorize incidental take of walruses and polar bears. Allowing the activity at particular locations is part of the permitting process which is authorized by the lead permitting agency, such as Minerals Management Service (MMS), Army Corps of Engineers (COE), or Bureau of Land Management (BLM). However, the Service can influence the placement of infrastructure within projects through mitigation measures in order to minimize disturbance and protect polar bears. The specific dates and durations of the individual operations and their geographic locations will be provided to the Service in detail when requests for LOAs are submitted.

Oil and gas activities anticipated and considered in the analysis of the Beaufort Sea Regulations include exploration, development, and production operations of oil and gas reserves, as well as environmental monitoring associated with these activities, on the northern coast of Alaska.

Alaska's North Slope encompasses an area of 228,644 square km (88,280 square mi) and currently contains 11 oil and gas field units associated with Industry. These include the Greater Prudhoe Bay, Duck Island, Badami, Northstar, Kuparuk River, Colville River, Oguruk, Tuvaq, Nikaitchuq, Milne Point, and Point Thomson. These units can encompass exploration, development, and production activities. In addition, some of these fields include associated satellite oilfields: Sag Delta North, Eider, North Prudhoe Bay, Lisburne, Niakuk, Niakuk-Ivashak, Aurora, Midnight Sun, Borealis, West Beach, Polaris, Orion, Tarn, Tabasco, Palm, West Sak, Meltwater, Cascade, Schrader Bluff, Sag River, and Alpine. Additional proposed satellite prospects identified within or near existing oil and gas field units, such as Pioneer Natural Resource's Gwydyr Bay leases and Kerr McGee's Two Bits Prospect, were also analyzed in the rule.

Exploration Activities

Exploration activities may occur onshore or offshore and include: geological surveys; geotechnical site investigations; reflective seismic exploration; vibrator seismic data collection; airgun and water gun seismic data collection; explosive seismic data collection; vertical seismic profiles; subsea sediment sampling; construction and use of drilling structures such as caisson-retained islands, ice islands, bottom-founded structures (steel drilling caisson), ice pads and ice roads; oil spill prevention, response, and cleanup; and site restoration and remediation. Exploration activities could also include the development of staging facilities. The level of exploration activities is expected to be similar to the level during the past regulatory periods, although exploration projects may shift to different locations, particularly NPR–A. The location of new exploration activities within the geographic region of the rule will, in part, be determined by the following State and Federal oil and gas lease sales:

- *State of Alaska Lease Sales*: The State of Alaska practices area-wide leasing in which the State annually offers all available State acreage not currently under lease within areas that are already subjected to leasing. North Slope Area-wide Lease Sales are held annually in October. Five

lease sales have been held as of 2006. As of July 2004, there are 777 active leases in this area, encompassing 2.4 million acres. Beaufort Sea Area-wide Lease Sales are held annually in October. Four lease sales have been held as of 2006. As of July 2004, there are 194 active leases in this area, encompassing 440,000 acres. Future State of Alaska lease sales will continue.

- *Northeast Planning Area of NPR–AI*: Two lease sales have been held in the Northeast Planning Area of NPR–A. The 1999 lease sale resulted in the sale of 133 tracts, and the 2002 sale resulted in the sale of 60 tracts. Acreage awarded under these two lease sales totals 1.4 million acres. Thirteen exploratory wells have been drilled as of 2006. Lands in the Northeast NPR-A were originally made available for leasing pursuant to a 1998 Northeast NPR-A Integrated Activity Plan/Environmental Impact Statement (IAP/EIS) Record of Decision (ROD). In 2006, the Secretary of the Interior amended the 1998 ROD to make additional lands available for leasing, pursuant to an Amended IAP/EIS. In September 2006, the 2006 ROD was vacated by the U.S. District Court for the District of Alaska. BLM then prepared a Supplemental IAP/EIS in order to make additional lands available for leasing but to defer from leasing lands northeast of Teshekpuk Lake for 10 years. As of the date of this BO, the ROD has not been issued.

- *OCS Lease Sales*: In February 2003, the MMS issued the Final EIS for three lease sales planned for the Beaufort Sea Planning Area in the OCS. Sale 186 was held in September 2003, resulting in the leasing of 34 tracts. Sale 195 was held in March 2005. Sale 202 was held in April 2007. While the disposition of the leases purchased is highly speculative at this time, it is probable that at least some seismic exploration and possibly some exploratory drilling could take place during the 5-year period of the regulations.

Exploratory drilling for oil is an aspect of exploration activities. Exploratory drilling and associated support activities and features include: transportation to site; setup of up to 100-person camps and support camps (lights, generators, snow removal, water plants, wastewater plants, dining halls, sleeping quarters, mechanical shops, fuel storage, camp moves, landing strips, aircraft support, health and safety facilities, data recording facility and communication equipment); building gravel pads; building gravel islands with sandbag and concrete block protection; ice islands; ice roads; gravel hauling; gravel mine sites; road building; pipelines; electrical lines; water lines; road maintenance; buildings and facilities; operating heavy equipment; digging trenches; burying and covering pipelines; sea lift; water flood; security operations; dredging; moving floating drill units; helicopter support; and drill ships such as the SDC, CANMAR Explorer III, and the Kulluk.

During the regulatory period, exploration activities are anticipated to continue in the current oil field units, including those projects identified by Industry below.

- *Oguruk Unit*: The Oguruk Unit is located adjacent to and immediately northwest of the Kuparuk River Unit in shallow waters of the Beaufort Sea, near Thetis Island. During the initial analysis of the petition, the unit operator, Pioneer Natural Resources, was conducting a feasibility study for the potential development of reservoirs encountered in previous exploration drilling. As of 2008, Pioneer began oil production. Facilities include an offshore production

island between Thetis Island and the Colville River Delta, a 9.2-km (5.7-mi) underground pipeline, where landfall occurs near the mouth of the Kalubik Creek.

- *Nikaitchuq Unit*: The Nikaitchuq Unit is located near Spy Island, north of Oliktok Point and the Kuparuk River Unit, and northwest of the Milne Point Unit. The original operator, Kerr-McGee Oil and Gas Corporation, drilled three exploratory wells on and immediately adjacent to Spy Island, 6.4 km (4.0 mi) north of Oliktok Point in the ice-covered season of 2004–2005. ENI Petroleum is the current owner, and they are moving to develop this site as a future production area. Facilities will include one offshore production islands south of the Jones Island group and approximately 21 km (13 mi) of underground pipeline connecting the sites to a mainland landfall near Oliktok Point and one mainland production facility at Oliktok Point.

- *Two Bits Prospect and Nearshore Stratigraphic Test Well, Eastern Beaufort Sea*: Since promulgation of the Regulations, these two projects are no longer proposed.

Exploration activities that occur beyond the current oil field units were also analyzed, including the Industry projects below.

- *Shell Exploration and Production Company's Beaufort Sea Program*: Shell Exploration and Production Company has conducted an open water seismic program, which consists of an estimated 4,828 km (3,000 mi) of 3D seismic line acquisition and site clearance surveys for the past two years in the central Beaufort Sea. The open water program involves geotechnical work and will occur between August and October annually, depending on ice and whaling activities.

- *Cape Simpson Support Program; Ukpeagvik Inupiat Corporation (UIC)*: UIC entered into lease agreements with the North Slope Borough to operate North Slope facilities between Prudhoe Bay and Barrow in support of oil and gas exploration activities. UIC is developing a staging area at Cape Simpson, between Smith Bay and Dease Inlet, on the Beaufort Sea coast. The following activities are likely to occur during their operations on the North Slope: marine transportation and barging; fixed and temporary camp operations; equipment and materials staging and storage; flight operations; ice road construction; and exploration site support.

Development Activities

Development activities associated with oil and gas industry operations include: road construction; pipeline construction; waterline construction; gravel pad construction; camp construction (personnel, dining, lodging, maintenance shops, water plants, wastewater plants); transportation (automobile, airplane, and helicopter traffic); runway construction; installation of electronic equipment; well drilling; drill rig transport; personnel support; and demobilization, restoration, and remediation.

In the most recent Beaufort Sea Regulations petition, the Alpine West Development was identified as an Industry development activity at the time of analysis. The development and construction of five Alpine satellite drill sites (identified as CD–3 through CD–7), gravel roads, an airstrip, and pipelines was in its second year in 2006. Two of the drill sites, CD–3 (also known as Fiord prospect or CD-North), and CD–4, (also known as the Nanuq prospect or CD South), are in the

Colville River Delta. The CD–3 drillsite is located north of CD–1 (Alpine facility) and is proposed to be a roadless development. The remaining drill sites are proposed to be connected to CD–1 by road. Three of the drill sites, CD–5 (also known as Alpine West prospect), CD–6 (Lookout prospect), and CD–7 (Spark prospect), are in the NPR–A. Construction of CD–3 and CD–4 drill sites began in winter 2004/2005, with production startup for both drill sites in late summer 2006. The three NPR–A drill sites are scheduled for construction from the winter 2007 through winter 2010. All drill sites are scheduled to be in production by summer 2010.

BPXA is planning to develop the Liberty oil field in the Beaufort Sea using extended reach drilling technology from onshore. The Liberty prospect is located approximately 8.9 km (5.5 mi) offshore in 6 meters (20 feet) of water, approximately 13 km (8 mi) east of the Endicott development. The development of Liberty was first proposed in 1998 when BPXA submitted a plan to the MMS for a production facility on an artificial island in Foggy Island Bay. In 2002, BPXA put the project on hold to review project design and economics after the completion of BPXA's Northstar project. In August 2005, BPXA moved the project onshore to take advantage of advances in extended reach drilling. Liberty wells will extend as much as 13 km (8 mi) offshore.

Production Activities

Production activities encompass activities in support of oil and gas production within the oil and gas field units. These include: personnel transportation (automobiles, airplanes, helicopters, boats, rolligons, cat trains, and snowmobiles); and unit operations (building operations, oil production, oil transport, restoration, remediation, and improvement of oil field operations). Production activities are permanent, year-round activities, whereas exploration and development activities are usually temporary and seasonal.

Production units and facilities analyzed for the Regulations included those operated by BPXA (Greater Prudhoe Bay, Endicott, Milne Point, Badami, Northstar), ConocoPhillips Alaska, Inc. (Kuparuk River, Alpine), and Pioneer Natural Resources Alaska, Inc. (Oguruk). Two other production projects are in development and have the potential to be producing oil within the timeframe of the regulations. They are the Nikaitchuq Development, operated by ENI Petroleum and the Liberty Development, operated by BPXA. If the activities and potential impacts are within the scope of activities and impacts analyzed in this rule, LOAs may be issued for the activity.

Proposed production activities will increase the total area of the industrial footprint by the addition of new facilities, such as drill pads, pipelines, and support facilities, in the geographic region; however, oil production volume is expected to decrease during the 5-year regulatory period, despite new fields initiating production. This is due to currently producing fields reducing output and new fields not replacing that output. Current monitoring and mitigation measures, described later, will be kept in place.

Information Required to Obtain a Letter of Authorization

Per 50 CFR §18.124(c) of the Regulations, applicants for a LOA must include the following:

(1) A description of the activity, the dates and duration of the activity, the specific location, and the estimated area affected by that activity, i.e., a Plan of Operation.

(2) A site-specific plan to monitor the effects of the activity on the behavior of polar bear and Pacific walrus that may be present during the ongoing activities. The monitoring program must document the effects to these marine mammals and estimate the actual level and type of take. The monitoring requirements will vary depending on the activity, the location, and the time of year.

(3) A site-specific polar bear awareness and interaction plan.

(4) A Plan of Cooperation to mitigate potential conflicts between the proposed activity and subsistence hunting, where relevant. This Plan of Cooperation must identify measures to minimize adverse effects on the availability of polar bear and Pacific walrus for subsistence uses if the activity takes place in or near a traditional subsistence hunting area. Some of these measures may include, but are not limited to, mitigation measures described in §18.128.

Letter of Authorization-Specific Measures

Mitigation, monitoring and reporting measures are generally required by the Service for each LOA issued under incidental take regulations. Accordingly, the following will also be required under the Beaufort Sea Regulations (§18.128):

(a) We require holders of Letters of Authorization to cooperate with us and other designated Federal, State, and local agencies to monitor the impacts of oil and gas exploration, development, and production activities on polar bear and Pacific walrus.

(b) Holders of Letters of Authorization must designate a qualified individual or individuals to observe, record, and report on the effects of their activities on polar bear and Pacific walrus.

(c) All holders of Letters of Authorization are required to have an approved polar bear and/or walrus interaction plan on file with the Service and on-site, and polar bear awareness training will also be required of certain personnel. Interaction plans must include:
    (1) The type of activity and, where and when the activity will occur, i.e., a Plan of Operation;
    (2) A food and waste management plan;
    (3) Personnel training materials and procedures;
    (4) Site at-risk locations and situations;
    (5) Walrus/bear observation and reporting procedures; and
    (6) Bear/walrus avoidance and encounter procedures.

(d) All applicants for a Letter of Authorization must contact affected subsistence communities to discuss potential conflicts caused by location, timing, and methods of proposed operations and submit to us a record of communication that documents these discussions. If appropriate, the applicant for a Letter of Authorization must also submit to us a Plan of Cooperation that ensures that activities will not interfere with subsistence hunting and that adverse effects on the availability of polar bear or Pacific walrus are minimized.

(e) Mitigation measures that may be required on a case-by-case basis include:

(1) The use of trained marine mammal monitors associated with marine activities. We may require a monitor on the site of the activity or on board drill ships, drill rigs, aircraft, icebreakers, or other support vessels or vehicles to monitor the impacts of Industry's activity on polar bear and Pacific walrus.
(2) The use of den habitat map developed by the USGS. A map of potential coastal polar bear denning habitat can be found at: http://www.absc.usgs.gov/research/sis_summaries/polar_bears_sis/mapping_dens.htm. This measure ensures that the location of potential polar bear dens is considered when conducting activities in the coastal areas of the Beaufort Sea.
(3) The use of Forward Looking Infrared (FLIR) imagery, polar bear scent-trained dogs, or both to determine the presence or absence of polar bear dens in area of the activity.
(4) Restricting the timing of the activity to limit disturbance around dens.
(5) Requiring a 1-mile exclusion buffer surrounding known dens. If known occupied dens are located within an operator's area of activity, we will require a 1-mile exclusion buffer around the den to limit disturbance or require that the operator conduct activities after the female bears emerge from their dens. We will review these requirements for extenuating circumstances on a case-by-case basis.

