

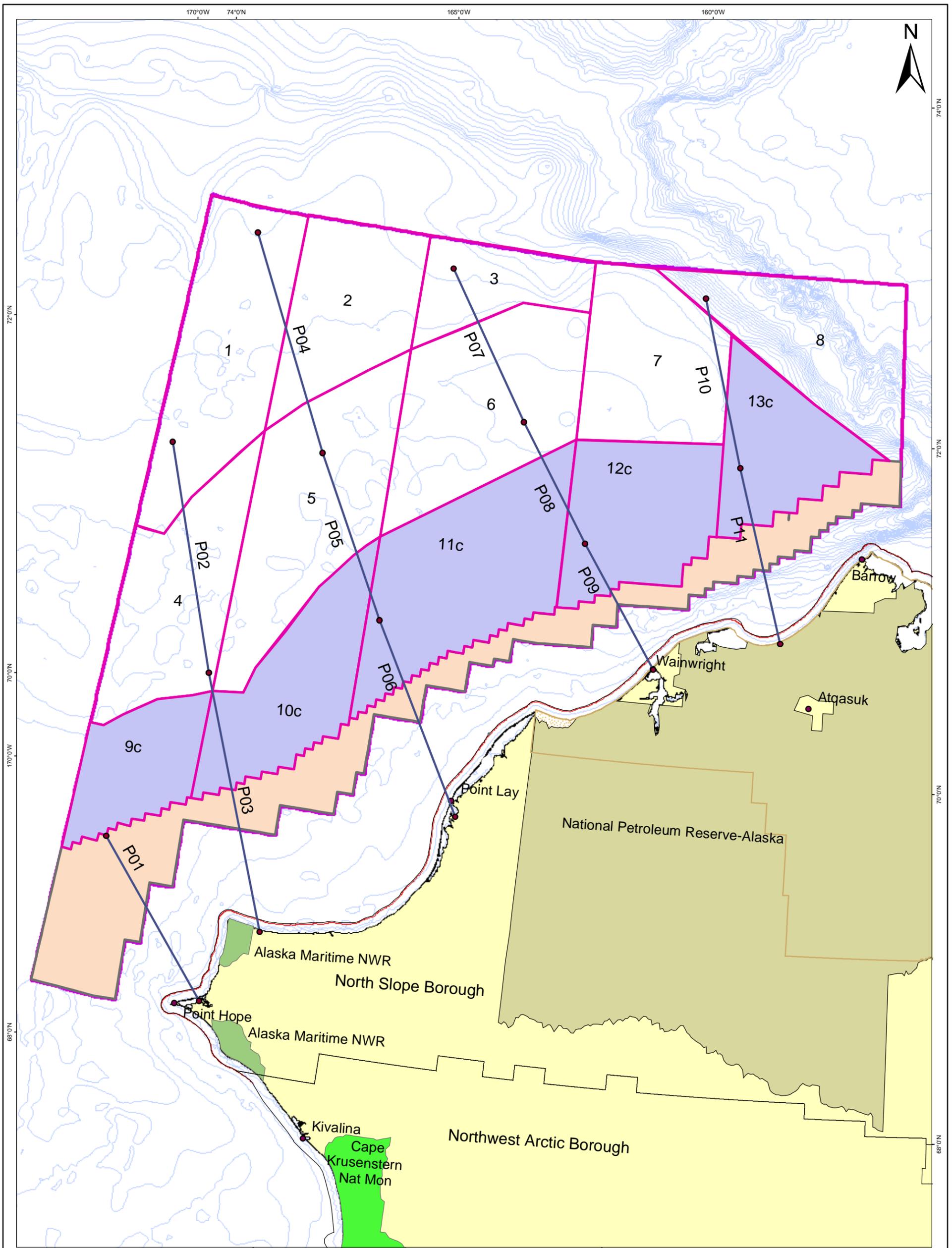
Map A.1-4b
Hypothetical Launch
Areas and Pipelines
Used in the
Oil-Spill-Trajectory
Analysis for
Alternative III

