

ENVIRONMENTAL ASSESSMENT

Incidental Harassment Authorization to Take of Small Numbers of Polar Bear (Ursus maritimus) and Pacific Walrus (Odobenus rosmarus divergens) During Oil and Gas Industry Seismic Activities in the Chukchi Sea

DEPARTMENT OF INTERIOR

U.S. FISH AND WILDLIFE SERVICE

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## **Chapter 1 - Purpose and need**

### **1.1 Introduction**

This environmental assessment (EA) is prepared to implement provisions of the National Environmental Policy Act of 1969 [(NEPA) 42 U.S.C. § 4321 *et cetera*]. The action being considered under NEPA is whether authorizing the incidental harassment of Pacific walrus (*Odobenus rosmarus divergens*) and polar bears (*Ursus maritimus*) during seismic operations in the Chukchi Sea is, or is not, a major Federal action. In Alaska, oil and gas industry activities occurring in Federal waters are permitted by the Department of Interior's Mineral Management Service (MMS), while oil and gas industry activities on State waters are permitted by the State of Alaska. Further, oil and gas industry activities may occur in habitat frequented by Pacific walrus and polar bears. The issuance of incidental harassment authorizations does not permit the actual oil and gas industry activities. Therefore industry activities will likely continue to occur in Pacific walrus and polar bear habitat regardless of the determination being made under this EA.

It is important to note that the U. S. Fish and Wildlife Service (Service) is not evaluating the impact of seismic exploration for oil and gas on Pacific walrus and polar bears in this document. Rather this EA evaluates the impact of issuing an incidental harassment authorization (IHA) on polar bear and Pacific walrus. Based upon this EA, a decision will be made concerning the environmental impacts resulting from the implementation of an IHA governing the taking of small numbers of Pacific walrus and polar bear incidental to oil and gas seismic activities in the Chukchi Sea. This EA will then determine if the action will have significant impacts, address any unresolved environmental issues, and provide a basis on whether or not to issue the IHA authorizing the incidental take of Pacific walrus and polar bears.

### **1.2 By what authority can we issue incidental harassment authorizations?**

Section 101(a)(5)(A) of the Marine Mammal Protection Act of 1972 (Act), as amended (16 U.S.C. § 1371), directs the Service to allow the incidental, but not intentional, take of small numbers of marine mammals in a specified activity (other than commercial fishing) within a specified geographical area for a specified time, upon the request of U.S. citizens. Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals where the take will be limited to harassment. Section 101(a)(5)(D)(iii) establishes a 45-day time limit for Service review of an application, followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of marine mammals. Within 45 days of the close of the comment period, the Service must either issue or deny issuance of the authorization. The Service refers to these authorizations as Incidental Harassment Authorizations (IHAs).

Prior to allowing such incidental takings, the Service must find in the analysis for the IHA, based on the best scientific evidence available, that the total taking 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. If both of these findings are made, we will issue a specific

IHA regarding the incidental taking of marine mammals that will include permissible methods of taking and other means to ensure the least practicable adverse impact on the species. The scope of the IHA will include the species, habitat, and the availability of the species for subsistence uses, and pay close attention to habitat areas of significance, monitoring activities and reporting requirements. Definitions of key terms used in the proposed authorization are listed below. Additional definitions can be found in 50 CFR Part 18.

*Harass.* The term "harass" as defined by the Act, for non-military readiness activities, means any act of pursuit, torment, or annoyance that a) has the potential to injure a marine mammal or marine mammal stock in the wild; or b) 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.

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

*Negligible impact.* Negligible impact is 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.* Small numbers means a portion of a marine mammal species or stock whose taking would have a negligible impact on that species or stock. We decline to quantify small numbers explicitly. Such numerical limits would ignore the significant differences in the status and population dynamics among the various marine mammal stocks and the type of taking (i.e., harassment versus mortality) or other impacts. Furthermore, Congress recognized the imprecision of "small numbers" but offered no additional guidance.

*Take.* The term "take" as defined by the Act means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.

### **1.3 Why do we need incidental harassment authorizations?**

Section 101 of the Act placed a moratorium on the taking of marine mammals. Section 101(a)(5)(A), as described in Section 1.2 of this document, allows the incidental, but not intentional, taking of marine mammals upon request of a U.S. Citizen once certain findings are made. In Alaska, the Service is responsible for the management of three marine mammal species: polar bear, northern sea otter (*Enhydra lutris kenyoni*), and the Pacific walrus. These species are protected under the Act. Neither the Pacific walrus nor polar bears are currently listed as threatened or endangered and, therefore, are not provided protection by the Endangered Species Act. On December 27, 2006, the Service proposed to list the polar bear as a threatened species under the Endangered Species Act and initiated a comprehensive scientific review to assess the current status and future of the species. The Service will use the next 12 months to gather more information, undertake additional analyses, and assess the reliability of relevant scientific models before making a final decision whether to list the species. More information can be found at: "<http://www.fws.gov/>" and "<http://www.fws.gov/home/feature/2006/010907FRproposedrule.pdf>."

On April 4, 2007, the Service received an application from Shell Offshore Incorporated (SOI) for the taking by harassment of Pacific walrus and polar bears incidental to conducting a seismic survey program in the Chukchi Sea. SOI proposes to conduct a marine geophysical (deep seismic) survey program during the 2007 open water season in support of future oil and gas exploration within the proposed U.S. Minerals Management Service (MMS) Chukchi Sea Lease Sale 193. A lease sale for this area is expected to occur in 2008. SOI's proposed seismic activity in the Chukchi Sea is part of a comprehensive exploration program that includes activities in the Beaufort Sea as well. Incidental take authorization for the Beaufort Sea portion of SOI's program are provided for under regulations described in 50 CFR part 18, subpart J. On June 1, 2007, the Service published proposed regulations in the *Federal Register* ([72 FR 30670](#)) that would authorize the nonlethal, incidental, unintentional take of small numbers of Pacific walrus and polar bears associated with oil and gas exploration activities in the Chukchi Sea and adjacent western coast of Alaska. A final decision regarding these proposed incidental take regulations (ITRs) is anticipated in 2008. No regulations are currently in place. SOI expects to conduct its seismic operations in the Chukchi Sea between July 15 and November 30, 2007. Scheduled transit time for SOI to the operational area is planned to begin July 2, 2007.

SOI proposes to conduct its seismic survey program in areas of known walrus and polar bear habitat. Thus, it is possible that while conducting legal activities in pursuit of oil and gas resources, SOI's actions could result in the incidental take of Pacific walrus or polar bears. Section 101(a)(5) (D)(i) directs the Service to allow such takings by harassment as long as certain findings can be made. Section 101(a)(5)(D)(ii) of the Act further requires monitoring and reporting programs by anyone operating under an IHA. Monitoring provides us with additional information to evaluate the effect of the activities on Pacific walrus and polar bears and also provides information to design and develop human/polar bear interaction plans which may serve to enhance human safety and protect polar bears. Without the proposed IHA, activities could continue; however, the Service would have no formal means of communicating with Industry or have the ability to require monitoring and mitigation of specific activities. Further, any form of "take" would be a violation of the Act.

#### **1.4 What types of activities would be authorized?**

##### **1.4.1. Permissible methods of take**

IHAs are restricted to incidental Level B (non-lethal) harassment only. Any taking resulting in the injury, or death of polar bears or walrus would not be authorized.

Although encounters with polar bears in the open water environment of the Chukchi Sea are considered unlikely, SOI has also requested intentional take authorization in the event that interactions with polar bear occur and hazing becomes necessary to protect polar bear and/ or personnel. In the Beaufort Sea Region, where the oil and gas industry operates in both terrestrial and marine environments, each operator mitigates potential encounters with training and having a Service-approved polar bear interaction plan on site. Such plans outline the steps the applicant will take to minimize impacts on animals, such as garbage disposal procedures to reduce the attraction of polar bears. Interaction plans must also outline the chain of command for

responding to an animal sighting. In addition to interaction plans, Industry personnel participate in polar bear awareness training. The intent of interaction plans and training activities is to allow for the early detection and appropriate response to polar bears that may be encountered during Industry activities. Most often, the appropriate response involves monitoring the animal's activities. SOI has submitted a polar bear interaction plan to the Service in support of its proposed Chukchi Sea seismic survey program. The implementation and administration of the intentional take authorization in the Chukchi Sea would be similar to currently established procedures that the Service uses to implement intentional take authorizations in the Beaufort Sea.