(f) For exploratory and development activities, holders of a Letter of Authorization must submit a report to our Alaska Regional Director (Attn: Marine Mammals Management Office) within 90 days after completion of activities. For production activities, holders of a Letter of Authorization must submit a report to our Alaska Regional Director (Attn: Marine Mammals Management Office) by January 15 for the preceding year's activities. Reports must include, at a minimum, the following information:
(1) Dates and times of activity;
(2) Dates and locations of polar bear or Pacific walrus activity as related to the monitoring activity; and
(3) Results of the monitoring activities required under subsection (g) of this section, including an estimated level of take.

(g) Monitoring requirements include, but are not limited to:
(1) For all activities, all sightings of polar bears and walrus must be recorded. To the extent possible, the monitor will record group size, age, sex, reaction, duration of interaction, and closest approach to Industry activity.
(2) Activities within the coast of the geographic region may incorporate daily polar bear watch logs.
(3) Polar bear monitors will be required under the monitoring plan if polar bears are known to frequent the area or known polar bear dens are present in the area. Monitors will act as an early detection system in regards to proximate bear activity to Industry facilities.
(4) Offshore sites may require systematic monitoring protocols for polar bears and walrus due to their nearshore locations. Systematic monitoring may be implemented to statistically monitor observation trends of walrus or polar bears in the nearshore areas where they usually occur.

Conclusions under MMPA

The Service's conclusions regarding the amount of incidental take anticipated for polar bears (and walruses) and impacts on the species under the Regulations are as follows (summarized from the Beaufort Sea Incidental Take Regulations final rule; 71 FR 43925, August 2, 2006):

Based on the best scientific information available, the results of monitoring data from previous regulations, the results of modeling assessments, and the status of the population, the Service found that any incidental take reasonably likely to result from the effects of oil and gas related exploration, development, and production activities during the period of the rule, in the Beaufort Sea and adjacent northern coast of Alaska will have no more than a negligible impact on polar bears and Pacific walrus. In making this finding, the following were considered: (1) the distribution of the species; (2) the biological characteristics of the species; (3) the nature of oil and gas industry activities; (4) the potential effects of Industry activities and potential oil spills on the species; (5) the probability of oil spills occurring; (6) the documented impacts of industry activities and oil spills on the species, (7) mitigation measures that will be conditions in the LOAs and minimize effects; and (8) other data provided by monitoring programs that have been in place since 1993. Specific to polar bears, the Service found that: (1) the Beaufort Sea polar bear population is widely distributed throughout its range, and (2) polar bears typically occur in low numbers in coastal and nearshore areas where most Industry activities occur. Furthermore, the Service does not expect disturbances related to activities to affect the rates of recruitment or survival for the polar bear. The Regulations do not authorize lethal take and the Service does not anticipate any lethal take will occur.

Generic conditions (described in **Letter of Authorization-Specific Measures**, above) are attached to each LOA. These conditions minimize interference with normal breeding, feeding, and possible migration patterns to ensure that the effects to the species remain negligible. MMM may add additional measures depending upon site-specific and species-specific concerns. For example, restrictions in denning areas will be applied on a case-by-case basis after assessing each LOA request, and may include requirements for pre-activity surveys (e.g., aerial surveys, FLIR surveys, or polar bear scent-trained dogs) to determine the presence or absence of denning activity, and/or enhanced monitoring or flight restrictions, such as minimum flight elevations, in known denning areas. MMM analyzes the required plan of operation and interaction plans to ensure that the level of activity and possible take are consistent with the finding that total incidental take will have a negligible impact on polar bear and Pacific walrus.

It is important to note that while an initial determination of negligible impact is made at the time the Regulations are issued (in this case, 2006) based on the best information at the time, each request for a LOA is evaluated to ensure it is consistent with this determination. The evaluation consists of the type and scope of the individual project, an analysis of all current species information, including the required monitoring reports from previously issued LOAs, and considers the effects of the individual project when added to all current LOAs in the geographic area. Through these means, the type and level of take to polar bears is continuously evaluated throughout the life of the Regulations in order to maintain a level of negligible impact.

3. Status of Species

This section presents biological and ecological information relevant to formation of the BO. Appropriate information on the polar bear's life history, habitat and distribution, and description of other factors necessary for their survival is included for analysis in later sections. The Range-wide Status Review of the Polar Bear (Schleibe et al. 2006), final rule listing the polar bear as a threatened species (73 FR 28211, May 15, 2008), USGS Administrative Reports, other agency reports, published literature, and personal communication with species experts were utilized in preparing this section.

Description and Ecological Adaptations

Polar bears are the largest of the living bear species (DeMaster and Stirling 1981) and occur throughout portions of the Northern Hemisphere where the sea is ice-covered for all or much of the year (Amstrup 2003). Polar bears depend upon sea ice for access to their prey and for other aspects of their life history (Stirling and Øritsland 1995; Stirling and Lunn 1997; Amstrup 2003). Because the principle habitat of polar bears is sea ice, it is considered a marine mammal, and was included in those species covered under the MMPA.

Polar bears are characterized by a large stocky body, with a longer neck and proportionately smaller head than other members of the bear family, although without the distinct shoulder hump common to brown bears (*Ursus arctos*). Polar bears exhibit sexual dimorphism, with female body length, skull size, and body mass considerably less than males (Derocher et al. 2005). Adult males have been recorded weighing 654 kilograms (1,440 pounds) (Kolenosky et al. 1992), with some individuals estimated at 800 kg (1,760 pounds), but too large for weighing equipment (DeMaster and Stirling 1981). Adult females weigh 181 to 317 kg (400 to 700 pounds). Polar bear fur color varies between white, yellow, gray, and brown, and is affected by oxidation or exposure to air, light conditions, and staining due to contact with fats from prey items. The nose, lips, and skin of polar bears is black (DeMaster and Stirling 1981, Amstrup 2003).

Polar bear genetics indicate the species branched off from brown bears and occupied an open niche on the surface of the sea ice during maximal extent of the continental ice sheets in the late Pleistocene; based upon molecular genetic techniques, this could have occurred as long as 250,000 years ago (Amstrup 2003). Subsequent behavioral and physical adaptations have allowed polar bears to increasingly specialize at hunting seals from the surface of the ice (Stirling 1974, Smith 1980, Stirling and Øritsland 1995).

Physical adaptations to life on sea ice include the whitish pelage with water repellent guard hairs and dense underfur, a short furred snout, and small ears. Polar bear teeth have become very specialized for a carnivorous diet, rather than the omnivorous diet of the brown bear (Amstrup 2003). Their teeth are well suited to grab prey and eat fat from the meat and hide and less well suited for grinding grasses or other vegetation (Amstrup 2003). Polar bear feet have hair on the bottoms and are large and paddle-like (Stirling 1988). That adaptation probably assists in swimming and also helps disperse weight and avoid breaking through when walking on thin ice (Stirling 1988). Polar bear claws are shorter and more strongly curved than those of brown bears, and larger and heavier than those of black bears (*Ursus americanus*), and appear to be well adapted to traveling over blocks of ice and snow and to securely gripping prey animals (Amstrup 2003).

Polar bears are well adapted for thermoregulation in the extreme cold conditions of the Arctic (Schliebe et al 2006). Normal body temperature of a resting polar bear is 37.0º Celsius (98.6º Fahrenheit), similar to other mammals (Best 1982, Stirling 1988). A combination of fur and hide properties, and up to 11 centimeters (4.5 inches) of blubber serve as excellent insulators and maintain body temperatures and metabolic rates at near normal levels at environmental temperatures of -37º C (-34.6º F) (Stirling 1988). However, polar bears are susceptible to overheating (Best 1982, Stirling 1988). Polar bears radiate heat from their muzzle, nose, ears, footpads, insides of the thighs, and blood vessels in the shoulder region near the skin (Stirling 1988). Polar bears can cool by swimming, because water conducts heat approximately 20 times more efficiently than air (Stirling 1988). Young cubs, however, can become chilled by swimming if it cools the body too much (Blix and Lentfer 1979, Stirling 1988). Polar bears also conserve energy by curling into a ball when exposed to extreme cold, windy weather, or sprawl out to keep cool on warm days (Stirling 1988). Bears in warm areas like Hudson Bay also move very little in summer in order to stay cool and conserve energy (Knudsen 1978, Derocher and Stirling 1990).

Unlike other species of bears where both sexes may hibernate, only pregnant female polar bears hibernate through the winter (Stirling 1988, Amstrup 2000). This is specialized winter dormancy, and not true hibernation. It is typified by a slightly depressed heart rate and temperature, during which time the bear does not feed and lives off accumulated fat stores (Stirling 1988, Amstrup 2003). Polar bears can also enter a hibernation-like state facultatively, as needed (Derocher et al. 2004). This allows polar bears to feed hyperphagically (dramatically increase food intake to be stored as fat), both seasonally and when an unpredictable opportunity presents itself, and then slow down their metabolism to make stored fat reserves last longer during periods of food shortage (Derocher et al 1990, Ramsay et al 1991, Stirling and Øritsland 1995). Their metabolic flexibility and ability to digest fat with 98 percent efficiency are important adaptations to the arctic environment, and probably what allows polar bears to fast the summer months on shore in Hudson Bay (Schliebe et al. 2006).

Distribution

Polar bears are distributed throughout regions of the arctic and subarctic waters where the sea is ice-covered for large portions of the year. Patterns in spatial segregation suggested by telemetry data, along with information from surveys, marking studies, and traditional knowledge, resulted in recognition of 19 partially discrete polar bear groups by the International Union for the Conservation of Nature (IUCN) Polar Bear Specialist Group (PBSG) for the purposes of management [the distribution of the subgroups is illustrated in the final rule listing the polar bear (73 FR 28212, May 15, 2008; page 28216)]. There is considerable overlap in areas occupied by members of these groups (Amstrup et al. 2005) and the boundaries have been adjusted as new data are collected.

Two of these populations (Southern Beaufort Sea and Chukchi Sea) occur in Alaska, with an area of seasonal intermingling of both populations that roughly overlaps with the geographic boundaries of the Beaufort Sea Regulations.

Polar Bear Movements

Information from telemetry studies indicate polar bear movements are not random, nor do they passively follow ocean currents on the ice as previously thought (Pedersen 1945, Mauritzen et al. 2003). Movement data come almost exclusively from adult female polar bears because male anatomy (their neck is larger than their skull) will not accommodate radio collars. Movements of seven male polar bears surgically implanted with transmitters in 1996 and 1997 were compared to movements of 104 females between 1985 and 1995 (Amstrup et al. 2001), which indicated males and females had similar activity areas on a monthly basis, but males traveled farther each month (Amstrup et al. 2000b). Activity areas have not been determined for many of the populations, and what information is available reflects movement data collected prior to the recent changes of retreating ice conditions. In the Beaufort Sea, annual activity areas for individually monitored female bears averaged 149,000 km^2 (57,529 mi^2), ranging from 13,000 km^2 to 597,000 km^2 (5,019 mi^2 to 230,503 mi^2) (Amstrup et al. 2000b.). Total annual movements by female bears in the Beaufort Sea averaged 3,415 km (2,122 mi) and ranged up to 6,200 km (3,853 mi), with movements rate of >4.0 km/hr (2.5 mi/hr) sometimes sustained for long periods, and movements of >50 km/day (31 mi/day) observed (Amstrup et al. 2000b). The mean activity area in the Chukchi Sea, characterized by highly dynamic ice conditions, was 244,463 km^2 (94,388 mi^2) (Garner et al. 1990). The average annual distance moved by Chukchi Sea female bears was 5,542 km (3,444 mi).

Telemetry data from radio-collared females indicates some individuals occupy home ranges (or "multi-annual activity areas") which they seldom leave (Amstrup 2003). The size of a polar bear's home range is determined, in part, by the annual pattern of freeze-up and break-up of sea ice, and therefore by the distance a bear must travel to obtain access to prey (Stirling 1988, Durner et al. 2004). A bear that has consistent access to ice, leads (channels of open water though areas of ice), and seals may have a relatively small home range, while bears in areas such as the Barents, Greenland, Chukchi, Bering or Baffin seas may have to move many hundreds of kilometers each year to remain in contact with sea ice from which they can hunt (Born et al. 1997, Mauritzen et al. 2001, Ferguson et al. 2001, Amstrup 2003, Wiig et al. 2003).

Feeding Habits

Polar bears derive essentially all their sustenance from marine mammal prey and have evolved a strategy that utilizes the high fat content of marine mammals (Best 1985, Amstrup et al. 2007). Over half the caloric content of a seal carcass is located in the layer of fat between the skin and under laying muscle (Stirling and McEwan 1975). Polar bears show their preference for fat by quickly removing the fat layer from beneath the skin after they catch a seal. High fat intake that can be achieved by specializing on marine mammal prey allows polar bears to thrive in the harsh Arctic environment (Stirling and Derocher 1990, Amstrup 2003).

Over much of their range, polar bears are dependent on one species of seal, the ringed seal (*Phoca hispida*). Polar bears occasionally catch belugas (*Delphinapterus leucas*), narwhals (*Monodon monocerus*), walrus, and harbor seals (*Phoca vitulina*) (Smith 1985, Calvert and Stirling 1990, Smith and Sjare 1990, Stirling and Øritsland 1995, Derocher et al. 2002). Where common, bearded seals (*Erignathus barbatus*) can be a large part of polar bear diets, and are probably the second most common prey item (Derocher et al. 2002). Walruses can be seasonally important in some parts of the polar bear range (Parovshchikov 1965, Ovsyanikov 1996). However, throughout most of their range, polar bears are most dependent upon ringed seals (Smith and Stirling 1975, Smith

1980), and the relationship between ringed seals and polar bears is so close that the abundance of ringed seals in some areas appears to regulate the density of polar bears, while polar bear predation in turn, regulates density and reproductive success of ringed seals (Hammill and Smith 1991, Stirling and Øritsland 1995).

Polar bears can rarely catch seals on land or in open water (Furnell and Oolooyuk 1980); rather they consistently catch seals and other marine mammals at the air-ice-water interface, where aquatic mammals come to breathe (Amstrup et al. 2007). Although there are local exceptions, it appears that polar bears gain little overall benefit from alternate foods (Amstrup et al. 2007). Even in Hudson Bay where polar bears are forced onto land for extended periods with access to a variety of foods including human refuse, little terrestrial food is incorporated into polar bear tissues (Ramsay and Hobson 1991). Therefore, maintenance of polar bear populations is dependent upon marine prey, largely ringed seals, and polar bears are tied to the surface of the ice for effective access to that prey (Amstrup et al. 2007).