Legend

-  Bathymetry in Meters
 -  8a Launch Areas
 -  Sale 193 Alternative III, Corridor I Deferral
 -  Sale 193, Alternative III, Corridor I Launch Areas
 -  Hypothetical Pipelines
- 0 12.5 25 50 Miles
 0 20 40 80 120 160 Kilometers

Locator Map

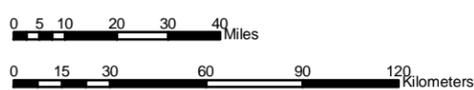




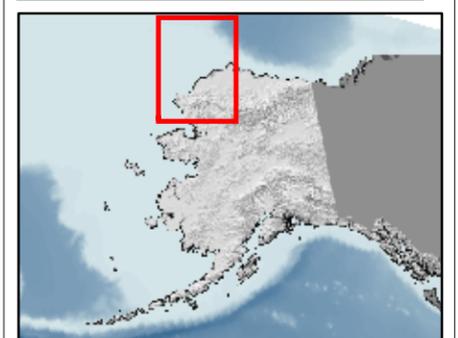
Map A.1-4c
Hypothetical Launch Areas and Pipelines Used in the Oil-Spill-Trajectory Analysis for Alternative IV

Legend

- Launch Areas
- Sale 193, Alternative IV, Corridor 2 Deferral
- Sale 193, Alternative IV, Corridor 2 Launch Areas
- Hypothetical Pipelines
- Bathymetry in Meters



Locator Map



APPENDIX B

**NMFS
Endangered Species Act,
Section 7
Consultation
And Coordination**



United States Department of the Interior



MINERALS MANAGEMENT SERVICE
Alaska Outer Continental Shelf Region
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5823

AUG 12 2005

James W. Balsiger, Ph.D.
Regional Administrator, Alaska Region
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

Dear Dr. Balsiger:

The Minerals Management Service (MMS) proposes to reinitiate consultation under Section 7 of the Endangered Species Act (ESA) on oil and gas leasing and exploration activities on two Outer Continental Shelf (OCS) Planning Areas in the arctic. Specifically, we propose to reinitiate following the Arctic Regional Biological Opinion (ARBO) approach used in the past, so that the geographic area considered in the consultation is expanded to again include potential activities that could occur within the entire Beaufort Sea Planning Area and within the Chukchi Sea OCS Program Area, as delineated in the Attachment which is reproduced from the Final EIS for our current 5-Year OCS Leasing Program. Note that the current 5-Year Leasing Program excludes the nearshore Polynya area from leasing consideration in the Chukchi Sea. Below we briefly summarize relevant background.

In November 1988, the National Marine Fisheries Service (NMFS) prepared the Arctic Regional Biological Opinion (ARBO) which concerned leasing and exploration activities in the Arctic Region (Beaufort Sea, Chukchi Sea, and Hope Basin OCS Planning Areas). Because of the removal of the gray whale from the list of threatened and endangered species, the availability of new information on the potential impacts of oil and gas-related noise on bowhead whales, the use of new seismic survey technology in the Arctic, and trends in OCS activities in the Arctic Region, MMS proposed to reinitiate consultation with NMFS on November 2, 1999. Because of lack of industry interest in the Chukchi Sea and Hope Basin Planning Areas at that time, MMS proposed, and NMFS agreed, to limit the reinitiated consultation to leasing and exploration activities only in the Beaufort Sea Planning Area. Thus, in the resultant, and most current, Biological Opinion of May 25, 2001, NMFS concluded that

“Present and foreseeable future oil and gas exploration activities on the Alaskan OCS are likely to occur only in the Beaufort Sea.”

Because of this assumption, which was based on the best information available at the time, the action area for the May 2001 biological opinion was defined as the Alaskan Beaufort Sea OCS Planning Area, extending from the Canadian border to the Barrow area.

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Due to industry response to our recent Beaufort Sea lease sales and call for information and nominations in the Chukchi Sea, and based on discussions with industry, the aforementioned assumption is no longer valid. Therefore, we would like to reinitiate consultation with your agency on leasing and exploration activities in areas of both the Beaufort Sea and the Chukchi Sea, as specified above.