#### **1.4.2. Specified activity**

SOI and its geophysical (seismic) contractor WesternGeco propose to conduct a marine geophysical (deep seismic) survey program during the 2007 open-water season on various U.S. Minerals Management Service (MMS) Outer Continental Shelf (OCS) lease blocks, in the Northern Chukchi Sea. This 3D seismic survey will consist of deep seismic surveys conducted from WesternGeco's vessel *M/V Gilavar* (84.9 m [278.5 ft] length, 5.3 m [17.4 ft] draft) using a BOLT Long Life Airgun array with a total volume of 3147 in<sup>3</sup> operated at a nominal source pressure of 2000 psi. The seismic acquisition vessel will be supported by the *M/V Gulf Provider* (or a seismic chase vessel of similar characteristics) 57.8 m (190 ft) length, 3.8 m (12.5 ft) draft. The *M/V Gulf Provider*, or similar vessel, will serve as a supply, fueling, support of acoustic and marine mammal monitoring, and seismic chase vessel. It will not deploy seismic acquisition gear. In addition, a crew change vessel such as the *M/V Peregrine* (27.4 m [90 ft] length,; 1 m, [3 ft] draft) will support the *M/V Gilavar* and the chase vessel in the Chukchi Sea.

A fixed-wing aerial overflight program also will be conducted as a component of the marine mammal monitoring and mitigation program. It is presumed that one specially outfitted Twin Otter fixed-wing aircraft will support this open water 3D seismic monitoring program in the Chukchi Sea. SOI will also contract a Sikorsky S-61 helicopter or similar aircraft to provide emergency rescue/evacuation and search and rescue services. The Sikorsky or similar aircraft will initially be stationed in Barrow. This aircraft would fly intermittent training missions over the Chukchi Sea.

The *M/V Gilavar* will conduct offshore surveys associated with 3D open water seismic acquisition. The marine mammal monitoring and mitigation program support may include acoustic instrument and buoy deployment by the *M/V Gulf Provider* or similar vessel at various locations throughout the Chukchi Sea, depending on ice conditions and stipulations in any IHA's.

Aerial over-flights are proposed to be flown from early July until SOI's seismic operations in the Chukchi Sea are completed. Twice weekly, a single fixed wing aircraft will fly a saw-toothed pattern from Point Barrow to Point Hope over an area extending from the mainland, or outer barrier island, out to 20 nautical miles offshore. Aerial over-flights will honor flight altitude restrictions of 1,000 feet over the survey area, and 1,500 feet after July 1 over the Ledyard Bay spectacled eider critical habitat area. Marine mammal observers will be aboard aircraft during

these surveys. The aerial component of the operation will observe a 0.5 mile (800 m) exclusion zone around walrus and polar bears observed on land or ice. In addition to these measures, aerial flights will remain outside of a 40-mile radius offshore from affected communities.

The proposed deep seismic survey in the Chukchi Sea potentially will occur before and after seismic survey activity in the Beaufort Sea. As sea ice coverage conditions allow, seismic activity will begin on or after July 20th and continue to the end of August or early September when the M/V Gilavar and M/V Gulf Provider, or similar vessel, will transit to the Beaufort Sea to start work on a deep seismic survey on SOI lease-holdings in the mid and eastern Beaufort. After early-October or when sea ice conditions in the mid and eastern Beaufort Sea make further survey work there impractical, the survey activity may return to the Chukchi Sea. The M/V Gilavar and M/V Gulf Provider will transit to the Chukchi Sea and continue the deep seismic survey program until such time as sea ice and weather conditions preclude further work, probably sometime in mid- to late-November.

#### **1.4.3. Specified geographical area**

The geographic area covered by the request for a IHA (hereafter referred to as the Chukchi Sea Region) encompasses all Chukchi Sea waters north and west of Point Hope (68°20'20" N, -166°50'40" W; BGN 1947) to the U.S– Russia Convention Line of 1867, and west of a north-south line through Point Barrow (71°23'29" N, -156°28'30" W; BGN 1944), and up to 200 miles north of Point Barrow. The north-south line at Point Barrow is the western border of the geographic region in the Beaufort Sea incidental take regulations (71 FR 43926).

#### **1.4.4. Specified time**

SOI's IHA application describes activities occurring from early July through mid- to late-November. For the purpose of this EA we will consider July 1 –November 30, 2007 as the specified time frame for the proposed activities.

#### **1.4.5. Existing measures to mitigate seismic-survey effects**

The current, existing measures summarized below are based on the protective measures in the most recent MMS marine seismic survey exploration permits and the recently completed *Programmatic Environmental Assessment of Arctic Ocean Outer Continental Shelf Seismic Surveys – 2006* (USDOJ, MMS, 2006).

*Spacing of Seismic Surveys* - Operators must maintain a minimum spacing of 15 miles between the seismic-source vessels for separate simultaneous operations. The intent of this provision is to avoid cumulative or synergistic effects of multiple seismic operations on walrus, polar bears or related subsistence hunting activities.

*Exclusion Zone* - A 180/190-decibel (dB) isopleth-exclusion zone (also called a safety zone) from the seismic-survey-sound source shall be free of marine mammals before the survey can begin and must remain free of mammals during the survey. The purpose of the exclusion zone is to protect marine mammals from Level A harassment (injury/harm). The 180-dB (Level A harassment injury) applies to cetaceans and the Pacific walrus, and the 190-dB (Level A harassment-injury) applies to pinnipeds other than the Pacific walrus and to polar bears.

*Monitoring of the Exclusion Zone* - Trained marine mammal observers shall monitor the area around the seismic survey for the presence of marine mammals to maintain a marine mammal-free exclusion zone and monitor for avoidance or take behaviors. Visual observers monitor the exclusion zone to ensure that marine mammals do not enter the exclusion zone for at least 30 minutes prior to ramp-up, during the conduct of the survey, or before resuming seismic survey work after shut-down.

*Temporal/spatial operational restrictions* - Seismic-survey and associated support vessels shall observe a 0.5-mile (~800-meter) safety radius around Pacific walrus groups hauled out onto land or ice. Aircraft shall be required to maintain a 1,000-foot minimum altitude within 0.5 miles of hauled out Pacific walruses. The purpose of these operating restrictions is to protect walruses from potential Level A harassment associated with disturbance-related trampling injuries.

#### **1.4.6. Proposed measures to mitigate potential effects of specified activities**

In conjunction with its 2007 IHA application, SOI has prepared a *Marine Mammal Monitoring and Mitigation Plan*, and a *Plan of Cooperation*. All terms and conditions associated with these plans would be incorporated into a IHA by reference.

*Marine Mammal Monitoring and Mitigation Plan (4MP)* - SOI has contracted LGL Alaska Research Associates, Inc. to design a marine mammal monitoring and mitigation program for their open-water seismic activities in the Chukchi and Beaufort seas in 2007. The goal of the 4MP is to develop a program that supports protection of the marine mammal resources in the area, fulfills reporting obligations to the Service, MMS, and the National Marine Fisheries Service (NMFS), and to provide data useful for monitoring and understanding the impacts of seismic exploration activities on marine mammals. The 4MP was developed in consultation with the Service, MMS, NMFS and potentially affected user groups through a series of peer review meetings. The proposed program consists of monitoring and mitigation during SOI's seismic activities that will provide information on the numbers of marine mammals potentially affected by the seismic program and real time mitigation to prevent possible injury of marine mammals by seismic sounds associated with its offshore seismic program. The 4MP also describes studies designed to add to current knowledge of marine mammal distribution and abundance to be funded cooperatively by SOI and other industry groups. Monitoring efforts would be initiated to collect data to: improve the understanding of the distribution and abundance of marine mammals in the Chukchi and Beaufort sea project areas; understand the propagation and attenuation of anthropogenic sounds in the project areas; determine the ambient sound levels in the waters of

the project areas; and assess the effects of sound on marine mammals inhabiting the project areas and their distribution relative to the local people that depend on them for subsistence hunting.