Breeding Biology

Polar bears have an intrinsically low reproductive rate characterized by late age of sexual maturity, small litter sizes, and extended parental investment in raising young. Female polar bears enter a prolonged estrus between March and June, when breeding occurs. Ovulation is thought to be induced by mating (Wimsatt 1963, Ramsay and Dunbrack 1986, Derocher and Stirling 1992). Implantation is delayed until autumn, and gestation is 195 to 265 days (Uspenski 1977), with active development of the fetus suspended for most of that time. The timing of implantation, and therefore the timing of birth, is likely dependent upon body condition of the female, which in turn is dependent upon a variety of environmental factors (Schliebe et al. 2006). Derocher et al. (1992) documented Hudson Bay polar bear births occurred from mid-November through mid- December. In the Beaufort Sea many pregnant females did not enter dens until late November or early December (Amstrup and Gardner 1994), and a later date of birth is assumed.

Throughout their range, most pregnant female polar bears excavate dens in snow located on land during September through November after drifts large enough to excavate a snow cave have formed (Ramsay and Stirling 1990, Amstrup and Gardner 1994). The only known exceptions are in Western and southern Hudson Bay where polar bears excavate earthen dens and later reposition into adjacent snow drifts (Jonkel et al. 1972, Richardson et al. 2005), and in the southern Beaufort Sea where a portion of the population dens in snow caves located on pack and shorefast ice. Successful denning by polar bears requires an accumulation of sufficient snow combined with winds to cause snow accumulation leeward of topographic features that create denning habitat (Harington 1968). The common characteristic of all denning habitat is topographic features that catch snow in the autumn and early winter (Durner et al. 2003).

Polar bear denning habitat in Alaska includes areas of low relief topography characterized by tundra with riverine banks within approximately 50 km (31 mi) of the coast (Amstrup 1993, Amstrup and Gardner 1994, Durner et al. 2001, 2003), and offshore pack ice pressure ridge habitat. The northern Alaskan coast receives minimal snow fall, but because the landscape is flat, snow is blown throughout winter creating drifts in areas of relief.

Fidelity to denning locales was investigated by Amstrup and Gardner (1994), in which 27 females were located at up to four successive maternity dens. Bears that denned once on pack ice were more likely to den on pack ice than on land in subsequent years. Similarly, bears were faithful to general geographic areas – those that denned once in the eastern half of the Alaska coast were more likely to den there than to the west in subsequent years. Annual variations in weather, ice conditions, prey availability, and the long-distance movements of polar bears (Amstrup et al. 1986, Amstrup et al. 2000b, Garner et al. 1990) make recurrence of exact denning locations unlikely.

Chronology of denning varies between polar bear populations. Satellite telemetry studies determined mean dates of den entry in the Beaufort Sea were 11 and 22 November for land (n = 20) and pack ice (n = 16), respectively (Amstrup and Gardner 1994). Female bears were foraging right up to the time of den entry, and then denned nearby. The mean date of emergence was 26 March for pack ice dens (n = 10) and 5 April for land dens (n = 18). Messier et al. (1994) reported mean date of den entry and exit varied among years depending upon sea ice, snow, and weather conditions; mean entry into maternal dens in the Canadian Arctic was 17 September and mean emergence was 21 March, with females and cubs remaining near dens for a mean 13 (SE = 13) days post emergence. Ferguson et al. (2000) observed that bears denning at higher latitudes entered dens a bit later than those to the south, but that exit times did not differ by latitude; they reported a mean den entry of 15 September (1 September to 7 October), a mean exit of 20 March (15 to 28 March), with a mean 180 days in dens (163 to 200 days). For bears denning on sea ice or moving from sea ice to land denning habitat, time of sea ice consolidation can alter the onset of denning. Sea ice dens must be in ice stable enough to stay intact for up to 164 days while possibly moving hundreds of kilometers by currents (Amstrup 2003, Wiig 1998).

Polar bears are largely food deprived while on land in the ice-free period and survive by mobilizing fat during that time. Pregnant females that spend the late summer on land then go into dens and may not feed for eight months (Watts and Hansen 1987, Ramsay and Stirling 1988). This may be the longest period of food deprivation of any mammal, and it occurs when the female could be gestating and lactating.

Polar bears give birth in the dens during mid-winter (Kostyan 1954, Harington 1968, Ramsay and Dunbrack 1986). Survival and growth of the cubs depends on the warmth and stable environment within the maternal den (Blix and Lentfer 1979). Family groups emerge from dens in March and April when cubs are about three months old and able to survive in the outside weather conditions (Blix and Lentfer 1979, Amstrup 1995).

Newborn polar bears are very small, weighing only approximately 0.6 kg (1.3 pounds) (Blix and Lentfer 1979), and nurse from their hibernating mothers. Cubs grow very quickly and may weigh 10 to 12 kg (22 to 26.4 pounds) by the time they emerge from the den about three months later. Young bears stay with their mothers until weaned, which occurs most commonly in early spring when the cubs are 2.3 years of age. Female polar bears are available to breed again after the cubs are weaned. Therefore, in most areas, the minimum successful reproductive interval for polar bears is 3 years (Schliebe et al. 2006).

Age of maturation of mammals is often associated with a threshold body mass (Sadleir 1969), and in polar bear populations it appears to be largely dependent on numbers and productivity of ringed

seals. In the Beaufort Sea, ringed seal densities are lower in some areas of the Canadian High Arctic and Hudson Bay. As a possible consequence, female polar bears in the Beaufort Sea usually do not breed for the first time until they are 5 years of age (Stirling et al. 1976, Lentfer and Hensel 1980). This means they give birth for the first time at 6 years of age. In contrast, many of the Canada females reach maturity at age 4 and produce their first young at age 5 (Stirling et al. 1977, 1980, 1984; Ramsay and Stirling 1982, 1988; Furnell and Schweinsburg 1984). Derocher et al. (1992) calculated average age of first breeding in the Hudson Bay area of 4.1 years, and cub production (assessed by estimated pregnancy rates) remained high between 5 and 20 years of age and declined thereafter.

Litter size and production rates vary by geographic area and may change in response to hunting pressure, environmental factors, and other population perturbations. Litters of two cubs are common (Schliebe et al. 2006), with litters of three cubs occurring sporadically across the Arctic and most commonly reported in the Hudson Bay region (Stirling et al. 1977, Ramsay and Stirling 1988, Derocher and Stirling 1992). Average litter size across the species range varied from 1.4 to 1.8 cubs (Schliebe et al. 2006), and several studies have linked reproduction to availability of seal prey, especially in the northern portion of their range. Body weights of mother polar bears and their cubs decreased markedly in the mid-1970s in the Beaufort Sea following a decline in ringed and bearded seal pup production (Stirling et al. 1976, 1977, Kingsley 1979, DeMaster et al. 1980, Stirling et al. 1982, Amstrup et al. 1986). Declines in reproductive parameters varied by region and year with the severity of ice conditions and corresponding reduction in numbers and productivity of seals (Amstrup et al. 1986). In the Beaufort Sea, females produce a litter of cubs at an annual rate of 0.25 litters per adult female (Amstrup 1995). Annual litter production rate in Hudson Bay region declined from 0.45 litters/female in the period 1965-1979 to 0.35 litters/female during 1985-1990 (Derocher and Stirling 1992).

Polar bear reproduction lends itself to early termination without extensive energetic investment on the female (Ramsay and Dunbrack 1986, Derocher and Stirling 1992). Female polar bears may defer reproduction in favor of survival when foraging conditions are difficult (Derocher et al. 1992). Persistent deferral of reproduction could cause a declining population trend in populations with an intrinsically low rate of growth (Schliebe et al. 2006).

Survival

Polar bears are long-lived animals; the oldest known female polar bear in the wild was 32 years of age and the oldest known male was 28, although few bears in the wild live beyond 20 years (Stirling 1990). Survival rates increase up to a certain age, with cubs-of –the-year having the lowest rates and prime age adults (between 5 and 20 years of age) having survival rates that can exceed 90 percent (Schliebe et al. 2006; Taylor et al. unpublished data). Amstrup and Durner (1995) report that high survival rates (exceeding 90% for adult females) are essential to sustain populations.

Survival of cubs is dependent upon their weight when they exit maternity dens (Derocher and Stirling 1992), and most cub mortality occurred early in the period after emergence from the den (Amstrup and Durner 1995, Derocher and Stirling 1996), with early age mortality generally associated with starvation (Derocher and Stirling 1996). Survival of cubs to weaning stage (generally 27-28 months) is generally estimated to range from 15 to 56 percent of births (Schliebe

et al. 2006). Subadult survival rates are poorly understood because collars cannot be used on these rapidly growing individuals.

Population age structure data indicate subadults 2 to 5 years survive at lower rates than adults (Amstrup 1995), probably because their hunting and survival skills are not fully developed (Stirling and Latour 1978). Eberhardt (1985) hypothesized adult survival rates must be in the upper 90 percent range to sustain polar bear populations. Studies using telemetry monitoring of individual animals (Amstrup and Durner 1995) estimated adult female survival in prime age groups may exceed 96 percent, and survival estimates are a reflection of the characteristics and qualities of an ecosystem to maintain the health of individual bears (Schliebe et al. 2006). Polar bears that avoid serious injury may become too old and feeble to hunt efficiently and most are generally believed to die of old age. Local and widespread climatic phenomena that have the potential to make seals less abundant or less available can significantly affect polar bear populations through survival or production (Kingsley 1979, DeMaster et al 1980, Amstrup et al. 1986, Stirling 2002).

Population Status

The total number of polar bears worldwide is estimated to be 20,000 to 25,000 bears (Aars et al. 2006). Worldwide population summaries were derived from information presented at the IUCN/PBSG meeting held in Seattle, Washington in June 2005, and updated with results available in October 2006 (Aars et al. 2006). Information presented for each population is based upon status reports and revisions given by each nation. Population sizes and associated uncertainty in estimates, historical and predicted human-caused mortality, population trends, and rationale for determination of status are presented (Aars et al. 2006).

Southern Beaufort Sea Population

The Southern Beaufort Sea (SB) population occurs between Icy Cape, Alaska on the western boundary and Pearce Point, Northwest Territory (NWT), Canada (Amstrup et al. 1986, Amstrup and DeMaster 1988, Stirling et al. 1988). The size of the SB population was estimated to be approximately 1,800 animals in 1986 (Amstrup et al. 1986). A new population assessment derived from capture-recapture data collected during 2001 to 2006 estimated 1,526 (95 percent CI = 1,211 - 1,841) polar bears in the region in 2006 (Regehr et al. 2006). Because the precision of the earlier estimate was low, the two estimates cannot be statistically differentiated. The harvest of polar bears in the SB region is shared between Canada and the United States and since 1988 has been managed under the "Polar Bear Management Agreement for the Southern Beaufort Sea" by the Inuvialuit Game Council of Canada, and the North Slope Borough of Alaska. The harvest quota for the SB is 80 animals (40 for Alaska and 40 for NWT). In 2004/2005 the joint harvest was 46 bears (Schliebe et al. 2006, Branigan et al. 2006). The status of the SB population is designated as reduced (73 FR 28212, May 15, 2008; page 28217) and the predicted trend is declining (Aars et al. 2006).

Chukchi Sea Population

The Chukchi Sea (CS) population is widely distributed on the pack ice of the northern Bering, Chukchi, and eastern portions of the Eastern Siberian seas (Garner et al. 1990, Garner et al. 1994, Garner et al. 1995). Polar bears are seasonably abundant in the Chukchi Sea and their distribution is influenced by the movement of the seasonal pack ice. Polar bears in the Chukchi and Bering Seas move south with the advancing ice during fall and winter and move north in advance of the

receding ice in late spring and early summer (Garner et al. 1990). Polar bears are dependent upon the sea ice for foraging and the most productive areas seem to be near the ice edge, leads, or polynyas (irregularly shaped areas of persistent open water that are sustained by winds or ocean heat) where the ocean depth is minimal (Durner et al. 2004). In addition polar bears could be present along the shoreline as they opportunistically scavenge on marine mammal carcasses (Kalxdorff and Fischbach 1998).

The current CS population size is not precisely known, but an estimate of approximately 2,000 was made in 1993 (Aars et al. 2006, Schliebe et al. 2006). The size of the population was derived from observations of dens and aerial surveys (Chelintsev 1977, Stishov 1991, Stishov et al. 1991); but the estimates have wide ranges (about 200 to 500 animals), so are considered of little use for management. Reliable estimates of population size based upon mark and recapture studies are not available for this region, and measuring the population size is a research challenge. It is believed the status of the CS population increased after the harvest was reduced in 1972, but the status and trend cannot yet be determined for this population (73 FR 28212, May 15, 2008; page 28217). The CS population is subject to subsistence hunting in Alaska where average annual harvest levels declined about 50 percent between the 1980s and 1990s (Schliebe et al. 1998) and have remained at low levels in recent years. No hunting quota is set for Alaska; in 2004/2005, 32 bears were harvested in Alaska. There is believed to be a substantial illegal harvest in Russia where a minimum of 100 bears are thought to be harvested annually, and in some years the estimates have exceeded 200 animals killed in Russia (Schliebe et al. 2006). Currently the combined Alaska-Chukotka polar bear harvest is believed to exceed sustainable levels, and the CS polar bear population is considered uncertain or declining (Aars et al. 2006).

Northern Beaufort Sea Population

The Northern Beaufort (NB) population of polar bears generally inhabits the eastern and northern Beaufort Sea in the Canadian region where sea ice converges on shorelines throughout most of the year. Population estimates based upon open population capture-recapture models indicate the current NB population is 980 (±155, 95 percent CI) and is not significantly different than earlier estimates for the periods of 745 (± 246, 95 percent CI) for 1972 to 1975, and 867 (±141, 95 percent CI) for 1985 to 1987 (Stirling et al 2007). This population of polar bears currently is considered stable, and the status is believed to not be reduced (73 FR 28212, May 15, 2008; page 28217).

Boundaries and population estimates of these three populations are of particular interest for U.S.–based activities and management considerations because there is potential overlap of bears in some areas. Stirling (2002) reviewed the ecology of polar bears and seals in the Canadian sector of the Beaufort Sea from 1970 to 2000, and recent analyses of the radio-telemetry data in the SB suggest some boundary realignments (Amstrup et al. 2004, Amstrup et al 2005). It is thought that nearly all bears in the central coastal region of the Beaufort Sea are from the SB population, and that proportional representation of SB bears decreases to both the west and east. For example, only 50 percent of polar bears occurring in Barrow, Alaska and Tuktoyaktuk, NWT are SB bears, with the remainder being from the CS and NB populations. Assignment of new boundaries may be suggested in the future that reflect improved understanding of the spatial and temporal use patterns of bears in the SB region (Amstrup et al. 2005). Presumably new population estimates would be derived for any new defined boundary areas, but the population estimates presented above (Aars et

al. 2006, Schliebe et al. 2006, Regehr et al. 2006) reflect the use of the previously-published boundaries for the SB stock of polar bears.

4. Environmental Baseline

The environmental baseline is the current status of listed species and their habitats, and the current status of critical habitat (if applicable), as a result of past and ongoing human and natural factors in the area of the proposed action. Also included in the environmental baseline are the anticipated impacts of other proposed Federal projects in the action area.