In accordance with the Endangered Species Act Section 7 regulations governing interagency cooperation, MMS intends to prepare a biological evaluation in which we describe the actions and specific areas being considered in the consultation, describe the listed species and critical habitats that may be affected by those actions, evaluate potential effects and cumulative effects on listed species and critical habitats, and provide other relevant information necessary for NMFS to prepare their biological opinion.

By this letter, we are notifying you of the listed species and critical habitat that we, with your concurrence, expect to include in our biological evaluation. Based on previous correspondence with NMFS on this issue and based on our review of available information, MMS is aware of only one listed species, the endangered bowhead whale, that commonly occurs in these two planning areas. However, based on NMFS' November 1988 Biological Opinion, and, in some cases, other information suggesting the possible occurrence of other listed species in areas within or near these two planning areas, MMS currently intends to review and consider the following listed species in our biological evaluation:

<u>Common Name</u>	<u>Scientific Name</u>	<u>ESA Status</u>
Bowhead whale	<i>Balaena mysticetus</i>	Endangered
Fin whale	<i>Balaenoptera physalus</i>	Endangered
Humpback whale	<i>Megaptera novaeangliae</i>	Endangered
Right whale	<i>Eubalaena glacialis</i>	Endangered
Sei whale	<i>Balaenoptera borealis</i>	Endangered

We have included right and sei whales on this species list because, in your biological opinion of November 1988 (page 3), NMFS stated that these species were among "...six species of endangered whales that inhabit Arctic Region waters of Alaska." On page 4 of the 1988 ARBO, NMFS stated that "The right and sei whales are rare in Arctic waters. They are represented by isolated records in the Chukchi Sea, probably of stray individuals well outside the normal ranges of their populations." We believe that information available since that opinion supports this conclusion.

MMS is not aware of any designated or proposed critical habitat for any species that is under the jurisdiction of NMFS and that occurs within, near, or that could potentially be affected by leasing or exploration activities within, the Beaufort Sea or Chukchi Sea.

Please notify us of your concurrence with, or necessary revisions to, the above list of species and add any critical habitats which you believe need to be considered in our biological evaluation. In addition, we ask that you specify whether we should include Eastern North Pacific gray whales (*Eschrichtius robustus*) in our evaluation. While this population of gray whales was removed from the list of threatened and endangered species in 1994, NMFS's Biological Opinion on Oil

and Gas Lease Sales 191 and 199 in the Cook Inlet OCS Planning Area included a "...general assessment of the effects of the action on gray whales as part of NMFS' continuing responsibility to monitor the status of the species." Lastly, we ask that you reaffirm NMFS's conclusion in recent consultations (e.g., the consultation on the Beaufort Sea Lease Sales 186, 195, and 202) that MMS does not need to consult on species along the transportation corridor from Valdez to ports along the Pacific coast and to the Far East.

To facilitate consideration of our request for concurrence, we are sending copies of this letter to your Anchorage Field Office. Upon receipt of your reply within 30 days, we will begin preparation of our biological evaluation reviewing potential effects of Federal oil and gas leasing and exploration by MMS within the Alaskan Beaufort Sea and the Chukchi Sea.

If you have any questions on the issues raised in this letter or require additional information, please contact Dr. Lisa Rotterman, Minerals Management Service, Mail Stop 8303, 3801 Centerpoint Drive, Suite 500, Anchorage Alaska 99503-5823 (commercial and FTS telephone: 907-334-5245)

Sincerely,



John Goll
Regional Director

Enclosure

cc: (w/enclosure)

Mr. Brad Smith
Anchorage Field Office
National Marine Fisheries Service
Federal Building
22 West 7th Avenue, Box 43
Anchorage Alaska 99513-7577