These objectives and the monitoring and mitigation goals would be addressed by: vessel-based marine mammal observers on the seismic source and other support vessels; an acoustic program to predict and then measure the sounds produced by the seismic operations and the possible responses of marine mammals to those sounds; aerial monitoring and reconnaissance of marine mammals available for subsistence harvest along the Chukchi Sea coast; and, bottom-founded autonomous acoustic recorder arrays along the Alaskan coast and offshore in the Chukchi and Beaufort seas to record ambient sound levels, vocalizations of marine mammals, and received levels of seismic operations should they be detectable.

*Plan of Cooperation (POC)* Through consultations with potentially effected communities and subsistence user groups, the applicant has developed a Plan of Cooperation detailing how the applicant will communicate and work with potentially effected communities to mitigate potential impacts of their specified activities on the subsistence uses of polar bears and walrus. The Service acknowledges that the POC is a dynamic document and as such SOI will be engaged with potentially affected communities in the POC's development and implementation throughout SOI's operational period. Proposed operational plans have been presented in public meetings in potentially effected communities and in Anchorage, Alaska. Based on feed-back provided at these meetings, the applicant has proposed to coordinate the timing and sighting of events with subsistence hunting activities in these communities to avoid conflicts with subsistence hunters.

## **Chapter 2 - Alternatives including the proposed action**

### **2.1 Alternative 1: No action**

The no action alternative for this EA would result in no IHA being issued. The moratorium and prohibitions on the taking of marine mammals imposed by the Act prohibits Industry from "taking" marine mammals, including incidental taking. Therefore, no further mitigation to minimize the effects of Industry activities on walrus and polar bears, monitoring, or reporting would be required. Under this alternative, takings that could occur incidental to oil and gas activities would be subject to prohibitions found in the Act, and Industry would be liable for penalties should any take occur.

### **2.2 Alternative 2: The proposed action (issuance of a IHA)**

The proposed alternative is to issue a IHA, which would authorize incidental take of small numbers of marine mammals associated with seismic operations in the Chukchi Sea. The proposed action would provide for additional mitigation, monitoring and reporting requirements designed to protect polar bears and walrus and the subsistence use of these resources. SOI would be responsible for their own actions, mitigating measures, and requirements for monitoring and reporting under the proposed IHA. The authorization would not allow the intentional taking of polar bears or walrus.

### **2.3. Alternatives considered but not feasible**

The Service considered alternatives that were not appropriate or feasible when determining the mechanism to authorize non-lethal incidental take of small numbers of marine mammals associated with oil and gas activities in the Chukchi Sea. They included issuing incidental take regulations similar to those developed for the Beaufort Sea. In evaluating the effects of incidental take regulations on polar bears and walruses, the Service is required to evaluate takes expected from all specified activities in the specific geographic area on polar bear and Pacific walrus. This evaluation involves assessing the accumulation of impacts from all anticipated activities combined (the applicant's anticipated takes, as well as takes from other citizens conducting similar activities in the geographic region), regardless of the type or location of activity, or season in order to evaluate the cumulative effects of Industry activities. Since seismic operations are scheduled for 2007, and insufficient time was available to develop incidental take regulations, a process that can take up to 2 years, this alternative was not considered feasible. On June 1, 2007, the Service published proposed regulations in the *Federal Register* (72 FR 30670) that would authorize the nonlethal, incidental, unintentional take of small numbers of Pacific walruses and polar bears associated with oil and gas exploration activities in the Chukchi Sea and adjacent western coast of Alaska projected out to 2012. A final decision regarding these proposed incidental take regulations is anticipated in 2008.

## **Chapter 3 - Affected environment**

### **3.1. Physical environment**

A detailed description of the Chukchi Sea ecosystem can be found in the MMS Final Environmental Impact Statement (EIS) on Oil and Gas Lease Sale 193 and Seismic Surveying Activities in the Chukchi Sea (OCS EIS/EA MMS 2007-026) available on the MMS Alaska Region web site:

[http://www.mms.gov/alaska/ref/EIS%20EA/Chukchi\\_feis\\_Sale193/feis\\_193.htm](http://www.mms.gov/alaska/ref/EIS%20EA/Chukchi_feis_Sale193/feis_193.htm).

## **3.2. Biological environment**

The biological environment associated with this environmental assessment in the Chukchi Sea includes the Pacific walrus population and polar bears from the Chukchi/Bering Seas and Southern Beaufort Sea stocks.

### **3.2.1. Pacific walrus**

#### Stock definition and range

Pacific walruses are represented by a single stock of animals that inhabit the shallow continental shelf waters of the Bering and Chukchi seas (Sease and Chapman 1988). The population ranges across the international boundaries of the United States and Russia, and both nations share common interests with respect to the conservation and management of this species.

The distribution of Pacific walruses varies markedly with seasons. During the late winter breeding season, walruses are found in areas of the Bering Sea where open leads, polynas, or areas of broken pack-ice occur. Significant winter concentrations are normally found in the Gulf of Anadyr, the St. Lawrence Island Polyna, and in an area south of Nunivak Island. In the spring and early summer, most of the population follows the retreating pack-ice northward into the Chukchi Sea; however, several thousand animals, primarily adult males, remain in the Bering Sea, utilizing coastal haulouts during the ice-free season. During the summer months, walruses are widely distributed across the shallow continental shelf waters of the Chukchi Sea. Significant summer concentrations are normally found in the unconsolidated pack ice west of Point Barrow, and along the northern coastline of Chukotka in the vicinity of Wrangel Island. As the ice edge advances southward in the fall, walruses reverse their migration and re-group on the Bering Sea pack-ice (USFWS 2002a).

#### Population status

Several decades of intense commercial exploitation in the late 1800s and early 1900s left the population severely depleted. Fay et al. (1986) reviewed the results of aerial surveys conducted between 1960 and 1985 and concluded that the population had increased from 50,000–100,000 animals in the late 1950s to more than 250,000 animals by 1985. They attributed this rapid population growth to hunting restrictions enacted in the United States and Russia that reduced the size of the commercial harvest and provided protection to female walruses and calves. Information concerning population size and trend after 1985 is less certain. An aerial survey flown in 1990 produced a population estimate of 201,039 animals; however, large confidence intervals associated with that estimate precluded any conclusions concerning population trend (Gilbert et al. 1992). The current size and trend of the Pacific walrus population are unknown (USFWS 2002a).

#### Habitat

Walruses rely on floating pack ice as a substrate for resting and giving birth. Walruses generally require ice thicknesses of 50 centimeters (cm) or more to support their weight. Although walruses can break through ice up to 20 cm thick, they usually occupy areas with natural openings and are not found in areas of extensive, unbroken ice (Fay 1982). Thus, their concentrations in winter tend to be in areas of divergent ice flow or along the margins of persistent polynas. Concentrations in summer tend to be in areas of unconsolidated pack-ice,

usually within 100 km of the leading edge of the ice pack (Gilbert 1999). When suitable pack-ice is not available, walrus haul out to rest on land. Isolated sites, such as barrier islands, points, and headlands, are most frequently occupied. Social factors, learned behavior, and proximity to their prey base are also thought to influence the location of walrus haulout sites. Traditional walrus haulout sites in the eastern Chukchi Sea include Cape Thompson, Cape Lisburne and Icy Cape. In recent years, the Cape Lisburne haulout site has seen regular use in late summer. Numerous haulouts also exist along the northern coastline of Chukotka, and on Wrangel and Herald islands, which are considered important hauling grounds in September, especially in years when the pack-ice retreats far to the north.

Although capable of diving to deeper depths, walrus are for the most part found in shallow waters of 100 m or less, possibly because of higher productivity of their benthic foods in shallower water. They feed almost exclusively on benthic invertebrates although Native hunters have also reported walrus preying on seals. Prey densities are thought to vary across the continental shelf according to sediment type and structure. Preferred feeding areas are typically composed of sediments of soft fine sands. The juxtaposition of ice over appropriate depths for feeding is especially important for females and their dependent young that are not capable of deep diving or long exposure in the water. The mobility of the pack ice is thought to help prevent walrus from overexploiting its prey resource (Ray et al. 2006). Foraging trips may last for several days, during which time walrus dive to the bottom nearly continuously. Most foraging dives to the bottom last between 5 and 10 minutes, with a relatively short (1–2 minute) surface interval. The intensive tilling of the sea floor by foraging walrus is thought to have significant influence on the ecology of the Bering and Chukchi Seas. Foraging activity recycles large quantities of nutrients from the sea floor back into the water column, provides food for scavenger organisms, and contributes greatly to the diversity of the benthic community.