The polar bear is listed as a threatened species throughout its range. The total number of polar bears worldwide is estimated to be 20,000 to 25,000 bears (Schliebe et al. 2006). Abundance estimates for the Alaska subpopulations under consideration in this BO are approximately 1,500 bears in the SB population, approximately 2,000 bears in the CS population, with unknown, but presumably limited, amount of co-mingling from the NB population of about 980 animals.

The primary habitat of polar bears is sea ice, from which they hunt, feed, seek mates and breed, den, and rest when traveling long distances. Most polar bears remain on the sea ice year-round or spend only limited time on land. No polar bear critical habitat has been proposed for designation at this time.

Current threats to polar bears range-wide were described in the Status Review (Schliebe et al. 2006) and the final listing rule (73 FR 28212, May 15, 2008). Loss of sea ice habitat due to climate change was identified as the primary threat to polar bears range-wide. Other threats evaluated included hunting, oil and gas development, human-bear interactions, environmental contaminants, disease, and predation. Whereas loss of sea ice habitat is considered the principle threat to polar bears, each of the other threats could become more significant in the future in combination with effects of climate change (Schliebe et al. 2006). The documented or anticipated effect of each threat is described below.

Loss of Sea Ice and Climate Change

The final listing rule summarizes many of the observed changes in Arctic sea ice that are of particular importance to the status of polar bears including reductions in the extent of both summer and winter ice, length of the melt period, and reduction in sea ice thickness (73 FR 28212, May 15, 2008 pages 28219-28224). Recent years have seen record low September Arctic sea ice extent, and the shallow continental shelf waters of the Chukchi Sea experienced a rapid and complete retreat of sea ice during the summer of 2007 (National Snow and Ice Data Center 2007). The 4th Assessment Report of the IPCC (IPCC 2007; http://www.ipcc.ch/ipccreports/ar4-syr.htm) observed that decreases in snow and ice extent are consistent with climate warming, and that satellite data since 1978 show that annual average Arctic ice extent has shrunk by 2.7 percent (90 percent CI = 2.1 to 3.3 percent) per decade, with larger decreases in summer of 7.4 percent (90 percent CI = 5.0 to 9.8 percent) per decade.

Polar bear studies in the SB region began in 1967 and constitute the longest and most consistent dataset on polar bears. Regehr et al. (2007) reviewed recent survival and breeding of polar bears in

the SB relative to sea ice conditions observed in 2001 though 2006. The SB population of polar bears occurs in the divergent ice ecoregions of the polar basin, where polar bears have historically remained on multiyear sea ice as it retreats toward the center of the polar basin during the summer (Amstrup 2003, Amstrup et al. 2007). Rates of decline in sea ice extent in this ecoregion have been among the highest in the Arctic (Meier et al. 2007). Declining sea ice extent and degrading ice in the SB have been associated with a shift toward more land-based denning and less denning in regions with higher rates of ice degradation (Fischbach et al. 2007), declines in cub survival (Regehr et al. 2006), and observations of drowned, emaciated, and cannibalized polar bears (Amstrup et al. 2006, Monnett and Gleason 2006, Stirling et al. 2008). Regehr et al. (2007) concluded that in 2002, the ice-free period over the continental shelf in the SB region was relatively short (mean 92 days) and survival of adults female polar bears was high (approximately 0.99, 90 percent CI = 0.10 to 1.0). In 2004 and 2005, the ice-free period was longer (mean 135 days) and survival of adult female polar bears was lower (approximately 0.77, 90 percent CI = 0.53 to 0.94). Breeding and cub-of-the-year litter survival also declined from high rates to lower rates in latter years of the study. Regehr et al. (2007) further concluded that although the precision of estimated vital rates was low, subsequent analysis (Hunter et al. 2007) indicated the declines in vital rates associated with longer ice-free periods have ramification for the probability of persistence of the SB population of polar bears. Further, the results by Regher et al. (2007) are relevant to over one-third of the world's polar bears that inhabit regions of the polar basin with sea ice dynamics similar to the SB and have already experienced more severe ice changes than the SB. Because Regehr et al.'s analysis of the SB population dynamics was short in duration relative to the life history of polar bears, continued monitoring is recommended to further elucidate the relationship between declining sea ice and polar bear population metrics.

Effects of sea ice loss on polar bear populations range wide have been considered by the Service based upon recent information. In 2007, a USGS science team released 9 reports (highlighted below) to the Service that included (1) new observational data on polar bears, including updated information on the current status of 3 of the world's 19 subpopulations of polar bears, and (2) projections of the future distribution and abundance of polar bears in the rest of the 21st century, given changes expected in future sea ice conditions. The reports are available at: http://www.usgs.gov/newsroom/special/polar_bears/.

The overall conclusion of the USGS research effort was that if projected changes in future sea ice conditions are realized, approximately two-thirds of the world's current polar bear population will be lost by the mid-21st century. Because the observed trajectory of Arctic sea ice decline appears to be underestimated by currently available models, this assessment of future polar bear status may be conservative (Amstrup et al. 2007).

Below are key USGS findings:

1. The range of the polar bear was divided into 4 ecoregions based on major differences in current and projected sea ice conditions (Amstrup et al. 2007). These ecoregions were the:
    - Seasonal Ice Ecoregion which includes Hudson Bay, and occurs mainly at the southern extreme of the polar bear range,
    - Archipelagic Ecoregion of the Canadian Arctic,

- Polar Basin Divergent Ecoregion where ice is formed and then drawn away from near-shore areas, especially during the summer minimum ice season (it includes the southern Beaufort, Chukchi, East Siberian-Laptev, Kara, and Barents seas), and
- Polar Basin Convergent Ecoregion where sea ice formed elsewhere tends to collect against the shore.

Dividing the range of the polar bear into these 4 ecoregions allowed inferences from available knowledge about subpopulations in each ecoregion to the entire ecoregion.

2. Projections were made of future sea ice in each ecoregion, based on 10 general circulation models, chosen from among 20 available (DeWeaver 2007). These 10 models did the best job of simulating current ice conditions and thus could be expected to do the best job of simulating future ice conditions. Outputs for "business as usual" greenhouse gas forcing (known as the SRES-A1B scenario) were used for most analyses.

3. An important conclusion from a review of current knowledge about sea ice and sea ice modeling is that Arctic sea ice decline is likely underestimated by the available models (DeWeaver 2007).

4. Based on new findings from the Northern Beaufort subpopulation, polar bear subpopulations in the convergent ice ecoregion of the polar basin are likely currently stable; most available information about the status of populations living in the archipelagic ecoregion, suggests relative stability (Stirling et al. 2007).

5. For two subpopulations of polar bears, Western Hudson Bay in the seasonal sea ice ecoregion, and Southern Beaufort Sea in the divergent ecoregion, it is now possible to relate declines in the availability of sea ice to declines in metrics of population status (Rode et al. 2007, Regehr et al. 2006, Regehr et al. 2007, Obbard et al. 2007).

6. Knowledge of how polar bear population growth rates relate to specific changes in sea ice (e.g., length of the ice-free season) provides a mechanism for developing projections of future populations under different sea ice scenarios (Regehr et al. 2007).

7. Under a range of future sea ice scenarios for the 21st century and modeling approaches, the Southern Beaufort Sea subpopulation of polar bears is projected to decline severely by the end of the century, and in many scenarios, by mid-century (Amstrup et al. 2007).

8. Polar bears primarily use sea ice over the continental shelf. They also prefer ice that is greater than 50 percent in concentration. Taking these habitat features into account, USGS projected future polar bear habitat within the polar basin for the divergent and convergent ice ecoregions using the available sea ice models. USGS evaluated how availability of polar bear habitat in the polar basin has changed in recent years.

9. Optimal habitat in the polar basin (including both the divergent and convergent ice ecoregions) declined between the early (1985-1995) and latter decades (1996-2006) of

the observational record of sea ice (based on passive microwave data). Most pronounced polar bear habitat loss in the past decade has occurred in peripheral seas of the Arctic Ocean - the Chukchi Sea and Barents/Greenland Seas (Amstrup et al. 2007).

10. Similarly, losses of polar bear habitat within the polar basin are projected to be greatest for the peripheral seas of the polar basin (e.g., the Chukchi Sea and Barents Sea) (Amstrup et al. 2007).

11. The largest reductions in habitat in the polar basin are predicted for spring and summer. Sea ice will reform each winter, but the large retreats of sea ice in summer may ultimately preclude bears from returning to onshore denning habitat. Low productivity of the polar basin appears to preclude bears from adapting a seasonal ice lifestyle here (Amstrup et al. 2007).

12. A 42 percent loss of optimal polar bear habitat during summer in the polar basin is predicted by mid century (Amstrup et al. 2007).

13. Due to unavailability of telemetry data showing habitats chosen by polar bears in the archipelagic and seasonal sea ice ecoregions, it is not possible to project habitat changes in these ecoregions for this analysis. Using a simple deterministic model of future carrying capacity for polar bears, it is forecast that polar bears could be extirpated in the divergent ice ecoregion within 75 years, assuming that sea ice decline follows the mean trajectory predicted by the 10 models used. If sea ice decline follows the minimum trajectory predicted, extirpation in this ecoregion could occur by year 45 (Amstrup et al. 2007).

15. Using the carrying capacity model, population declines of polar bears are projected in all other ecoregions at all time steps, with severity of decline dependent upon whether minimum, maximum, or mean ice projections were used. The only exception was a slight, temporary, increase in the polar basin convergent ice ecoregion for the 45 year timestep and the maximum ice scenario (Amstrup et al. 2007).

16. Based on a first-generation Bayesian Network model[1] incorporating a range of factors affecting polar bears, USGS forecasted extirpation of polar bear populations in the seasonal sea ice and the polar basin divergent ecoregions by 45 years from present (Amstrup et al. 2007).

17. Extirpation of polar bear populations in the polar basin convergent ecoregion is predicted by 75 years from present. In the archipelagic ecoregion, polar bears could occur through the end of the century, but in smaller numbers than now (Amstrup et al. 2007).

[1] Bayesian Network models represent a set of interacting variables that are linked by probabilities. They provide an efficient way to represent and summarize understanding of a system, and can combine empirical data and expert knowledge into the same modeling structure. They are also particularly useful in synthesizing large amounts of quantitative and qualitative information to answer "what if" kinds of questions.

18. Sea ice conditions would have to be substantially better than even the most conservative general circulation model projections to result in qualitatively different outcomes for polar bears in any of the ecoregions (Amstrup et al. 2007).

The populations of polar bears under consideration in this BO, primarily the SB and CS stocks, inhabit the Polar Basin Divergent Ecoregion, an area documented to be undergoing the most dramatic and rapid reduction in seasonal sea ice, and accordingly are predicted to undergo the most rapid population declines.

Hunting

Prior to the 1950s, most polar bear hunting was conducted by indigenous people for subsistence purposes. Population declines due to sport hunting became an increasing international concern during the 1950s and 1960s. In 1968, the IUCN/PBSG was formed and developed the *1973 International Agreement on the Conservation of Polar Bears,* which called for international management of polar bear populations based on sound conservation practices. It prohibits polar bear hunting except by local people using traditional methods, calls for protection of females and denning bears, and bans use of aircraft and large motorized vessels to hunt polar bears. The PBSG meets every 3 to 5 years to review all aspects of polar bears science and management, including harvest management. At present, concern exists for potential over-harvest of several populations of polar bears, including the CS populations (Schliebe et al. 2006).

Oil and Gas Development

Each of the Parties to the Agreement on the Conservation of Polar Bears has developed detailed regulations pertaining to the extraction of oil and gas within their countries. Most oil and gas activity within polar bear habitat is currently occurring in the U.S. (Alaska). Documented impacts on polar bears by the oil and gas industry in the U.S. during the past 30 years are minimal. Polar bears spend a limited amount of time on land, coming ashore to feed, den, or move to other areas. At times, fall storms deposit bears along the coastline where bears remain until the ice returns. For this reason, polar bears have mainly been encountered at or near most coastal and offshore production facilities, or along the roads and causeways that link these facilities to the mainland. During those periods, the likelihood of interactions between polar bears and industry activities increases. The Service's MMM has found that the polar bear interaction planning and training requirements set forth in the Beaufort Sea Regulations and required through the LOA process have increased polar bear awareness and minimized these encounters. LOA requirements have also increased the Service's knowledge of polar bear activity in the developed areas.

No lethal take associated with the oil and gas industry has occurred during the period covered by incidental take regulations in either the Beaufort or Chukchi seas. Prior to issuance of regulations, lethal takes by industry were rare. Since 1968, there have been two documented cases of lethal take of polar bears associated with oil and gas activities. In both instances, the lethal take was reported to be in defense of human life. In the winter of 1968–1969, an industry employee shot and killed a polar bear. In 1990, a female polar bear was killed at a drill site on the west side of Camden Bay. In contrast, 33 polar bears were killed in the Canadian NWT from 1976 to 1986 due to encounters with industry. Since the beginning of the incidental take program, which includes measures that minimize impacts to the species, no polar bears are known to have been killed due to encounters associated with the current Industry activities on the North Slope of Alaska.

Bear-Human Interactions

Polar bears come into conflict with humans partly because they will scavenge for food at sites of human habitation and also because they may occasionally prey or attempt to prey upon humans (Stirling 1988). "Problem bears" are most often sub-adults, because they are inexperienced hunters and have the most difficulty hunting, and because their feeding habits include more scavenging than adult bears (Stirling 1988). In the NWT, a preliminary study found that 36 of 44 "problem bears" killed between 1972 and 1999 were less than five years of age (Lunn et al. 2002). In the Canadian Beaufort Sea, 12 of the 16 "problem bears" killed from 1973 to 1983 whose ages were determined were 5 years of age or less, with an average age of 2.25 years (Stirling 1988). After sub-adults, females with cubs are the most likely type of bear to interact with humans, because females with cubs are likely to be thinner and hungrier than single adult bears and starving bears will risk death in an attempt to obtain food (Stirling 1988).

Adult male polar bears, unlike adult black or grizzly bears, are less likely to frequent areas of human habitation, presumably because adult male polar bears are usually in better physical condition than other sex or age classes (Stirling 1988). In the Beaufort Sea, adult males were present for protracted periods of time near settlements feeding on bowhead whale remains during the fall period of 2002 to 2005 (Miller et al. 2006). The reason for the unusual presence of adult males near a North Slope village is unknown but suggests that these animals were attracted by the presence of the carcasses and may have been nutritionally stressed.