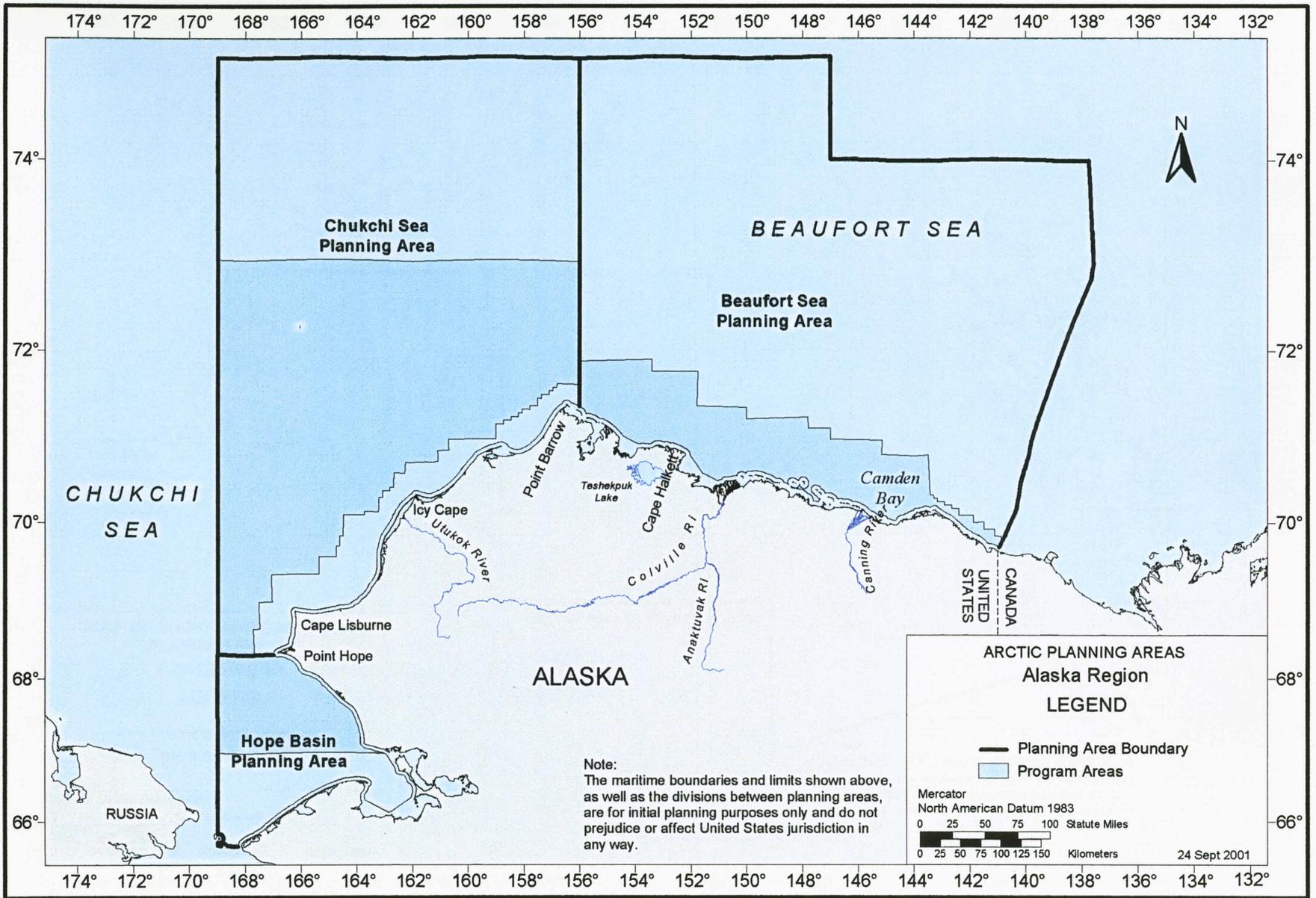


Figure 2-3. Beaufort Sea, Chukchi Sea, and Hope Basin Planning Areas - Alaska Region



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

September 30, 2005

John Goll
 Regional Director
 Minerals Management Service
 Alaska Outer Continental Shelf Region
 3801 Centerpoint Drive, Suite 500
 Anchorage, AK. 99503-5823

Dear Mr. Goll:

The National Marine Fisheries Service (NMFS) has received your letter requesting information on the presence of threatened or endangered species and their designated critical habitat which occur in the Alaska Beaufort Sea and Chukchi Sea planning areas.