#### Life history

Walrus are long-lived animals with low rates of reproduction. Females reach sexual maturity at 4–9 years of age. Males become fertile at 5–7 years of age; however, they are usually unable to compete for mates until they reach full physical maturity at 15–16 years of age. Breeding occurs between January and March in the pack-ice of the Bering Sea. Calves are usually born in late April or May the following year during the northward migration from the Bering Sea to the Chukchi Sea. Calving areas in the Chukchi Sea extend from the Bering Strait to latitude 70°N. (Fay et al. 1984). Calves are capable of entering the water shortly after birth, but tend to haulout frequently, until their swimming ability and blubber layer are well developed. Newborn calves are tended closely. They accompany their mother from birth and are usually not weaned for 2 years or more. Cows brood neonates to aid in their thermoregulation (Fay and Ray 1968), and carry them on their back or under their flipper while in the water (Gehrich 1984). Females with newborns often join together to form large "nursery herds" (Burns 1970). Summer distribution of females and young walrus is closely tied to the movements of the pack-ice relative to feeding areas. Females give birth to one calf every two or more years. This reproductive rate is much lower than other pinniped species; however, some walrus live to age 35–40 and remain reproductively active until relatively late in life (Garlich-Miller et al. 2006).

Walrus are extremely social and gregarious animals. They tend to travel in groups and haulout onto ice or land in groups. Walrus spend approximately one-third of their time hauled out onto

land or ice. Hauled-out walrus tend to lie in close physical contact with each other. Youngsters often lie on top of the adults. The size of the hauled out groups can range from a few animals up to several thousand individuals.

#### Mortality

Polar bears are known to prey on walrus calves, and killer whales (*Orcinus orca*) have been known to take all age classes of these animals. Predation levels are thought to be highest near terrestrial haulout sites where large aggregations of walrus can be found; however, few observations exist for off-shore environs.

Pacific walrus have been hunted by coastal Natives in Alaska and Chukotka for thousands of years. Exploitation of the Pacific walrus population by Europeans has also occurred in varying degrees since first contact. Presently, walrus hunting in Alaska and Chukotka is restricted to meet the subsistence needs of aboriginal peoples. The Service, in partnership with the Eskimo Walrus Commission (EWC) and the Association of Traditional Marine Mammal Hunters of Chukotka, administered subsistence harvest monitoring programs in Alaska and Chukotka in 2000–2005. Harvest mortality averaged 5,458 walrus per year. This mortality estimate includes corrections for under-reported harvest and struck and lost animals.

Intra-specific trauma is also a known source of injury and mortality. Disturbance events can cause walrus to stampede into the water and have been known to result in injuries and mortalities. The risk of stampede-related injuries increases with the number of animals hauled out. Calves and young animals at the perimeter of these herds are particularly vulnerable to trampling injuries.

#### Distributions and abundance of walrus in the Chukchi Sea

Walrus are seasonably abundant in the Chukchi Sea and Lease Sale 193 Area. Their distribution is thought to be influenced primarily by the extent of the seasonal pack-ice (Fay 1982), although habitat use patterns are poorly known. In May and June, most of the Pacific walrus population migrates through the Bering Strait into the Chukchi Sea. Walrus tend to migrate into the Chukchi Sea along lead systems that develop along the northwest coast of Alaska. Walrus are expected to be closely associated with the southern edge of the seasonal pack-ice during the open water season. By July, large groups of walrus, up to several thousand animals, can be found along the edge of the pack ice between Icy Cape and Point Barrow. During August, the edge of the pack-ice generally retreats northward to about 71°N, but in light ice years, the ice edge can retreat beyond 76°N. The sea ice normally reaches its minimum (northern) extent in September. It is unclear how walrus respond in years when the sea ice retreats beyond the relatively shallow continental shelf waters. At least some animals are thought to migrate west towards Chukotka, while others have been observed hauling out along the shoreline between Point Barrow and Cape Lisburne. The pack-ice rapidly advances southward in October, and most animals are thought to have returned to the Bering Sea by early November (Fay 1982).

A recent abundance estimate for the number of walrus present in the Chukchi Sea, including the Lease Sale 193 Area during the proposed operating season is lacking. Johnson et al. (1982) estimated 101,213 walrus hauled-out onto Chukchi Sea pack-ice, east of 172°30' W, in

September 1980. Gilbert (1989) estimated 62,177 walrus were distributed in the Chukchi Sea pack-ice in the eastern Chukchi Sea in September 1985. Gilbert et al. (1992) estimated 16,489 walrus were distributed in the Chukchi sea pack-ice between Wrangel Island and Point Barrow in September 1990, but the authors also noted that the pack-ice was distributed well beyond the continental shelf at the time of the survey. These abundance estimates are all considered conservative because no corrections were made for walrus in water (not visible) at the time of the surveys.

### **3.2.2 Polar bear**

#### **Stock definition and range**

Polar bears occur throughout the Arctic. The world population estimate of polar bears ranges from 20,000–25,000 individuals. In Alaska, they have been observed as far south in the eastern Bering Sea as St. Matthew Island and the Pribilof Islands (Ray 1971). However, they are most commonly found within 180 miles of the Alaskan coast of the Chukchi and Beaufort Seas, from the Bering Strait to the Canadian border. Two stocks occur in Alaska: (1) the Chukchi-Bering Seas stock (CS); and (2) the Southern Beaufort Sea stock (SBS). A summary of the Chukchi and Southern Beaufort Sea polar bear stocks are described below. A detailed description of the Chukchi Sea and Southern Beaufort Sea polar bear stocks can be found in the, “Range-Wide Status Review of the Polar Bear (*Ursus Maritimus*)” (<http://alaska.fws.gov/fisheries/mmm/polarbear/issues.htm>).

#### **Chukchi/Bering Seas stock (CS)**

The Chukchi/Bering Seas stock is defined as polar bears inhabiting the area as far west as the eastern portion of the Eastern Siberian Sea, as far east as Point Barrow, and extending into the Bering Sea, with its southern boundary determined by the extent of annual ice. Based upon these telemetry studies, the western boundary of the population was set near Chaunskaya Bay in north-eastern Russia. The eastern boundary was set at Icy Cape, Alaska, which also is the previous western boundary of the SBS. This eastern boundary constitutes a large overlap zone with bears in the SBS population.

Estimates of the size of the population have been derived from observations of dens, and aerial surveys. However, these estimates have wide ranges (*ca.* 200-500) and are considered to be of little value for management. Reliable estimates of population size based upon mark and recapture are not available for this region (Evans et al. 2003). The status of the CS population, which was believed to have increased after the level of harvest was reduced in 1972, is now thought to be uncertain or declining. Measuring the population size remains a research challenge and recent reports of substantial levels of illegal harvest in Russia are cause for concern. Legal harvesting activities are currently restricted to Inuit in western Alaska. In Alaska, average annual harvest levels declined by approximately 50% between the 1980s and the 1990s and have remained at low levels in recent years. There are several factors potentially affecting the harvest level in western Alaska. The factor of greatest direct relevance is the substantial illegal harvest in Chukotka. In addition, other factors such as climatic change and its effects on pack ice distribution, as well as changing demographics and hunting effort in native communities could influence the declining take. Recent measures undertaken by regional authorities in Chukotka may have reduced the illegal hunt. The unknown rate of illegal take makes the stable designation uncertain and tentative and as a precaution the Chukchi population is designated as declining.