In Nunavut, Canada, details from 618 polar bear defense of life and property (DLP) kills that occurred from 1970 to 2000 were analyzed (Dyck 2006). The study found that most bears killed were less than 6 years of age (73 percent), the majority of bears were males (71 percent), and most interactions occurred at Native hunting camps (74 percent). Sources of food were believed to be a contributing factor in many instances but other possible reasons were an increase in land use activities, or the number of camps, increased human populations in areas of high polar bear activity, increased polar bear population size, and climatic warming related to earlier departure from ice habitat to terrestrial habitats. The implementation of a DLP monitoring program in 1980 resulted in a decrease in the number of kills, although recently increased levels of DLP have been reported (Dowsley 2005, Dyck 2006).

Some experts predict that the number of interactions and DLP kills will increase as climate change continues (Derocher et al. 2004). Amstrup (2000) observed that direct interactions between people and bears in Alaska have increased markedly in recent years, and that this trend is expected to continue. Schliebe et al. (2006) confirmed this observation with data from hunter-harvested polar bears in Alaska. The number of bears taken for safety reasons, based on three-year running averages, increased steadily from about 3 per year in 1993, to about 12 in 1998, and has averaged about 10 per year recently. There are several plausible explanations for this increase. First it could be an artifact of increased reporting by the hunters, or of an increased polar bear population and corresponding increased probability of interactions with humans. Alternatively or in combination, polar bears from the SB and CS populations typically move from the pack ice to the near shore environment in the fall to take advantage of the higher productivity of ice seals over the continental shelf. In the 1980s and early 1990s, the near shore environment would have been frozen by early or mid October, allowing polar bears to effectively access seals in the area. Since the late 1990s, the timing of ice formation in the fall has occurred later in November or early December, resulting

in an increased amount of time that the area was not accessible to polar bears. Consequently, bears spent a greater amount of time on land and not feeding. The later formation of near-shore ice increases the probability of bear-human interactions occurring in coastal villages (Schliebe et al. 2006).

The increased use of coastal habitats by polar bears during the fall in recent years is further supported by data from aerial surveys along the coast and barrier islands from Barrow to the Canadian border and from information from local residents in coastal villages in northern and western Alaska. The number of bears using coastal habitats has been relatively stable in the most recent years, possibly explaining why DLP kills have stabilized.

Environmental Contaminants

Three main types of contaminants in the Arctic are thought to present the greatest potential threat to polar bears and other marine mammals: petroleum hydrocarbons, persistent organic pollutants (POPs), and heavy metals.

Petroleum Hydrocarbons

Potential exposure of polar bears to petroleum hydrocarbons comes from direct contact and ingestion of crude oil and refined products from acute and chronic oil spills. Polar bear range overlaps with many active and planned oil and gas operations within 40 km (25 mi) of the coast or offshore (Schliebe et al. 2006). To date, no major oil spills have occurred in the Alaska marine environment within the range of polar bears.

Polar bears could come in contact with oil spilled in the marine or land environment, or by ingesting contaminated prey (Neff 1990). Polar bears groom themselves regularly as a means to maintain the insulating properties of their fur, so oil ingestion would also be likely during grooming behavior by a fouled bear (Neff 1990). Some direct information on oiled polar bears comes from an experimental study (St. Aubin 1990) in which two polar bears were involuntarily forced into a pool of oil for 15 minutes and then observed. The animals immediately attempted to clean the oil from their paws and forelegs by licking, and continued grooming trying to clean their fur for five days. After 26 days one bear died of liver and kidney failure and the other bear was euthanized at day 29. Gastrointestinal fungus-containing ulcers, degenerated kidney tubules, low-grade liver lesions, and depressed lymphoid activity were found during necropsy (St. Aubin 1990). Other effects included loss of hair (Derocher and Stirling 1991), anemia, anorexia, and stress (St. Aubin 1990).

Additionally, polar bears are curious and are likely to investigate oil spills and oil contaminated wildlife. Although it is not known whether healthy polar bears in their natural environment would avoid oil spills and contaminated seals, bears that are hungry are likely to scavenge contaminated seals, as they have shown no aversion to eating and ingesting oil (St. Aubin 1990, Derocher and Stirling 1991).

Due to the seasonal distribution of polar bears, the times of greatest impact from an oil spill are summer and autumn (Amstrup et al. 2000a). This is important because distributions of polar bears are not uniform through time. In fact, near-shore densities of polar bears are two to five times greater in autumn than in summer (Durner et al. 2000), and polar bear use of coastal areas during

the fall open water period has increased in recent years in the Beaufort Sea. Though there is a low probability that a large number of bears (i.e., 25 to 60) might be affected by a large oil spill, the impact of a large spill, particularly during the broken ice period, could be significant to the polar bear population (71 FR 43926, USFWS 2006). The number of polar bears affected by an oil spill could be substantially higher if the spill spread to areas of seasonal polar bear concentrations, such as the area near Kaktovik, in the fall, and could have a significant impact to the SB polar bear population.

Industrial development of any kind in polar bear habitat may also expose individuals to other hazardous substances through improper storage or spills. For example, one polar bear died in Alaska from consuming ethylene glycol in 1988 (Amstrup et al. 1989).

Contamination of the Arctic and sub-Arctic regions through long-range transport of pollutants has been recognized for over 30 years (Bowes and Jonkel 1975, deMarch et al. 1998, Proshutinsky and Johnson 2001, MacDonald et al. 2003, Lie et al. 2003). The Arctic ecosystem is particularly sensitive to environmental contamination due to the slower rate of breakdown of POPs, including organochlorine compounds (OCs), relatively simple food chains, and the presence of long-lived organisms with low rates of reproduction and high lipid levels. The persistence and lipophilic nature of organochlorines increase the potential for bioaccumulation and biomagnification at higher trophic levels (Fisk et al. 2001). The highest concentrations of OCs have been found in species at the top of the marine food chains, such as glaucous gulls which scavenge on marine mammals and polar bears which feed primarily on seals (Braune et al. 2005). Consistent patterns between OC and mercury contamination and trophic status have been documented in Arctic marine food webs (Braune et al. 2005). The southern Beaufort Sea polar bear population may have concentrations of mercury close to the biological threshold levels of 60 micrograms wet weight reported for marine mammals (AMAP 2005).

Contaminant concentrations in most polar bear populations are presently not thought to have population level effects. However, contaminant exposure in combination with other factors, such as loss of sea ice habitat and decreased prey availability, which have the potential to influence the recruitment or survival rates, could ultimately have population-level effects.

Increases in Arctic oil and gas development and trans-Arctic shipping will increase the probability of an oil spill and release of contaminants. The Service believes a marine oil spill would cause polar bear mortality if bears are exposed to the spill, and may result in population-level effects if multiple bear are exposed.

Disease

Except for the presence of *Trichinella* larvae, the occurrence of diseases and parasites in polar bears is relatively rare compared to other bears. Polar bears feed primarily on fat which is relatively free of parasites, except for *Trichinella* (Rogers and Rogers 1976, Forbes 2000). It is unknown whether polar bears are more susceptible to new pathogens due to their lack of previous exposure to diseases and parasites. Many different pathogens and viruses have been found in seal species that are polar bear prey (Duignan et al. 1997, Measures and Olson 1999, Dubey et al. 2003, Hughes-Hanks et al. 2005), so the potential exists for transmission of these diseases to polar bears. As polar bears become more stressed they may eat more of the intestines and internal organs than

they do presently, thus increasing their potential exposure to parasites and viruses (Derocher et al. 2004, Amstrup et al. 2006).

Predation

Polar bears have no predators but man and other polar bears (see **Hunting**, above). Intraspecific killing has been reported among all North American bear species. Reasons for intraspecific predation in bears species is poorly understood but thought to include population regulation, nutrition, and enhanced breeding opportunities in the case of predation of cubs. Although infanticide by male polar bears has been well documented (Hannsson and Thomassen 1983, Larsen 1985, Taylor et al. 1985, Derocher and Wiig 1999), it is thought that this activity does not account for large percentage of the cub mortality. A potential reason for infanticide relates to density dependent mechanisms of population control as this behavior seems to occur more frequently with increasing population size (Derocher and Wiig 1999).

Cannibalism has been recently documented in polar bears (Derocher and Wiig 1999, Amstrup et al. 2006). Amstrup et al. (2006) observed three non-related instances of intraspecific predation and cannibalism in the southern Beaufort Sea during the spring of 2004. One instance was the first documented predation of an adult female in a den, the second instance was of a female and newly emerged cub from a den, and the third instance involved a yearling male. In a combined 58 years of research by the senior investigators, similar observations had not taken place. Active stalking or hunting preceded the attacks and the killed bears were partially consumed. Adult males were believed to be the predator in all of the attacks. Amstrup et al. (2006) indicated that in general a greater portion of polar bears in the area where the predation occurred were in poor physical condition compared to other years. The authors hypothesized that adult males may be the first to show the effects of nutritional stress caused by significant ice retreat in this area (Skinner et al. 1998, Comiso and Parkinson 2004, Stroeve et al. 2005) because they feed less during the spring mating season and enter the summer in poorer condition than other sex/age classes. Derocher and Wiig (1999) documented a similar intraspecific killing and consumption of another polar bear in Svalbard, Norway, which was attributed to relatively high population densities and food shortages. Taylor et al. (1985) documented that a malnourished female killed and consumed her own cubs, and Lunn and Stenhouse (1985) found an emaciated male consuming an adult female polar bear. The potential importance of cannibalism and infanticide for population regulation is unknown. Given our current knowledge of disease and predation, we do not believe that these factors currently are having population level effects. However, increased cannibalism in polar bears was postulated and thought to be a result of nutritional stress brought on by climate change (Derocher et al. 2004).

5. Effects of the Action on the Species

This analysis focuses on the direct and indirect effects resulting from the promulgated Regulations and whether such effects, when considered with the species status, environmental baseline, and cumulative effects within the action area, are likely to jeopardize the continued existence of polar bears. Because the Regulations are addressing take of polar bears incidental to Industry activities associated with oil and gas exploration, development, and production in the Beaufort Sea, the effects analysis is organized around the potential effects of those activities. Whereas the

Regulations would permit some non-lethal incidental take of polar bears, the Regulations would require mitigation measures designed to avoid or minimize foreseeable adverse effects of Industry activities on polar bears, and require monitoring to document the effectiveness of these measures as well as document incidental take of polar bears. Therefore, the Regulations would also have direct benefits to polar bears, as well as provide a means for obtaining information useful for future management of polar bears in the Beaufort Sea.

Polar bears are present in the region of activity and, therefore, oil and gas activities could impact polar bears in various ways during both open-water and ice-covered seasons. Potential direct and indirect effects of the Industry activities from noise disturbance; physical obstructions; human encounters; effects on prey species, and oil and fuel spills are described below. In some cases, the Service has information about the response of polar bears to similar activities. This polar bear response information is relevant because it was largely obtained from the monitoring programs in place under previous or existing Regulations in the Chukchi and Beaufort seas. No lethal take is anticipated; only non-lethal incidental take is under consideration.

Noise Disturbance

Noise produced by Industry activities during the open-water and ice-covered seasons could potentially result in take of polar bears. During the ice-covered season, denning female bears, as well as mobile, non-denning bears, could be exposed to oil and gas activities and potentially affected in different ways. The best available scientific information indicates that female polar bears entering dens, or females in dens with cubs, are more sensitive than other age and sex groups to noises.

Noise disturbance can originate from either stationary or mobile sources. Stationary sources include: construction, maintenance, repair, and remediation activities; operations at production facilities; flaring excess gas; and drilling operations from either onshore or offshore facilities. Mobile sources include: vessel and aircraft traffic; open-water seismic exploration; winter vibroseis programs; geotechnical surveys; ice road construction and associated vehicle traffic, including tracked vehicles and snowmobiles; drilling; dredging; and ice-breaking vessels.

Stationary Sources

Typically, most polar bears occur in the active ice zone, far offshore, hunting throughout the year. However, some bears also spend a limited amount of time on land, coming ashore to feed, den, or move to other areas. If fall storms and ocean currents deposit ice-bound bears on land, they may remain along the coast or on barrier islands for several weeks until the ice returns.

Noise produced by stationary Industry activities could elicit several different responses in polar bears. The noise may act as a deterrent to bears entering the area or potentially attract bears. Attracting bears to these facilities, especially exploration facilities in the coastal or nearshore environment, could result in human–bear encounters, which could result in unintentional harassment, lethal take, or intentional hazing (under separate authorization) of the bear (see **Human Encounters**, below).

During the ice-covered season, noise from stationary Industry activities may deter females from denning in the surrounding area, even though polar bears have been known to den near industrial

activities without any observed impact to the polar bears. For example, in 1991 two maternity dens were located on the south shore of a barrier island within 2.8 km (1.7 mi) of a production facility. During the ice-covered seasons of 2000-2001 and 2001-2002, active dens were located within approximately 0.4 km and 0.8 km (0.25 mi and 0.5 mi) of remediation activities on Flaxman Island in the Beaufort Sea with no observed impact to the polar bears.

In other cases, polar bears may have abandoned dens as a result of human disturbance. For example, in January 1985, a female polar bear may have abandoned her den due to rolligon traffic, which occurred between 250 m and 500 m (820 ft and 1,640 ft) from the den site. Researcher disturbance created by nearby camp and associated noise, which occurred during a den emergence study in 2002 on the North Slope, may have caused a female bear and her cub(s) to abandon their den and move to the ice sooner than necessary. The female was observed later without the cub(s). Available information indicates such events have been infrequent and isolated.

Polar bears exposed to routine industrial noises may acclimate to those noises and show less vigilance than bears not exposed to such stimuli. This implication came from a study that occurred in conjunction with industrial activities performed on Flaxman Island in 2002 and a study of undisturbed dens in 2002 and 2003 (n = 8). Researchers assessed vigilant behavior with two potential measures of disturbance: (1) proportion of time scanning their surroundings and (2) the frequency of observable vigilant behaviors. Bears exposed to industrial activity spent less time scanning their surroundings than bears in undisturbed areas and engaged in vigilant behavior significantly less often.

In 2007, at the Intrepid exploration site located on the Chukchi Sea coast south of Barrow, a female bear and her cub were observed approximately 100 meters from a pad. The bear did not appear concerned about the activity and, after being observed by a bear monitor, the female changed her direction of movement and left the area. This is another example of a polar bear showing minimal behavior change due to an interaction with Industry and it is similar to encounters between polar bears and Industry that have been documented in the Beaufort Sea.