The following species is listed under the Federal Endangered Species Act and is found in these areas:

Bowhead Whale (*Balaena mysticetus*).....Endangered

Critical habitat has not been designated for the bowhead whale.

Additionally, the endangered humpback (*Megaptera novaeangliae*) and fin whale (*Balaenoptera physalus*) are found in waters of the Chukchi Sea and Bering Sea outside of the subject planning areas. These animals could be impacted secondarily by OCS activities. NMFS recommends their inclusion in your evaluation. NMFS also recommends the evaluation provide a comprehensive assessment of OCS activities on threatened and endangered species, and, to accomplish this, include all deferrals within these planning areas.

We hope this information will be useful in your section 7 determinations. Please direct any questions to Brad Smith in our Anchorage office, (907) 271-3023.

Sincerely,

Kaja Brix
 Assistant Regional Administrator
 for Protected Resources





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

June 16, 2006

John Goll
Director, Alaska Outer Continental Shelf Region
Minerals Management Service
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5823

Dear Mr. Goll:

This document transmits the National Marine Fisheries Service's (NMFS) Biological Opinion for Federal oil and gas leasing and exploration by the Minerals Management Service (MMS) within the Alaskan Beaufort and Chukchi Seas, and its effects on the endangered bowhead whale in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Your March 3, 2006 letter to NMFS requested re-initiation of consultation in this matter. The MMS has provided a Biological Evaluation of leasing and exploration actions in the Beaufort and Chukchi Seas, which was received on March 15, 2006. We acknowledged receipt of this information in our letter dated April 5, 2006.

This Biological Opinion is based on information provided in the March 2006 Biological Evaluation and other sources of information. A complete administrative record of this consultation is on file at the NMFS offices in Anchorage.

NMFS concludes that leasing and exploration are not likely to jeopardize the continued existence of the bowhead whale. In formulating this opinion, NMFS used the best available information, including information provided by MMS, recent research on the effects of oil and gas activities on the bowhead whale, and the traditional knowledge of Native hunters and the Inupiat along Alaska's north slope. Although we conclude that foreseeable exploration activities are not likely to jeopardize the continued existence of the bowhead whale, we remain concerned about the potential additive effects of oil and gas activities associated with exploration, production, and transportation throughout the Beaufort and Chukchi Seas. Conservation recommendations are provided with the opinion which are intended to improve our understanding of the impacts of oil and gas activities on the bowhead whale, as well as to minimize or mitigate adverse effects.

Sincerely,

Robert D. Mecum
Acting Administrator, Alaska Region



APPENDIX C

**USFWS
Endangered Species Act,
Section 7
Consultation
And Coordination**



United States Department of the Interior



MINERALS MANAGEMENT SERVICE
Alaska Outer Continental Shelf Region
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5823

SEP 21 2006

Memorandum

To: Regional Director, FWS, Region 7
From: Regional Director *John Hall*
Subject: Chukchi Sea Lease Sale 193: Endangered Species Act Section 7 Consultation

The Minerals Management Service (MMS) is completing a draft Environmental Impact Statement (DEIS) for the proposed Chukchi Sea Lease Sale 193. The Steller's and spectacled eider, both threatened species, and the Kittlitz's murrelet, a candidate species, occur in the proposed lease sale area. We have worked closely with the Fairbanks Endangered Species Branch in preparing the attached biological evaluation to evaluate the potential effects this lease sale could have on threatened and candidate birds.

We sent a previous draft of this biological evaluation to the Fairbanks Fish and Wildlife Field Office on July 17, 2006. We recently received some comments on the draft biological evaluation when Fish and Wildlife Services (FWS) personnel met with us on September 7, 2006. Those comments pertained to the need to calculate the anticipated incidental take from onshore developments should production occur following the lease sale. We were requested to address the potential for the Steller's eiders to be affected if an oil spill were to occur when they were concentrated in the spring-lead system and to more fully explain the most likely development scenario in terms of the potential for locating a commercially developable field. Our explanation of the oil spill risk analysis modeling was expanded to include combined probabilities. We revised the draft biological evaluation to address the FWS' comments and concerns.