### Southern Beaufort Sea stock (SBS)

The SBS polar bear population is shared between Canada and Alaska. Radio-telemetry data, combined with earlier tag returns from harvested bears, suggested that the SB region comprised a single population with a western boundary near Icy Cape, Alaska, and an eastern boundary near Pearce Point, NWT, Canada. The Southern Beaufort Sea population (from Point Hope, Alaska, to Banks Island, Northwest Territories) was estimated at 2,200 bears in 2000 (USFWS 2002b; 2002c). Later estimates suggested the size of the SBS population was approximately 1800 polar bears, although uneven sampling was known to compromise the accuracy of that estimate. A preliminary population analysis of the SBS stock was completed in June 2006 through joint research coordinated between the U.S. and Canada. That analysis indicated the population of the region between Icy Cape and Pearce Point is now approximately 1500 polar bears (95% confidence intervals approximately 1000 - 2000). Further analyses are likely to tighten the confidence intervals, but not likely to change the point estimate appreciably. Although the confidence intervals of the current population estimate overlap the previous population estimate of 1,800, other statistical and ecological evidence (e.g., high recapture rates encountered in the field) suggest that the current population is actually smaller than has been estimated for this area in the past. Although the new SBS population estimate is preliminary, we believe it should be used for current status assessments.

Recent analyses of radio-telemetry data of spatial and temporal use patterns of bears of the SBS stock using new spatial modelling techniques suggest realignment of the boundaries of the Southern Beaufort Sea area. We now know that nearly all bears in the central coastal region of the Beaufort Sea are from the SBS population, and that proportional representation of SBS bears decreases to both the west and east. For example, only 50% of the bears occurring in Barrow, Alaska and Tuktoyaktuk, NWT are SBS bears, with the remainder being from the CS and northern Beaufort Sea populations, respectively. The recent radio-telemetry data indicate that bears from the SBS population seldom reach Pearce Point, which is currently on the eastern management boundary for the SBS population. Conversely, SBS bears can also be found in the eastern regions of their range (i.e., Wainwright and Point Lay) in lower proportions than the central portion of their range.

The primary management and conservation concerns for the CS and SBS populations are: Climate warming, which continues to increase both the expanse and duration of open water in summer and fall; Human activities, including hydrocarbon exploration and development occurring within the near-shore environment; Changing atmospheric and oceanic transport of contaminants into the region; and Possible inadvertent over-harvest, if the stocks become increasingly nutritionally-stressed or decline due to some combination of the afore-mentioned threats.

On December 27, 2006, the Service proposed to list the polar bear as a threatened species under the Endangered Species Act and initiated a comprehensive scientific review to assess the current status and future of the species. The Service will use the next 12 months to gather more information, undertake additional analyses, and assess the reliability of relevant scientific models before making a final decision whether to list the species. More information can be found at: "<http://www.fws.gov/>" and <http://www.fws.gov/home/feature/2006/010907FRproposedrule.pdf>.

### Habitat

Polar bears of the Chukchi Sea are subject to the movements and coverage of the pack-ice. The most extensive north-south movements of polar bears are associated with the spring and fall ice movement. For example, during the 2006 ice-covered season, six bears radio-collared in the Beaufort Sea were located in the Chukchi and Bering Seas as far south as 59° latitude. Summer movements tend to be less dramatic due to the reduction of ice habitat. Summer distribution is somewhat dependent upon the location of the ice front; however, polar bears are accomplished swimmers and are often seen on floes separated from the main pack-ice. Therefore, bears can appear at any time in what can be called “open water.” The summer ice pack can be quite disjunct and segments can be driven by wind great distances carrying polar bears with them. Bears from both stocks overlap in their distribution around Point Barrow and can move into surrounding areas depending on ice conditions.

Polar bears spend most of their time in near-shore, shallow waters over the productive continental shelf associated with the shear zone and the active ice adjacent to the shear zone. Sea ice and food availability are two important factors affecting the distribution of polar bears. In the near-shore environment, Beaufort Sea polar bears are generally widely distributed in low numbers across the Beaufort Sea area; however, polar bears have been observed congregating on the barrier islands in the fall and winter resting, moving, and feeding on available food. Polar bears will occasionally feed on bowhead whale (*Balaena mysticetus*) carcasses at Point Barrow, Cross and Barter islands, areas where bowhead whales are harvested for subsistence purposes. An increase trend by polar bears to use coastal habitats in the fall during open-water and freeze-up conditions has been noted since 1992.

### Denning and reproduction

Although insufficient data exist to accurately quantify polar bear denning along the Alaskan Chukchi Sea coast, dens in the area are less concentrated than for other areas in the Arctic. The majority of denning of Chukchi Sea polar bears occurs on Wrangel Island, Herald Island, and certain locations on the northern Chukotka coast. Females without dependent cubs breed in the spring. Females can initiate breeding at 5 to 6 years of age. Females with cubs do not mate. Pregnant females enter maternity dens by late November, and the young are usually born in late December or early January. Only pregnant females den for an extended period during the winter; other polar bears may excavate temporary dens to escape harsh winter winds. An average of two cubs are usually born, and after giving birth, the female and her cubs remain in the den where the cubs are nurtured until they can walk. Reproductive potential (intrinsic rate of increase) is low. The average reproductive interval for a polar bear is 3 to 4 years, and a female polar bear may produce about 8 to 10 cubs in her lifetime; in healthy populations, 50 to 60 percent of the cubs will survive. Female bears can be quite sensitive to disturbances during this denning period.

In late March or early April, the female and cubs emerge from the den. If the mother moves young cubs from the den before they can walk or withstand the cold, mortality to the cubs may increase. Therefore, it is thought that successful denning, birthing, and rearing activities require a relatively undisturbed environment. Radio and satellite telemetry studies elsewhere indicate that denning can occur in multi-year pack-ice and on land.

Both fur and fat are important to polar bears for insulation in air and water. Cubs-of-the-year must accumulate a sufficient layer of fat in order to maintain their body temperature when immersed in water. It is unknown to what extent young cubs can withstand exposure in water before they are threatened by hypothermia. Polar bears groom their fur to maintain its insulative value.

#### Prey

Ringed seals (*Phoca hispida*) are the primary prey of polar bears in most areas. Bearded seals (*Erignathus barbatus*) and walrus calves are hunted occasionally. Polar bears opportunistically scavenge marine mammal carcasses, and there are reports of polar bears killing beluga whales (*Delphinapterus leucas*) trapped in the ice. Polar bears are also known to eat nonfood items including styrofoam, plastic, antifreeze, and hydraulic and lubricating fluids.

Polar bears hunt seals along leads and other areas of open water or by waiting at a breathing hole, or by breaking through the roof of a seal's lair. Lairs are excavated in snow drifts on top of the ice. Bears also stalk seals in the spring when they haul out on the ice in warm weather. The relationship between ice type and bear distribution is as yet unknown, but it is suspected to be related to seal availability.

#### Mortality

Polar bears are long-lived (up to 30 years) and have no natural predators, and they do not appear to be prone to death by diseases or parasites. Cannibalism by adult males on cubs and occasionally on other bears is known to occur. The most significant source of mortality is man. Before the MMPA was passed in 1972, polar bears were taken by sport hunters and residents. Between 1925 and 1972, the mean reported kill 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).

#### Distributions and abundance of polar bears in the Chukchi Sea

Polar Bears are seasonably abundant in the Chukchi Sea and Lease Sale 193 Area 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). The distance between the northern and southern extremes of the seasonal pack ice is approximately 800 miles. In May, and June polar bears are likely to be encountered in the Lease Sale Area as they move northward from the northern Bering Sea, through the Bering Strait into the southern Chukchi Sea Bering Strait. During fall/early winter period polar bears are likely to be encountered in the Lease Sale Area during their southward migration in late October and November. Polar bears are dependent upon the sea ice for foraging and the most productive areas seem to be near the ice

edge, leads, or polynas where the ocean depth is minimal (Durner et al. 2004). In addition polar bears could be present along the shoreline in this area as they will opportunistically scavenge on marine mammal carcasses washed up along the shoreline (Kalxdorff and Fischbach 1998).

### **3.3. Socio-economic environment**

The communities most likely to be impacted by the proposed activities are Point Hope, Point Lay, Wainwright, and Barrow. Walrus and polar bears have been traditionally harvested from these communities for subsistence purposes. The harvest of these species plays an important role in the culture and economy of these coastal communities. Walrus meat is consumed by humans and dogs, and the ivory is used to manufacture traditional arts and crafts. Polar bears are primarily hunted for their fur, which is used to manufacture cold weather gear; however, their meat is also occasionally consumed.