Mobile Sources

In the southern Beaufort Sea, during the open-water season, polar bears spend the majority of their lives on the pack ice, which limits the chances of impacts on polar bears from Industry activities. Although polar bears have been documented in open-water, miles from the ice edge or ice floes, this has been a relatively rare occurrence. However, with the amount of ice cover changing rapidly due to climate change, more bears may encounter Industry activities being conducted in open water. Researchers have observed that in some cases bears swim long distances during the open water period seeking either ice or land and may become vulnerable to exhaustion and storms with large waves because ice floes are dissipating and unavailable or unsuitable for use as haul outs or resting platforms. During a MMS coastal aerial survey program in the fall of 2004, four drowned polar bears were observed in the Beaufort Sea; presumably, the drownings were the result of a storm event (Monnett and Gleason 2006).

In the open-water season, Industry activities are generally limited to vessel-based exploration activities, such as ocean-bottom cable seismic and shallow hazards surveys. These activities avoid

ice floes and the multi-year ice edge; however, they may contact bears in open water and the effects of such encounters are likely to be short-term behavior disturbance.

Vessel and Aircraft Traffic: Polar bears are known to run from sources of noise and the sight of vessels or icebreakers and aircraft, especially helicopters. The effects of fleeing from aircraft may be minimal if the event is short and the animal is otherwise unstressed. Likewise, fleeing from a working icebreaker may have minimal effects for a healthy animal on a cool day. However, on a warm spring or summer day, a short run may be enough to overheat a well insulated polar bear.

During the open-water season, most polar bears remain offshore in the pack ice and are not typically present in the area of vessel traffic. Barges and vessels associated with Industry activities travel in open-water and avoid large ice floes. If there is any encounter between a vessel and a bear, it would most likely result in short-term behavioral disturbance only.

Routine aircraft traffic should have little to no effect on polar bears; however, extensive or repeated overflights of fixed-wing aircraft for monitoring purposes or helicopters used for re-supply of Industry operations could disturb polar bears. Behavioral reactions of non-denning polar bears should be limited to short-term changes in behavior and would have no long-term impact on individuals and no impacts on the polar bear population. In contrast, denning bears may abandon or depart their dens early in response to repeated noise such as that produced by extensive aircraft overflights. Mitigation measures, such as minimum flight elevations over polar bears or areas of concern and flight restrictions around known polar bear dens, will be required, as appropriate, to reduce the likelihood that bears are disturbed by aircraft.

Noise from Seismic Activity: Little information is available about the effects of noise on polar bears, nor the potential for seismic survey sounds to cause auditory impairment or other physical effects in polar bears. In the Chukchi Sea, four polar bears were sighted during three oil and gas seismic surveys (but no bears were observed from active seismic vessels) between September 2 and October 3 2006. Three of the four bears were observed walking on ice, and one animal was observed swimming; two of the four reacted to the vessel by distancing itself from the vessel.

Polar bears are curious and tend to investigate novel sights, smells, and possibly noises. Noise produced by seismic activities could elicit several different responses in polar bears. Noise may act as a deterrent to bears entering the area of operation, or the noise could potentially attract curious bears. Available data suggest that such effects, if they occur at all, would be limited to short distances and probably to projects involving large airgun arrays. There is no evidence that airgun pulses cause serious injury or death, even in the case of large airgun arrays. Marine mammals that show behavioral avoidance of seismic vessels are especially unlikely to incur auditory impairment or other physical effects.

Although polar bears are typically associated with the pack ice during summer and fall, open-water seismic exploration activities can encounter polar bears in the central Beaufort Sea in late summer or fall. It is unlikely that seismic exploration activities or other geophysical surveys during the openwater season would result in more than temporary behavioral disturbance to polar bears. Polar bears normally swim with their heads above the surface, where underwater noises are weak or undetectable. Furthermore, inclusion of standard Service mitigation measures for seismic

activities, such as power-down or shut-down of airguns if bears enter the 190 db ensonification zone, reduces the likelihood that adverse effects might occur. Therefore, the Service concludes that it is unlikely that any single bear would be exposed to strong underwater seismic sounds long enough for significant disturbance to develop.

Noise and vibrations produced by oil and gas activities during the ice-covered season could potentially result in impacts on polar bears. During this time of year, denning female bears as well as mobile, non-denning bears could be exposed to and affected differently by potential impacts from seismic activities. As stated earlier, disturbances to denning females, either on land or on ice are of particular concern. As part of the LOA application for seismic surveys during denning season, Industry provides the Service with the proposed seismic survey routes. To minimize the likelihood of disturbance to denning females, these routes are evaluated along with information about known polar bear dens, historic denning sites, and delineated denning habitat.

Physical Obstructions

There is little chance that Industry facilities would act as physical barriers to movements of polar bears. Most facilities are located onshore where polar bears are only occasionally found. The offshore and coastal facilities are most likely to be approached by polar bears. The Endicott and West Dock causeways and facilities have the greatest potential to act as barriers to movements of polar bears because they extend continuously from the coastline to the offshore facility. Yet because polar bears appear to have little or no fear of man-made structures and can easily climb and cross gravel roads and causeways, bears have frequently been observed crossing existing roads and causeways in the Prudhoe Bay oilfields. Offshore production facilities, such as Northstar, may be approached by polar bears, but due to their layout (i.e., continuous sheet pile walls around the perimeter) and monitoring plan, the bears may not gain access to the facility itself. This situation may present a small-scale, local obstruction to the bears' movement, but also minimizes the likelihood of human-bear encounters.

Human Encounters

Human encounters can be dangerous for both the polar bear and the human. Whenever humans work in the habitat of the animal, there is a chance of an encounter, even though, historically, such encounters have been uncommon in association with Industry.

Although bears may be found along the coast during open-water periods, most of the polar bears in the action area inhabit the multi-year pack ice during this time of year. Encounters are more likely to occur during fall and winter periods when greater numbers of the bears are found in the coastal environment searching for food and possibly den sites later in the season. Industry takes steps to actively prevent bears from accessing facilities, such as using safety gates and fences.

Documented impacts on polar bears by the oil and gas industry in the Beaufort Sea during the past 30 years are minimal. Polar bears spend time on land, coming ashore to feed, den, or move to other areas. Recent observations suggest that bears are increasing time on land, perhaps in response to changing ice conditions. Annual monitoring reports from Industry activities and community observations indicate that fall storms force bears to concentrate along the coastline where bears remain until the ice returns. For this reason, polar bears have been encountered at or near most coastal and offshore production facilities, or along roads and causeways that link these facilities to

the mainland. During those periods, the likelihood of interactions between polar bears and Industry activities increases. Most bears are observed within 1.6 km (1.0 mi) of the coastline. Similarly, we expect intermittent periods with high concentrations of bears in the coastal habitat to occur along the Beaufort Sea coastline where Industry activity is operating.

The majority of actual impacts on polar bears in the Beaufort Sea have resulted from direct human–bear encounters. Monitoring efforts by Industry required under Beaufort Sea Regulations resulted in the documentation of various types of interactions between polar bears and Industry. A total of 269 LOAs have been issued for incidental (unintentional) take of polar bears in regard to oil and gas activities from 1993 to 2005; approximately 76 percent were for exploration activities. In 2004, the most recent year in which records are complete, the oil and gas industry reported 89 polar bear sightings involving 113 individual bears. Polar bears were more frequently sighted from August to January. Seventy-four sightings were of single bears and 15 sightings consisted of family groups. Offshore oil facilities, Northstar and Endicott, accounted for 63 percent of all polar bear sightings, 42 percent and 21 percent, respectively. This shows that Industry activities that occur on or near the Beaufort Sea coast have a greater possibility for encountering polar bears than Industry activities occurring inland. Fifty-nine percent (n = 53) of polar bear sightings consisted of observations of polar bears traveling through or resting near the monitored areas without a perceived reaction to human presence. Forty-one percent (n = 36) of polar bear sightings involved Level B harassment, where bears were deterred from industrial areas with no injury.

Offshore production islands, such as the Northstar production facility, could potentially attract polar bears. In 2004, Northstar accounted for 41 percent of all polar bear observations Industry-wide. They reported 37 sightings in which 54 polar bears were observed. Most bears were observed as passing through the area. Such offshore facilities could potentially increase the rate of human-bear encounters, which could result in increased incident of harassment of bears. Employee training and company policies reduce and mitigate such encounters.

In the past, such interactions have been mitigated through conditions in the LOA, which require the applicant to develop a polar bear interaction plan for each operation. These plans outline the steps the applicant will take, such as garbage disposal procedures, to minimize impacts to polar bears by reducing the attraction of Industry activities to polar bears. Interaction plans also outline the chain of command for responding to a polar bear sighting. In addition to interaction plans, Industry personnel participate in polar bear interaction training while on site.

Employee training programs are designed to educate field personnel about the dangers of bear encounters and to implement safety procedures in the event of a bear sighting. The result of these polar bear interaction plans and training allows personnel on site to detect bears and respond safely and appropriately. Often, personnel are instructed to leave an area when bears are seen. Many times polar bears are monitored until they move out of the area. Sometimes, this response involves deterring the bear from the site. If it is not possible to leave, in most cases bears can be displaced by using pyrotechnics (e.g., cracker shells) or other forms of deterrents (e.g., the vehicle itself, vehicle horn, vehicle siren, vehicle lights, spot lights, etc.). The purpose of these plans and training is to eliminate the potential for injury to personnel or lethal take of bears in defense of human life. Since the Regulations went into effect in 1993, there has been no known instance of a bear being killed or Industry personnel being injured by a bear as a result of Industry activities. The

mitigation measures associated with these regulations have been proven to minimize human-bear interactions and will continue to be requirements of future LOAs, as appropriate.

There is the potential for human activity to contact polar bear dens as well. Known polar bear dens, found as a result of radio-collared, pregnant females or verification by scent-trained dogs, around the oilfield are monitored by the Service. These are only a small percentage of the total active polar bear den locations in the action area in any given year. Industry routinely coordinates with the Service to determine the location of Industry's activities relative to known dens and denning habitat. General LOA provisions require Industry operations to avoid known polar bear dens by 1.6 km (1 mi).

There is the possibility that an unknown den may be encountered during Industry activities as well. Once a previously unknown den is identified by Industry, the Service requires the den be reported. Communication between Industry and the Service and the implementation of mitigation measures, such as the 1.6-km (1-mi) exclusion area around the now known den, will ensure that disturbance is minimized.

Vessel traffic could result in short-term behavioral reactions by polar bears. If a ship is surrounded by ice it is more likely that curious bears will approach. Any on-ice activities required by exploration activities create the opportunity for bear-human interactions. In relatively ice-free waters, polar bears are less likely to approach ships, although they may be encountered on ice floes. For example, during the late 1980s, at the Belcher exploration drilling site in the Beaufort Sea, in a period of little ice, a large floe threatened the drill rig at the site. After the floe was moved by an icebreaker, workers noticed a female bear with a cub-of-the-year and a lone adult swimming nearby. It was assumed these bears had been disturbed from the ice floe.

The Service expects the trends in the Beaufort Sea to continue, including: a higher frequency of polar bears observed on land during fall and early winter months; single bears seen more frequently than family groups; and a higher percentage of bears observed passing through Industry areas than the percentage of bears involved in interactions.

Adoption of the following measures that are required by the Regulations will reduce potential impacts from drilling and human-induced disturbance: (1) development of a polar bear interaction plan; (2) maintenance of a 1.6-km (1.0-mi) buffer between industry activities and known denning sites to limit disturbance to the bear; and (3) den detection surveys through the use of FLIR technology, coupled with trained dogs, to locate or verify occupied polar bear dens. Furthermore, as part of the LOA application for seismic surveys during denning season, Industry provides the proposed seismic survey routes. To minimize the likelihood of disturbance to denning females, the Service will evaluate these routes along with information about known polar bear dens, historic denning sites, and delineated denning habitat.

Adoption of mitigation measures to reduce human-bear encounters include: (1) use of detection systems, such as bear monitors, motion and infrared detection systems; (2) use of safety gates and fences; (3) development of a polar bear interaction plan for each operation that outlines steps the applicant will take, such as garbage disposal and snow management procedures; (4) outline the

chain of command for responding to a polar bear sighting; and (5) requirement that personnel participate in polar bear interaction training.

Prior to issuance of regulations, lethal takes by Industry were rare. Since 1968, there have been only two documented cases of lethal take of polar bears associated with oil and gas activities. In both instances, the lethal take was reported to be in defense of human life. In winter 1968–1969, an Industry employee shot and killed a polar bear. In 1990, a female polar bear was killed at an exploratory drill site on the west side of Camden Bay. In contrast, 33 polar bears were killed in the Canadian NWT from 1976 to 1986 due to encounters with Industry. Since the beginning of the U.S. incidental take program, which includes measures that minimize impacts to the species, no polar bears have been killed due to encounters associated with Industry activities on the North Slope. For this reason, Industry has requested that these regulations cover only non-lethal, incidental take. Based upon the demonstrated effectiveness of the mitigation measures put in place by these Regulations, the Service anticipates that Industry exploration activities will result in non-lethal disturbance of polar bears

In summary, inclusion of the above mitigation requirements, as well as other measures described that may be required in individual LOAs, the Service concludes in the Regulations that only small numbers of polar bears would be potentially taken by harassment (as defined by the MMPA) from drilling and human-induced disturbance.

Effect on Prey Species

Ringed seals are the primary prey of polar bears and inhabit the nearshore waters where offshore Industry activities occur. Industry will mainly have an effect on seals through the potential for contamination (oil spills) or industrial noise disturbance. Some effects of contamination from oil discharges for seals are described in the following section, **Oil and Fuel Spills**.

Studies have shown that seals can be displaced from certain areas, such as pupping lairs or haulouts, and abandon breathing holes near Industry activity. However, these disturbances appear to have minor effects and are short term. In one study, no slope-wide effects of Industry activity on ringed seals could be measured.

Oil and Fuel Spills

The possibility of oil and waste product spills from Industry activities and the subsequent impacts on polar bears are a major concern to the Service. Polar bears could encounter oil spills during the open-water and ice-covered seasons in offshore or onshore habitat. Although the majority of the polar bears in the action area spend a large amount of their time offshore on the pack ice, some bears are likely to encounter oil from a spill regardless of the season and location.

Spills are unintentional releases of oil or petroleum products and it is not legal to discharge oil into the environment. However, accidental spills of oil and refined products may occur in association with Industry exploration activities, so their potential occurrence and impacts to polar bears are described. MMS describes the history of oil spills associated with the oil and gas industry in Northern Alaska (OCS EIS/EA MMS 2007-026, http://www.mms.gov/alaska/ref/EIS%20EA/Chukchi_FEIS_193/feis_193.htm).

A reporting system requires operators to report spills in accordance with the National Pollutant Discharge Elimination System Permit Program, and all North Slope oil companies must prepare and submit an oil spill contingency plan. According to MMS, 35 exploratory wells have been drilled on the Beaufort and Chukchi OCS, during which 35 small spills occurred totaling 26.7 barrels (1,120 gallons), of which approximately 24 barrels were recovered or cleaned up. By Industry standards, small spills are <50 barrels while large spills are ≥500 barrels. There is potential for refined product spills from marine vessels during exploration activities and the Industry history indicates the likelihood is that most will be localized and relatively small. Spills in the offshore or onshore environments classified as minor could occur during normal operations (e.g., transfer of fuel, handling of lubricants and liquid products, and general maintenance of equipment). To date, no major exploratory offshore oil spills have occurred on the North Slope in either the Beaufort or Chukchi seas.

Larger spills associated with Alaskan oil and gas activities on the North Slope have been production–related, and have occurred at production facility or pipeline connecting wells to the Trans-Alaska Pipeline System. In addition to onshore sites, this could include offshore facilities, such as causeway-linked Endicott or the sub-sea pipeline-linked Northstar Island. The trajectories of large offshore spills from Northstar and the proposed Liberty facilities were modeled to examine potential impacts to polar bears and were discussed in the final Regulations (71 FR 43938-43941).

Oil spills in the marine environment that can accumulate at the ice edge, in ice leads, and similar areas of importance to polar bears are of particular concern to the Service. Likewise, oil spills from offshore production activities, such as Northstar, are of concern because as additional offshore oil exploration and production (e.g., the Oguruk and Nikaitchuq projects) occurs, the potential for large spills in the marine environment increases. The Northstar Project transports crude oil from a gravel island in the Beaufort Sea to shore via a 9.5-km (5.9-mi) buried sub-sea pipeline. The pipeline is buried in a trench in the sea floor deep enough to reduce the risk of damage from ice gouging and strudel scour. Production of Northstar began in 2001, and currently an estimated 70,000 barrels of oil pass through the pipeline daily. However, spill response and clean-up of an oil spill, especially in broken-ice conditions is still problematic where it is unknown if oil could be effectively cleaned up. During the history of Industry operation activities on the North Slope (1985-2006), six large terrestrial spills occurred that posed minimal risk to polar bears (USFWS 2008).

During the ice-covered season, mobile, non-denning bears would have a higher probability of encountering oil or other production wastes than non-mobile, denning females. Current management practices by Industry, such as requiring the proper use, storage, and disposal of hazardous materials, minimize the potential occurrence of such incidents. In the event of an oil spill, it is also likely that polar bears would be intentionally hazed to keep them away from the area, further reducing the likelihood of impacting the population.

Oil may also affect food sources of polar bears. A local reduction in ringed seal numbers as a result of direct or indirect effects of oil could, therefore, temporarily affect the local distribution of polar bears. A reduction in density of seals as a direct result of mortality from contact with spilled oil could result in polar bears not using a particular area for hunting. Possible impacts from the loss of a food source could reduce recruitment or survival. Also, seals that die as a result of an oil

spill could be scavenged by polar bears. This would increase exposure of the bears to hydrocarbons and could result in lethal impact or reduced survival to individual bears.

Based upon the reported effects of crude oil exposure on polar bears (see **4. Environmental Baseline - Environmental Contaminants**), the Service believes an oil spill or refined product discharge contacting a polar bear likely would result in its death. To date, large oil spills from Industry activities in the Beaufort Sea and coastal regions that would impact polar bears have not occurred, although the development of offshore production facilities and pipelines has increased the potential for large offshore oil spills. With limited background information available regarding oil spills in the Arctic environment, it is not certain what the outcome of such a spill would be if one were to occur. In a large spill (e.g., 5,900 barrels: the size of a rupture in the Northstar pipeline and a complete drain of the subsea portion of the pipeline), oil would be influenced by seasonal weather and sea conditions. These would include temperature, winds, and, for offshore events, wave action and currents. Weather and sea conditions would also affect the type of equipment needed for spill response and how effective spill cleanup would be. Indeed, spill response drills have been unsuccessful in the cleanup of oil in broken-ice conditions. In addition, based on clean-up activities with the Exxon Valdez oil spill, spill response may be largely unsuccessful in open water conditions. These factors, in turn, would dictate how large spills impact polar bear and walrus habitat and numbers.

The major concern regarding large oil spills is the impact a spill would have on the survival and recruitment of the SB stock. Currently, this bear population is approximately 1,500 bears. Recently, harvest levels generally do not exceed 50 bears in the Beaufort See (divided between Canada and Alaska). The population may be able to sustain the additional mortality caused by a large oil spill of a small number of bears, such as 1 to 5 individuals; however, the additive effect of a worst-case scenario, such as numerous bear deaths (i.e., in the range of 20 to 30) due to direct or indirect effects from a large oil spill, may reduce population rates of recruitment or survival. Indirect effects may occur through a local reduction in seal productivity or scavenging of oiled seal carcasses coupled with the subsistence harvest and other potential impacts, both natural and human-induced. The removal of a large number of bears from the population would exceed sustainable levels, potentially causing a decline in the bear population and affecting bear productivity and subsistence use.

Potential impacts of Industry waste products and oil spills suggest that individual bears could be impacted by the disturbances. Depending on the amount of oil or wastes involved, the timing and location of a spill, impacts could be short-term, chronic, or lethal. In order for bear population reproduction or survival to be impacted, a large-volume oil spill would have to take place. In assessing the effects of the activities to be covered by the Regulations, the Service conducted an oil spill risk assessment analysis that considered the oil spill probability for two sites (Northstar and Liberty), oil spill trajectory models, and a polar bear distribution model based on location of satellite-collared females during September and October. A detailed description of the assessment, including methodology, can be found in the final rule promulgating these Regulations (71 FR 43938-43941). Using two different techniques, the analysis calculated the probabilities of an oil spill occurring during various ice conditions. For the fall broken ice period (the timeframe hypothesized effects of an oil-spill would be greatest), the probability of an oil spill from the Northstar and Liberty facilities were calculated to range from 0.4-1.4 percent and 0.2-0.4 percent,

respectively, for the 5-year Regulations. Additionally, the analysis found that the probability that an oil spill during the fall would be more likely to affect small numbers of bears (5 bears). For Northstar, the probability of a spill causing the mortality of 5 or more bears ranged from 1.0-3.4 percent; 10 or more bears was 0.7-2.3 percent; and 20 or more bears was 0.2-0.8 percent. For Liberty, the probability of a spill causing the mortality of 5 or more bears ranged from 0.3-7.4 percent; 10 or more bears was 0.1-0.4 percent; and 20 or more bears was 0.1-0.2 percent. This analysis, as well as the history of oil spills in the Beaufort Sea, suggested that it is not reasonably certain that an oil spill would occur as a result of the activities covered in the Beaufort Regulations during the time period for which the Regulations are in effect, and that even if such a spill were to occur, there is a low probability that 5 or more polar bears would be exposed to the spill.

Impacts on the Physical Environment
The action area is limited to the Beaufort Sea west of the Canadian border. The activities covered by the Regulations include exploration, development, and production operations of oil and gas reserves, as well as environmental monitoring associated with these activities.

Once an Industry project has been proposed, the Service will evaluate the project in regards to polar bears through a requested LOA per the process provided by the Regulations. With inclusion of all appropriate mitigation measures, plus any other measures incorporated into an LOA, the Service has determined that the proposed action would result in no measurable impacts to the physical environment.

Interdependent and Interrelated Actions
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 has not identified any activities that are interdependent or interrelated with the proposed Regulations.

6. 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 in this section because they require separate consultation under the ESA. Analysis of the following threats was provided in Schliebe et al. (2006), and the Final EA Beaufort Sea Incidental Take Regulations (June 2006).

Subsistence Harvest
The most significant source of polar bear mortality is man. Before MMPA was enacted in 1972, polar bears were taken by sport hunters and residents. Between 1925 and 1972, the mean reported harvest in Alaska was 186 bears per year. Seventy-five percent of these were males, as cubs and females with cubs were protected. Since 1972, only Alaska Natives from coastal Alaskan villages have been allowed to hunt polar bears for their subsistence uses or for handicraft and clothing items for sale. The Native hunt occurs without restrictions on sex, age, or number provided that the population is not determined to be depleted. From 1980 to 2005, the total annual harvest for Alaska averaged 101 bears: 64 percent from the Chukchi Sea and 36 percent from the Beaufort Sea.

Other sources of mortality related to human activities include bears killed during research activities, euthanasia of sick and/or injured bears, and defense of life kills by non-Natives (Brower et al. 2002). A management concern is the possible inadvertent over-harvest of the SB stock, particularly if they become increasingly nutritionally-stressed or populations decline due to the combination of the threats due to loss of sea ice, increased atmospheric and oceanic transport of contaminants into the region, increases in both expanse and duration of open water in summer and fall; human activities, including hydrocarbon exploration and development within the near-shore environment.

Marine Vessel Traffic

Polar bears spend the majority of their time on pack ice during the open-water season, which limits their interaction with fishing vessels and barge traffic. However, polar bears are known to run from sources of noise and the sight of vessels. The effects of fleeing may be minimal if the event is short and the animal is otherwise unstressed, but a short run on a warm spring or summer day could overheat a polar bear. If predictions for the decrease in the temporal and seasonal extent of the sea ice are realized, more vessels may transit the area encountering polar bears more frequently. Researchers have observed bears may swim long distances during the open water period seeking either ice or land. With diminished ice, swimming bears may become vulnerable to exhaustion and storms because ice floes are dissipating and unavailable or unsuitable for use as haul outs or resting platforms.

As discussed throughout **5. Effects of the Action**, observation of polar bear reactions to industry or military vessels indicates polar bear reactions tend to be short-term and limited to minor changes in behavior.

Summary of Cumulative Effects

Hunting pressure, loss of sea ice and climate change (see **4. Environmental Baseline**), and the expansion of commercial activities into polar bear habitat have potential to impact polar bears. Combined, these factors could present significant challenges to future conservation and management efforts. The success of future management efforts will rely in part on continued investments in research investigating population status and trends and habitat use patterns. The effectiveness of various mitigation measures and management actions will need to be continually evaluated through monitoring programs.

7. Conclusion

Service Findings under ESA

After reviewing the current status of the polar bear; the environmental baseline for the Beaufort Sea Regulations action area; the effects of the Regulations; documented impacts of Industry activities on the species; data provided by monitoring programs in the Beaufort Sea (1993–2006) and the Chukchi Sea (1991–1996); and the cumulative effects; it is the Service's biological opinion that the Regulations, as promulgated, are not likely to jeopardize the continued existence of the polar bear. Critical habitat has not been designated or proposed for the polar bear; therefore none will be destroyed or adversely modified.

Regulations (50 CFR 402) 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. For the issuance of incidental take regulations under the MMPA, the Service must (1) find, based on the best scientific evidence available, that the total take for the specified time period will have a negligible impact (i.e., an impact that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival) on the species or stock and will not have an unmitigable adverse impact on the availability of the species or stock for subsistence uses; (2) prescribe regulations setting forth permissible methods of taking and other means of effecting the least practicable adverse impact on the species and its habitat and on the availability of the species for subsistence uses, and (3) prescribe regulations pertaining to the monitoring and reporting of such taking (50 CFR 18.27(b)). In making such determinations, the Service must consider information regarding the effects of the activity on the species as described in implementing regulations for section 101(a)(5) of the MMPA (50 CFR 18.27(d)) as well as conduct a NEPA analysis that results in a similar evaluation to that required for making the "jeopardy/no jeopardy" call under section 7 of the ESA.

While there is significant overlap in the information and evaluation required to make the jeopardy and negligible impact determinations, there may be significant differences in (1) the portion of the species' population evaluated (i.e., the listed entity versus the effected stock(s), respectively) and (2) the threshold of the effects that trigger a negative determination (i.e., the action will jeopardize the species, or the action has more than a negligible effect). With regard to the polar bear, the portion of the population evaluated for a jeopardy determination is the range-wide population as the species is listed in its entirety. For the negligible impact determination, however, only those stocks which are potentially affected by the Regulations are evaluated (i.e., Southern Beaufort Sea stock). Further, the thresholds of the effects of impacts being evaluated are significantly different, essentially the difference between not adversely affecting a species or stock versus jeopardizing the continued existence of the species. It is reasonable to expect that an action being independently evaluated under the MMPA and the ESA would be determined to have more than a negligible impact before, and in some cases well before, a jeopardy determination would be made.

Although Industry activities may adversely affect a small number of polar bears within the action area, mitigating measures, as identified in §18.124 of the Regulations, included in project-specific LOA request will reduce the potential for exposure to adverse effects through temporal and spatial separation between polar bears and Industry activities, and reduce potential adverse effects in cases of unavoidable interactions (e.g., curious bears drawn to the activity) and unintentional, unauthorized consequences of the activities (e.g., oil spills). In addition to these mitigating measures, other project specific mitigating measures may be required through the issuance of an LOA per §18.128 of the Regulations. The Regulations, while allowing a "small number" of animals to be incidentally taken by harassment, provide a mechanism requiring that mitigating measures are implemented, monitored, and reported on annually. Thus, the Regulations contribute to the collection of additional information that will aid in developing and/or further refining mitigating measures for future Industry activities.

Based on the above evaluation and the fact that (1) the Regulations do not authorize lethal take, (2) the Beaufort Sea Regulations have been in place almost continuously since 1993, and (3) a small number bears are likely to interact with Industry, and those that interact are likely to alter their behavior only temporarily if at all, the Service believes that the existing Beaufort Sea Incidental Take Regulations under the MMPA will not appreciably reduce the likelihood of survival and recovery of the polar bear, and therefore are not likely to jeopardize their continued existence.

8. Administration of the Programmatic Biological Opinion

This BO is structured in a "programmatic," tiered approach, with this document serving as Tier 1. The Tier 1 BO does the following:

- Evaluates the issuance of the Beaufort Sea Incidental Take Regulations per requirements under section 7 of the ESA and its implementing regulations (50 CFR 402);
- Clarifies the regulatory dependence upon the take analysis required under the MMPA for ESA incidental take evaluation;
- Concludes that the proposed action will not jeopardize the continued existence of the species; and
- Provides the process for conducting Tier 2 consultation (below and Appendix 3).

The Tier 1 BO relies on the negligible impacts and small numbers analysis (see explanation below) in the Incidental Take Regulations to evaluate the projected level of take. Because project-specific information is not known until a request for an LOA is made under the Regulations, the Service defers authorizing incidental take until such requests are made (i.e., Tier 2).

Tier 2 of this programmatic consultation is triggered when Industry requests an LOA from MMM. The request for the LOA will also serve as a request for Tier 2 consultation. A separate Tier 2 consultation will be required for each LOA requested under the Regulations. To track the take projections in the Regulations and in order for the Tier 2 BO to be consistent with the "no jeopardy" conclusion of the Tier 1 BO and an incidental take statement (ITS) to be issued: (1) the proposed activity must provide the required information, as described in §18.124 of the Regulations, (2) the LOA includes any mitigation measures that the MMM believes appropriate for the specific activity and location, as described in §18.128 of the Regulations, and (3) the MMM must determine that the incidental take for the specific activity will be consistent with the negligible impact finding for the total take allowed under the Regulations.