An exemption under section 101(b) of the MMPA allows Alaska Natives who reside in Alaska and dwell on the coast of the North Pacific Ocean or the Arctic Ocean to take polar bears and walrus if such taking is for subsistence purposes or occurs for purposes of creating and selling authentic native articles of handicrafts and clothing, as long as the take is not done in a wasteful manner. Sport hunting of both species has been prohibited in the United States since enactment of the MMPA in 1972. Under the terms of the MMPA, there are no restrictions on the number, season, or ages of polar bears or walrus that can be harvested in Alaska. A more restrictive Native to Native agreement between the Inupiat from Alaska and the Inuvialuit in Canada was created for the Southern Beaufort Sea stock of Polar bears in 1988 (Brower et al. 2002). Polar bears harvested from the villages of Barrow and Wainwright are currently considered part of the Southern Beaufort Sea stock and thus are subject to the terms of the Inuvialuit-Inupiat Polar Bear Management Agreement (Agreement). The Agreement establishes quotas and recommendations concerning protection of denning females, family groups, and methods of take. Quotas are based on estimates of population size and age specific estimates of survival and recruitment. The polar bears harvested by the communities of Point Hope and Point Lay are thought to come primarily from the Chukchi/Bering sea stock. Neither Point Hope nor Point Lay hunters are parties to the Agreement.

The US Fish and Wildlife Service collects information on the subsistence harvest of walrus and polar bears in Alaska through the Marking, Tagging and Reporting Program (MTRP). The program is administered through a network of MTRP “taggers” employed in subsistence hunting communities. The marking and tagging rule requires that hunters report harvested walrus and polar bears to MTRP taggers within 30 days of kill. Taggers also certify (tag) specified parts (ivory tusks for walrus, hide and skull for polar bears) to help control illegal take and trade. Table 1 presents the mean number of walrus and polar bears recorded through the MTRP program in Wainwright, Barrow, Point Hope, and Point Lay from 1990-2006. Harvest data for 2007 were incomplete at the time of this analysis. Reported harvest from these four Chukchi Sea communities underestimates the actual walrus harvest by an undetermined amount (John Trent, pers.com). Polar bear harvests reported by the MTRP are believed to be as high as 80% (Tom Evans, [pers. com.](#)).

Table 1. Mean ( $\pm$  SD) number of polar bears and walruses harvested per year in 4 communities on the Chukchi Sea, 1990-2006, as recorded through the USFWS MTRP.

	Barrow	Wainwright	Point Hope	Point Lay
Polar bears	18.1 $\pm$ 8.1	5.7 $\pm$ 3.2	12.1 $\pm$ 4.9	1.8 $\pm$ 1.4
Walrus	23.5 $\pm$ 14.6	42.6 $\pm$ 29.2	3.4 $\pm$ 5.2	2.0 $\pm$ 1.9

Harvest levels of polar bears and walruses in these communities vary considerably between years, presumably in response to differences in ice conditions (Braund 1993 a, b). Sections 3.3.1.–3.3.4. provide more specific descriptive information on subsistence harvests of walruses and polar bears in each community based on available literature.

### 3.3.1. Point Hope

Between 1990 and 2006, the average annual walrus harvest recorded through the MTRP at Point Hope was 3.4 ( $\pm$  5.2) animals per year (Table 1). Walruses are thought to represent approximately 16% (by weight) of the community's annual marine mammal harvest (Braund 1993a). Point Hope hunters typically begin their walrus hunt in late May and June as walruses migrate into the Chukchi Sea. The sea ice is usually well off shore of Point Hope by July and does not bring animals back into the range of hunters until late August and September. Most (70.8%) of the reported walrus harvest at Point Hope occurred in June and September. It should be noted that other sources report higher harvest levels. A study by Fuller and George (1997) in 1992 reported 72 walruses being harvested, compared with five reported through the MTRP. Most of the walruses recorded through the MTRP at Point Hope were taken within five miles of the coast, or near coastal haulout sites at Cape Lisburne and Cape Thompson. Braund and Burnham (1984) mapped intensive walrus subsistence use areas within 5 miles of the coast from Cape Thompson to five miles north of Point Hope, within several miles of Kilikralik Point, along a five mile stretch near Cape Dyer, and within a several mile radius of Cape Lisburne.

Between 1990 and 2006, the average reported polar bear harvest at Point Hope was 12.1  $\pm$  4.9 animals per year (Table 1). Polar bear harvests typically occur from January to April coincidental to the winter seal hunting season. Most of the polar bears reported through the MTRP program were harvested within 10 miles of the community; however, residents also reported taking polar bears as far away as Cape Thompson and Cape Lisburne.

### 3.3.2. Point Lay

Point Lay hunters reported an average of 2.0  $\pm$  1.9 walruses per year between 1990 and 2006 (Table 1). Walruses are thought to represent a relatively small fraction (4%) of the community's annual consumption of marine mammals (Braund 1993b). Based on MTRP data, walrus hunting in Point Lay peaks in June-July with 84.4% of all walruses being harvested during these months. Historically, harvests have occurred primarily within 40 miles north and south along the coast from Point Lay and approximately 30 miles offshore (see Fig. III-C-9; MMS 1990). MTRP data suggests that most walrus harvests occur within 30 miles of the community.

Between 1990 and 2006, the average reported polar bear harvest at Point Lay was  $1.8 \pm 1.4$  animals per year (Table 1). The only information on harvest locations comes from the MTRP database; all reported harvest occurred within 25 miles of the village.

### **3.3.3. Wainwright**

Wainwright hunters have consistently harvested more walrus than any other subsistence community on the North Slope. Between 1990 and 2006, the average reported walrus harvest in Wainwright was  $42.6 \pm 29.2$  animals per year (Table 1). A discrepancy between MTRP data and other sources of harvest information is noted. For example, Braund (1993b) notes that Wainwright hunters harvested 106 walrus per year in 1989, whereas the MTRP program recorded 59. According to Braund (1993b) walrus represent approximately 40% of the communities' annual subsistence diet of marine mammals. Wainwright residents hunt walrus from June through August as the ice retreats northward. Walrus are sometimes plentiful in the pack-ice near the village this time of year. Most (85.2%) of the harvest occurs in June and July (data from 1988-1989; Braund 1993b). Most walrus hunting is thought to occur within 20 miles of the village, in all seaward directions (MTRP). Locations of walrus harvests in 1988 and 1989 overlapped strongly with locations of ringed seal and bearded seal harvests (Braund 1993b).

Between 1990 and 2006, the average reported polar bear harvest at Wainwright was  $5.7 \pm 3.2$  animals per year (Table 1). Polar bears are harvested throughout much of the year, with peaks in May and December (MTRP database). Braund (1993a) reported that locations of polar bear harvests in 1988 and 1989 closely coincided with locations of beluga and bowhead whale harvests. MTRP data indicates that most hunting occurs within 10 miles of the community.

### **3.3.4. Barrow**

Barrow is the northernmost community within the geographical region being considered. Most (88.6%) walrus hunting occurs in June and July when the land-fast ice breaks up and hunters can access the walrus by boat as they migrate north on the retreating pack-ice (Pedersen and North Slope Borough 1979, Braund 1993a). Braund (1993a) reported that walrus hunters from Barrow range up to 60 miles from shore. MTRP data indicate that most harvests occur within 30 miles of the community. Between 1990 and 2006, the average reported walrus harvest in Barrow was  $23.5 \pm 14.6$  animals per year (Table 1). Braund (1993a) reported that in 1987-1989, 29% of the Barrow community participated in walrus hunting activities and walrus accounted for 16% of the total marine mammals harvest (by volume). In 1992, walrus accounted for approximately 12% of the marine mammal harvest (Fuller and George 1999).

Between 1990 and 2006, the average reported polar bear harvest at Barrow was  $18.1 \pm 8.1$  animals per year (Table 1). According to Braund (1993a) the number of polar bears harvested in Barrow is influenced primarily by ice conditions and the number of people out on the ice. Most (74%) of all polar bear harvests reported by Barrow residents occurred in February and March (MTRP Database). Although relatively few people are thought to hunt specifically for polar bears, those that do hunt primarily between October and March (Braund 1993a). Hunting areas for polar bears overlap strongly with areas of bowhead subsistence hunting; particularly the area from Point Barrow southwest to Walakpa Lagoon where walrus and whale carcasses are known to concentrate polar bears.

### **3.4. Nature of Effects of Proposed Activities**

The proposed activities involve the operation of seismic survey vessels, supply boats, fixed-winged aircrafts and helicopters. The sight, sound, or smell of these operations could result in disturbances to walrus and polar bears. Potential effects of disturbances on walrus and polar bears include: displacement, insufficient rest, increased stress and energy expenditure, interference with feeding, and the masking of communication. Under certain ice conditions, noise generated from the proposed activities could potentially obstruct migratory pathways and interfere with the free movements of animals.

Noise and disturbances associated with the specified activities also have the potential to adversely impact subsistence harvests of walrus and polar bears by displacing animals beyond the hunting range of these four communities. Disturbances associated with exploration activities could also heighten the sensitivity of animals to humans with potential impacts to hunting success.

### **3.5. Potential impacts of proposed activities**

#### **3.5.1. Pacific walrus**

The proposed activities have the potential to disturb walrus and disrupt their normal behavior. The response of walrus to disturbance stimuli is highly variable. Anecdotal observations by walrus hunters and researchers suggest that males tend to be more tolerant of disturbances than females and individuals tend to be more tolerant than groups. Females with dependent calves are considered least tolerant of disturbances. Hearing sensitivity is assumed to be within the 13 Hz and 1,200 Hz range of their own vocalizations (Kastelein et.al. 2002). Walrus hunters and researchers have noted that walrus tend to react to the presence of humans and machines at greater distances from upwind approaches than from downwind approaches, suggesting that odor is also a stimulus for a flight response. The visual acuity of walrus is thought to be less than for other species of pinnipeds.

Seismic operations are expected to introduce significant levels of noise into the marine environment. There are few data available to evaluate the potential response of walrus to seismic operations. Airgun volumes for high-resolution surveys are typically 90-150 in<sup>3</sup>, and the output of a 90-in<sup>3</sup> airgun ranges from 229-233 dB re 1µPa at 1 m. Airgun pressures typically are 2,000 psi (pounds per square inch). Although the hearing sensitivity of walrus is poorly known, source levels associated with Marine 3D and 2D seismic surveys are thought to be high enough to cause temporary hearing loss in other pinniped species. Therefore, it is possible that walrus within the 180-decibel (dB re 1 µPa) safety radius for seismic activities could suffer shifts in hearing thresholds and temporary hearing loss (Kastak et al. 2005). Industry is expected to adopt standard seismic mitigation measures including the monitoring of a 180 db ensonification exclusion zone, which is expected to minimize the potential for air-gun pulses to injure walrus during seismic operations. It is also reasonable to assume that walrus

swimming in open water will be able to detect air-gun pulses well beyond the 180db safety radius.

For the purpose of this IHA, the Service will consider sound levels greater than 160 dB as the criterion for the onset of Level B harassment. Based upon field measurements on this airgun array in 2006, the 160 dB ensonification zone is expected to extend up to 8,400 meters from the airgun array. Marine mammal monitoring programs are necessary to gather information concerning the response of walruses to various seismic operations. These data could provide a basis from which future mitigative conditions can be developed.

Although seismic surveys are expected to occur in areas of open water some distance from the pack ice, support vessels and/or aircraft servicing seismic operations may encounter aggregations of walruses hauled out onto sea ice. The reaction of walruses to vessel traffic is likely dependent upon vessel type, distance, speed, and previous exposure to disturbances. Environmental variables such as wind speed and direction may also contribute to variability in detection and response. Reactions of walruses to aircraft are thought to vary with aircraft type, range, and flight pattern, as well as the age, sex, and group size of exposed individuals. Fixed-winged aircraft are less likely to elicit a response than helicopter over-flights. Walruses are particularly sensitive to changes in engine noise and are more likely to stampede when planes turn or fly low overhead. Researchers conducting aerial surveys for walruses in sea ice habitats have observed little reaction to fixed-winged aircraft above 1,000 ft (305 m). The sight, sound or smell of humans and machines could potentially displace these animals from ice haulouts. The most likely response of walruses in open water to acoustic and visual cues will be for animals to move away from the source of the disturbance. Because seismic operations are expected to move throughout the Chukchi Sea, impacts associated with support vessels and aircrafts are likely to be distributed in time and space. Therefore, noise and disturbance from aircraft and vessel traffic associated with seismic surveys are expected to have relatively localized, short term effects. MMS permit stipulations will require that seismic-survey vessels and associated support vessels shall observe a 0.5-mile (~800-meter) safety radius around Pacific walrus groups hauled out onto land or ice. Aircraft shall be required to maintain a 1,000-foot minimum altitude within 0.5 miles of hauled out Pacific walruses. This stipulation is expected to reduce the intensity of disturbance events and minimize the potential for injuries to animals.

A paucity of information concerning the distribution and abundance of walruses in the Chukchi Sea Lease Sale Area precludes a meaningful assessment of the numbers of animals likely to be impacted by the proposed exploration activities. Based upon previous aerial survey efforts (Johnson et al. 1982; Gilbert 1989; Gilbert et al. 1992), and exploration monitoring programs (Brueggeman et al. 1991), walruses are expected to be closely associated with seasonal pack ice during the proposed operating season. Therefore, in evaluating potential impacts of exploration activities, broken pack ice may serve as a reasonable predictor of walrus abundance. Activities occurring in or near sea ice habitats are presumed to have the greatest potential for impacting walruses. The requested geotechnical seismic surveys are expected to occur in open water conditions, some distance from the pack ice, which will presumably limit their interactions with large concentrations of walruses. Based upon previous aerial survey results it is reasonable to

assume that seismic operations will interact with small numbers of walrus swimming in open water. Based on our review of the proposed activities; existing operating conditions and mitigation measures; information on the biology, ecology, and habitat use patterns of walrus in the Chukchi Sea; and available information on potential effects of seismic activities on walrus, we conclude that, while the incidental take (by harassment) of walrus is reasonably likely to or reasonably expected to occur as a result of the proposed activities, most anticipated takes will be limited to temporary, nonlethal disturbances impacting a relatively small proportion of the Pacific walrus population. It is unlikely that there will be any lethal take due to Industry activities. We propose a finding that the total expected takings of walrus associated with the proposed activities will have a negligible impact on this species. This proposed finding is based on the supposition that most of the Pacific walrus population will be associated with sea ice during the operating season; that relatively few animals will be found in areas of open water where proposed activities will occur; and, that required mitigation measures will reduce the intensity of disturbance events to short-term behavioral responses. Additional mitigation measures prescribed through an IHA with site-specific operating restrictions and monitoring requirements would provide an additional level of mitigation and protection for walrus to help ensure that that impacts associated with the proposed activities are not greater than anticipated, and provide a source of data for evaluating future proposed activities in this Region.

### **3.5.2. Polar bear**

In the Chukchi Sea, polar bears will have a limited presence during the open-water season during Industry operations as they generally move to the northwestern portion of the Chukchi Sea during this time and to the multi-years pack ice in the Beaufort Sea. This limits the chances of interactions with and impacts to polar bears. Although polar bears have been documented in open-water, miles from the ice edge or ice floes, this has been a relatively rare occurrence.

The proposed activities will be limited to vessel-based exploration activities, such as seismic surveys and site clearance surveys and aerial surveys in support of the exploration project. These activities avoid ice floes and the multi-year ice edge; however, they may contact a limited number of bears in open water. Research is limited on the effects of noise on polar bears. 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.

In general, little is known about the potential for seismic survey sounds to cause auditory impairment or other physical effects in polar 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. Currently, there is no evidence that airgun pulses can seriously injure, or kill a polar bear, even in the case of large airgun arrays. Marine mammals that exhibit behavioral avoidance of seismic vessels are especially unlikely to incur auditory impairment or other physical effects. Also, the planned monitoring and mitigation measures include shut-downs of the airguns, which will reduce any such effects that might otherwise occur. Polar bears normally

swim with their heads above the surface, where underwater noises are weak or undetectable. Thus, it is doubtful that any single bear would be exposed to strong underwater seismic sounds long enough for significant disturbance to develop.