Upon receipt of the request MMM will:

- Determine whether the request falls within the parameters established in the Beaufort Sea Regulations and the Tier 1 BO
  - If yes, the Tier 2 process will continue.
  - If no, additional evaluation is necessary to determine if LOA/ITS mitigation measures will be sufficient to bring the request within the parameters of the Regulations and Tier 1 BO.

    - If additional measures are sufficient and can be implemented by the applicant, the Tier 2 consultation will continue.
    - If additional measures are not sufficient and/or cannot be implemented by the applicant, a separate consultation may be required. It is important to note, however, that an ITS under the ESA cannot be given for a marine mammal if the take is not covered under section 101(a)(5) of the MMPA (i.e., through Regulations/LOA or an Incidental Harassment Authorization).
- For requests that fall within the parameters of the Regulations and Tier 1 BO, issue a combined LOA/ITS that will provide incidental take coverage under both Acts (see Appendix 3). Issuance of the LOA/ITS concludes ESA consultation for that action.
- Each LOA will require a comprehensive final report of all take, which will be provided to the MMM. The report will cover required compliance with both the MMPA's the ESA's requirement to monitor take.

The above programmatic approach integrates the ESA with the existing incidental take regulation/LOA process that MMM has been conducting since 1991 on oil and gas activities in the Beaufort and Chukchi seas. The combined LOA/ITS language provided in Appendix 3 is intended to meet the legal requirements of both Acts and provide for the greatest conservation benefits allowable under both Acts. This reduces duplication of effort by taking advantage of overlapping areas of the Acts, adding only what is uniquely required through section 7 of the ESA.

While the ITS is technically provided to the Service's MMM and the LOA applicant, we anticipate that other Federal agencies involved in permitting the exploration actions covered by the Beaufort Sea Regulations will also seek to fulfill their section 7 responsibilities by seeking consultation with the Service. So long as the activities covered by such consultations comply with the MMPA incidental take regulations, we would expect these consultations to be completed by linking to this intra-Service biological opinion.

9. Incidental Take Statement

By virtue of establishing the special rule for polar bears (73 FR 28306-28318; May 15, 2008) and by virtue of the Service making the appropriate determinations under the MMPA, the activities covered by this consultation are exempt from any take prohibitions that might otherwise apply under the ESA. Section 7(b)(4)(C)(iii) of the ESA, however, requires the issuance of an ITS, which "specifies those measures that are necessary to comply with" the MMPA. This ITS replicates, rather than being additive to, any requirements and obligations necessary to comply with the MMPA.

Section 9 of the ESA and Federal regulations 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 the Service 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 the Service as intentional or negligent actions that create the likelihood of injury to

listed species to such an extent as to significantly disrupt normal behavioral 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. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this ITS.

The measures described below are non-discretionary, and will be binding conditions of any permit issued to an LOA applicant for the exemption in section 7(o)(2) of the ESA to apply. MMM will regulate the activity covered by this incidental take statement to ensure the LOA holder adhere to the terms and conditions of the ITS through enforceable terms that are added to the permit or grant document, so that the protective coverage of section 7(o)(2) does not lapse. In order to monitor the impact of incidental take, the MMM will provide annual monitoring reports to the FFWFO as specified in the ITS. [50 CFR 402.14(i)(3)]

In the accompanying BO, the Service determined that total take anticipated as a result of the issuance of the Regulations under section 101(a)(5)(A) of the MMPA is not likely to result in jeopardy to the polar bear. No lethal take is anticipated. While the Service cannot anticipate the specific amount or extent of other types of take that may result from activities that may be authorized under the Regulations until they are proposed and the specific activities and location is known, the negligible effects finding and the small numbers determination articulates the anticipated amount of take with respect to effect on the population.

The Service believes that mitigating measures required by the Regulations and to be included in site-specific LOAs will provide a thorough and effective mechanism for minimizing potential adverse impacts of oil and gas activities on polar bears. The Service does not identify additional necessary measures to reduce impacts under the ESA because the Service believes all identified measures to mitigate impacts are included in the Regulations or will be required in LOAs. Therefore, the following Reasonable and Prudent Measure and its implementing terms and conditions require compliance with mitigating measures provided through the MMPA Regulations and LOA processes. The measure and its implementing terms and conditions are provided in the Tier 1 BO so that MMM may incorporate them into the LOA (Tier 2) process.

10. Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize the impacts of incidental take of polar bears:

1. Reduce adverse impacts to polar bears from oil and gas exploration, development, and production activities by incorporating all standard mitigation measures identified in the Incidental Take Regulations and all site specific mitigation measures included in individual LOAs.

11. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the MMM must comply with the following terms and conditions, which implement the reasonable and prudent measure described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. MMM will require the implementation of appropriate mitigation measures of Industry applicants to minimize impacts to polar bears through the Incidental Take Regulations and project specific Letter of Authorization.

2. LOA monitoring reports will be provided to the MMM upon project conclusion by the Industry operator. Reports shall include, but not be limited to, (1) the amount of take anticipated and type of take authorized in each LOA/ITS, (2) the amount and type of take that actually occurs, and (3) other polar bear observations that did not result in take.

As lethal take is not anticipated, specific procedures for handling or disposing of carcasses (50 CFR 402.14(i)(1)(v)), are not necessary.

12. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service has the following conservation recommendation for this action.

- The status of polar bears in the SB and CS stocks needs to be monitored throughout the duration of these Regulations. The Service has particular concern about the response of polar bears, at the individual and population levels, to the quickly changing environmental conditions in the action area of the Beaufort Sea and coastal northern Alaska. It recommends the Service and its agents in this action (permitting agencies and Industry) promote collection of baseline data to help increase understanding of how the effects of climate change will affect polar bears inhabiting Alaska, (http://alaska.fws.gov/fisheries/mmm/polarbear/issues.htm). For example, ongoing studies include those led by the USGS Alaska Science Center, in cooperation with the Service, to examine polar bear habitat use, reproduction, and survival relative to a changing sea-ice environment. Specific objectives are to evaluate polar bear habitat availability and quality as influenced by ongoing climate changes and response by polar bears; effects of changes in sea-ice environment on condition of adults, numbers and sizes of offspring, and survival of offspring to weaning (recruitment); and population structure.

13. Re-initiation Notice

This concludes formal consultation on effects to polar bears on the existing Beaufort Sea Incidental Take Regulations. As provided in 50 C.F.R. 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and 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 agency action is subsequently modified in a manner that causes an effect to listed or critical habitat not considered in this opinion; and/or
(4) A new species is listed or critical habitat designated that may be affected by the action.

Thank you for your cooperation in the development of this conference opinion. If you have any comments or require additional information, please contact Ted Swem, Endangered Species Branch Chief, Fairbanks Fish and Wildlife Field Office, 101 12th Ave., Fairbanks, AK, 99701, Telephone: 907/456-0441.

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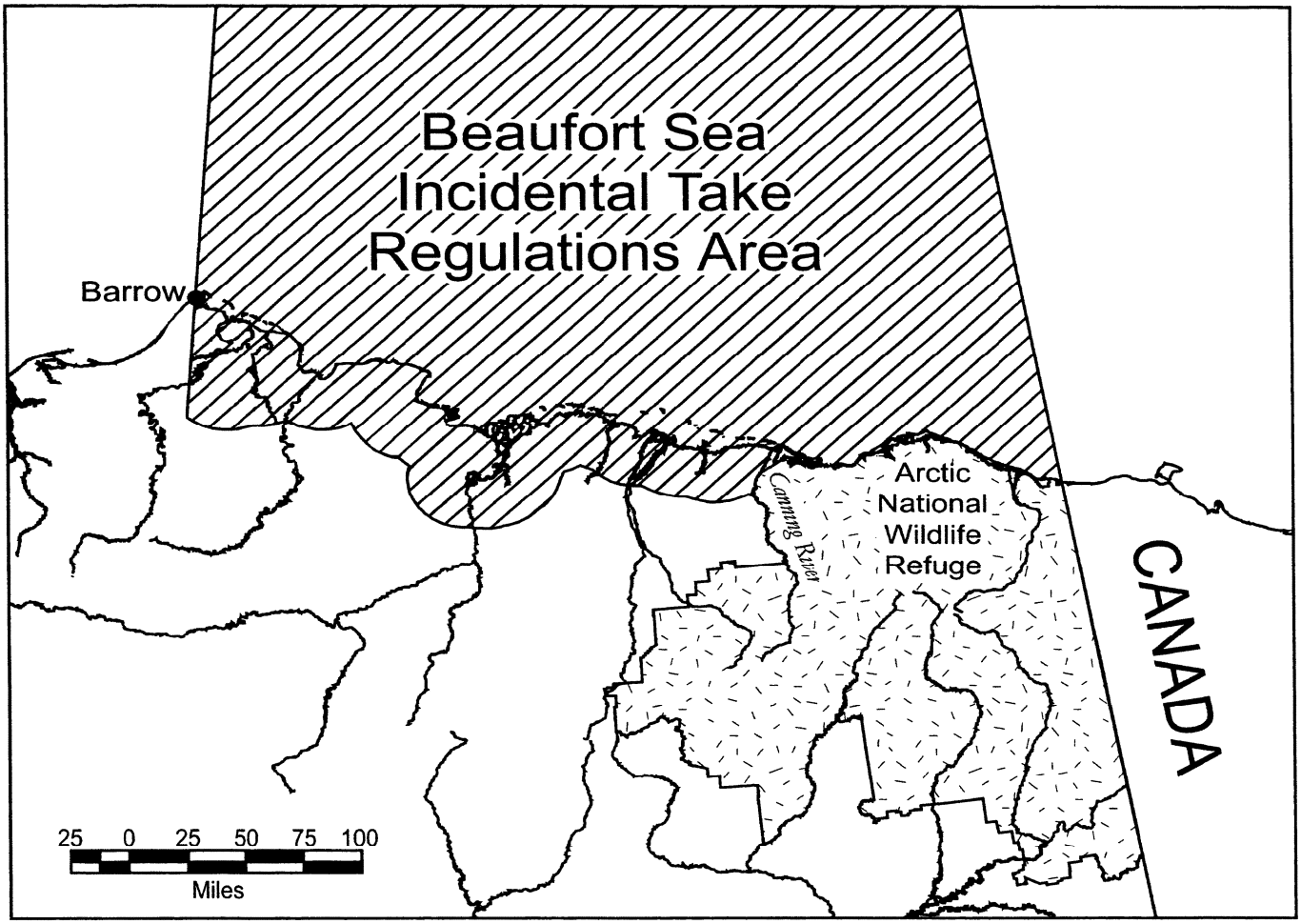

Figure 1. Specific geographic region covered by the Beaufort Sea incidental take regulations.

From: Marine Mammals; Incidental Take During Specified Activities (Final Rule); 71 FR 43951

Appendix 1.
Summary of Conference/Consultation Activities

1/7/08 – FFWFO conference call with RO ES and MMM staff to discuss polar bear conferences. RO identified need for intra-service Sec 7 conference/consultation on Chukchi Sea and Beaufort Sea ITRs. Overall new polar bear workload was discussed.

1/8/08 – Conference call with RO and WO ES staff regarding polar bear conferences/consultations. Proposed Chukchi Sea ITRs are scheduled to come out about March 1.

2/11/08 – Polar bear coordination meeting between FFWFO and MMM at Anchorage Regional office; intra-Service conferences on Chukchi and Beaufort ITRs discussed.

2/26/08 – Conference call between FFWFO, MMM, and RO and WO ES, and AK and WO Solicitors to discuss MMPA/ESA coordination issues identified in the Draft Chukchi ITR Conference Opinion (relevant, also, to Beaufort Sea ITRs conference).

3/31/08 – A 90-day detailee arrives in FFWFO to work solely on polar bear conference/consultations; Chukchi ITRs are highest priority in detailee's workload.

5/15/08 – Final rule to list the polar bear as a threatened species under the ESA and interim final 4(d) rule are published in the *Federal Register*; both are effective immediately. Conferences become consultations.

5/29/08 – FFWFO finalizes BO. Beaufort Sea ITRs consultation becomes detailee's priority workload.

6/10-12/08 – FFWFO worked with MMM to update project description, effects of the action, etc., based on new information and any LOAs issued since the Beaufort ITRs were issued.

6/16/08 – Draft BO sent to RO, MMM, WO, and Solicitors for review.

6/23/08 – FFWFO finalizes BO.

Appendix 2.
LOA/ITS Content

The Letter of Authorization Cover Letter will include these statements:

> Per the Programmatic Biological Opinion for the Beaufort Sea Incidental Take Regulations for Polar Bear (June 2008), your request also triggers the second of the two-tiered programmatic process.
>
> The LOA also serves as an "Incidental Take Statement" (ITS), required under section 7 of the Endangered Species Act of 1973 (ESA), in order for incidental take of the polar bear to be exempted from the prohibitions of the ESA. Issuance of the LOA/ITS fulfills the requirements for Tier 2 Consultation of the Programmatic Biological Opinion for the activities described in this letter.

The following statement should be included in the body of the LOA:

INCIDENTAL TAKE STATEMENT
Polar Bear

In the Programmatic Biological Opinion for Polar Bears (*Ursus maritimus*) on Beaufort Sea Incidental Take Regulations" (June 2008; Tier 1 BO), the Service determined that the total take anticipated as a result of the issuance of the Regulations is not likely to result in jeopardy to the polar bear, in accordance with section 7 of the Endangered Species Act of 1973, as amended (ESA). In order for the Tier 2 BO to be consistent with the "no jeopardy" conclusion of the Tier 1 BO and an incidental take statement (ITS) to be provided: (1) the proposed activity must provide the required information, as described in the §18.124 of the Regulations, (2) the LOA includes any mitigation measures that the MMM believes appropriate for the specific activity and location, as described in §18.128 of the Regulations, and (3) the MMM must determine that the incidental take for the specific activity will be consistent with the negligible impact finding for the total take allowed under the Regulations.

A reasonable and prudent measure and implementing terms and conditions were included for MMM in the Tier 1 BO and have been incorporated into the LOA process. Issuance of this ITS with the LOA completes ESA requirements for authorization of incidental take of the polar bear. Compliance with the terms and conditions of the above LOA insures that the LOA holder is also in compliance with the ESA.

Documentation of Take

A requirement of each LOA is to provide observational data of polar bears throughout the project and a complete report of all observations at the conclusion of the project. This final report will be provided to the MMM. This report meets the tracking and reporting requirements relative to the documentation of take as required by the MMPA and the ESA.