Polar bears are known to run from sources of noise such as marine vessels and aircraft, especially helicopters. The effects of fleeing from noise sources are expected to be minimal if the event is short and the animal is otherwise unstressed.

As already stated, polar bears spend the majority of their time on pack ice during the open-water period of the Chukchi Sea, which limits the chance of impacts from human and industry activities. 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. In the fall of 2004 four drowned polar bears were observed in the Beaufort Sea during a U.S. Minerals Management Service coastal aerial survey program.

Seismic activities avoid ice floes and the pack ice edge; however, they may contact bears in open water. It is unlikely that seismic exploration activities would result in more than temporary behavioral disturbance to polar bears.

Vessel traffic could result in short-term behavioral disturbance to polar bears. If a ship is surrounded by ice it is more likely that curious bears will approach. Any ice-associated 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, during a period of limited 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.

Ships and ice breakers may act as physical obstructions, altering or intercepting bear movements in the spring during the start-up period for exploration if they transit through a restricted lead system, such as the Chukchi Polyna. Polynas are important habitat for other marine mammals, which makes them important hunting areas for polar bears. A similar situation could occur in the fall when the pack ice begins to expand.

Routine aircraft traffic, such as scheduled commercial flights over a broad area, should have little to no effect on polar bears; however, extensive or repeated over-flights of fixed-wing aircraft or helicopters in a limited area could disturb polar bears. Behavioral reactions of polar bears should be limited to short-term changes in behavior that would have no long-term impact on individuals and no impacts on the polar bear population.

The Service anticipates that potential impacts of the proposed activities would be limited to short-term changes in behavior that would have no long-term impact on individuals nor impacts to the polar bear population. Individual polar bears may be observed in the open water during offshore activities, but the majority of the population will be found on the pack ice during this time of year. It is unlikely that there will be any lethal take due to Industry activities. Therefore, we conclude that the proposed exploration activities, especially as mitigated through the IHA process, are not expected to have more than negligible impacts on polar bears in the Chukchi Sea. Additional mitigation measures prescribed through an IHA would further help reduce the potential for adverse impacts to polar bears and provide valuable information for evaluating the potential effects of future activities.

### **3.5.3. Subsistence use of Pacific walrus and polar bear**

Walrus and polar bear have deep cultural and subsistence significance to the Inupiat Eskimos inhabiting the north coast of Alaska. Four North Slope communities are considered within the potentially affected area: Point Hope, Point Lay, Wainwright, and Barrow. The proposed operating season coincides with walrus hunting activities in these communities. Although subsistence harvest of polar bears can occur year round in the Chukchi Sea, depending on ice conditions, most polar bear hunting occurs in the spring and fall. Noise and disturbances associated with the proposed activities have the potential to adversely impact subsistence harvests of walrus and polar bears by displacing animals beyond the hunting range of these communities. Disturbances associated with exploration activities could also heighten the sensitivity of animals to humans with potential impacts to hunting success.

Little information is available to predict the effects of open water seismic surveys on the subsistence harvest of walrus and polar bears. Walrus and polar bears are normally closely associated with seasonal pack ice, and hunting success varies considerably from year to year because of variable ice and weather conditions. Harvest information collected through the Service MTRP suggests that most subsistence hunting for walrus and polar bears occurs within a 30 mile radius of the communities. The Chukchi Sea Lease Sale Area 193 includes a 25-mile coastal deferral zone, i.e., no lease sales will be offered within 25 miles of the coast, which is expected to reduce the impacts of exploration activities on subsistence hunting. MMS permitting associated with pre-lease sale seismic surveys is also expected to respect this 25-mile coastal corridor.

Through consultations with potentially effected communities and subsistence user groups, the applicant has developed a Plan of Cooperation detailing how the applicant will communicate and work with potentially effected communities to mitigate potential impacts of their activities to subsistence users. Proposed operational plans were presented in public meetings in potentially effected communities and in Anchorage, Alaska. Based on feedback provided at these meetings the applicant has proposed to coordinate the timing and sighting of events with subsistence hunting activities in these communities to avoid conflicts with subsistence hunters. Specific mitigation measures agreed to by the applicant include, but are not limited to, delaying seismic surveys until after July 20<sup>th</sup> to avoid conflicts with subsistence walrus hunters; agreeing not to conduct seismic surveys within a 50 mile radius of the communities; and staffing a community

liaison (communication center) in each of the potentially affected communities throughout the operating season to let the operator know when and where subsistence hunting activity is occurring. As stated previously, the Service acknowledges that the POC is a dynamic document and as such SOI will be engaged with potentially affected communities in the POC's development and implementation throughout SOI's operational period.

Based on the best scientific information available and the results of harvest data, including affected villages, the number of animals harvested, the season of the harvests, and the location of hunting areas, we find that the effects of the proposed seismic activities in the Chukchi Sea region would not have an unmitigable adverse impact on the availability of Pacific walrus and polar bears for taking for subsistence uses during the period of the activities. In making this finding, we considered the following: (1) records on subsistence harvest from the Service's Marking, Tagging, and Reporting Program (historical data regarding the timing and location of harvests); (2) effectiveness of the Plans of Cooperation that will be required, as appropriate, between the applicants and affected Native communities; and (3) anticipated effects of the applicants' proposed activities on subsistence hunting.

## **Chapter 4 - Environmental consequences**

### **4.1. Alternative 1: No action**

If this alternative is implemented, no incidental harassment authorization would be issued. IHAs do not explicitly permit or prohibit Industry activity; however, it is likely that Industry would continue to conduct seismic exploration activities as planned. Without IHAs, monitoring and reporting of interactions between Industry and polar bears and/or Pacific walrus would not be required and our interaction with the Industry to monitor potential effects on Pacific walrus and polar bear would be greatly reduced.

### **4.2. Alternative 2: Proposed action**

Under this alternative, monitoring and reporting will be implemented to evaluate the effects of Industry activities on Pacific walrus and polar bear populations. Section 101(a)(5)(A) of the Act states that the Secretary of the Interior may allow the incidental, but not intentional, taking of marine mammals provided regulations set forth requirements pertaining to the monitoring and reporting of such taking.

Prior to issuance of an authorization, the applicant would submit a marine mammal monitoring and mitigation plan, a polar bear interaction plan, and a Plan of Cooperation detailing how the applicant will avoid interference with subsistence hunting activities. Upon review and approval of the submitted Plans they would become an integral part of the IHA.

### **4.3. Conclusions**

Based on our review of these factors and the information presented, we conclude that, while incidental harassment of Pacific walruses and polar bears is reasonably likely to or reasonably expected to occur as a result of proposed activities, the overall impact would be negligible on polar bear and Pacific walrus populations. In addition, we find that most of the anticipated takes

will be limited to non-lethal disturbances, affecting a relatively small number of animals and most disturbances will be relatively short-term in duration. Furthermore, we do not expect the anticipated level of harassment from these proposed activities to affect the rates of recruitment or survival of Pacific walrus and polar bear populations. In consideration of the operational mitigation measures stipulated by the MMS, and the additional protective measures associated with Service incidental harassment authorization, we conclude that the specified activity will not have an unmitigable adverse impact on the availability of walrus or polar bears for subsistence uses. For these reasons, the Service concludes that authorizing the incidental harassment of Pacific walrus and polar bears during the described 2007 seismic activities in the Chukchi Sea is not a major Federal action.

### **Chapter 5 - Agencies/Persons Consulted**

Persons and Agencies consulted included the following:

U.S. Minerals Management Service  
National Marine Fisheries Service  
Shell Offshore, Incorporated  
Conoco Phillips Alaska, Incorporated (CPAI)  
Eskimo Walrus Commission  
Nannuq Commission  
Alaska Eskimo Whaling Commission  
North Slope Borough  
Defenders of Wildlife  
Eskimo Walrus Commission  
Marine Mammal Commission  
Arctic Connections  
National Wildlife Federation  
Greenpeace  
Center for Biological Diversity  
Audubon Alaska  
Trustees for Alaska  
Sierra Club, Alaska Chapter  
Earthjustice  
Wilderness Society, Anchorage  
Northern Alaska Environmental Center  
Friends of Animals

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