We consider the attached biological evaluation a complete document for your review. We believe the biological evaluation satisfies the information requirements specified in 50 CFR 402.12 and 402.14. If you still require additional information or analysis, please contact us quickly as we anticipate including a copy of the biological evaluation in our DEIS, which is scheduled to go to the printer on October 3, 2006.

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Our biological evaluation determined that the proposed Chukchi Sea Lease Sale 193 would likely have the following level of effects on Steller's and spectacled eiders and Kittlitz's murrelets:

- Listed and Candidate Species
 - Lease Sale 193 could present new sources of disturbance, collision hazards, and oil/toxic pollution that could result in the taking of Steller's and spectacled eiders. Without comprehensive mitigation measures to avoid or minimize potential impacts, these activities *are likely to adversely affect* Steller's and spectacled eiders.
 - Lease Sale 193 could present new sources of disturbance and oil/toxic pollution that could result in the taking of Kittlitz's murrelet. Without comprehensive mitigation measures to avoid or minimize potential impacts, these activities *may affect* the Kittlitz's murrelet.
- Ledyard Bay Critical Habitat Area
 - Lease Sale 193 could present new activities that could result in the physical modification of seafloor habitats and decrease use of the Ledyard Bay Critical Habitat Area by molting spectacled eiders. Without comprehensive mitigation measures to avoid or minimize potential impacts, these activities *are likely to adversely modify* the Ledyard Bay Critical Habitat Area.

We request your opinion on these findings. If you determine a jeopardy situation may exist for all or any part of the proposed action, we ask that you respond to this memorandum in as timely a manner as possible, according to 50 CFR 402 14(g)(5), to allow the MMS and FWS staff time to jointly discuss the findings. We believe that such discussions will facilitate the consultation and ensure protection of listed species. These discussions will also ensure that any proposed alternatives are within our authority to control and implement, and are feasible, prudent, and effective. To facilitate completion of this consultation, we are sending a copy of this memorandum to the Fairbanks Fish and Wildlife Field Office in Fairbanks, Alaska.

If you have any questions on this consultation or require additional information, please contact Mr. Mark Schroeder at (907) 334-5247.

Attachment

cc: Field Office Supervisor
U.S. Fish and Wildlife Service
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Room 110
Fairbanks, Alaska 99701



IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. Tudor Rd.
Anchorage, Alaska 99503-6199

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NOV 1 2006

REGIONAL DIRECTOR, ALASKA
Minerals Management Service
ANCHORAGE, ALASKA

AFES

OCT 27 2006

Memorandum

To: Regional Director, Minerals Management Service –
Alaska Outer Continental Shelf Region

From: Regional Director – Region 7 *James O. Melus*

Subject: Chukchi Sea Lease Sale 193: Endangered Species Act Section 7
Consultation

We acknowledged receipt on September 25, 2006, of your Biological Evaluation and memorandum requesting initiation of Section 7 consultation under the Endangered Species Act for activities associated with Lease Sale 193 in the Chukchi Sea. The consultation concerns the possible effects of the proposed action on threatened Steller's eiders (*Polysticta stelleri*), spectacled eiders (*Somateria fischeri*), and the candidate species Kittlitz's murrelet (*Brachyramphus brevirostris*).

After reviewing the BE we have determined that the proposed action may adversely impact listed species and will therefore require formal consultation. All the information required to initiate formal consultation was either included in the BE or is otherwise accessible for our consideration and reference. However, it is likely that we will identify additional information needs, or require clarification on aspects of the proposed action as consultation progresses.

As a reminder, Section 7 allows the Fish and Wildlife Service 90 calendar days to conclude formal consultation with your agency and an additional 45 calendar days to prepare our biological opinion (unless we mutually agree upon an extension). Therefore, we will provide you with our final biological opinion on or before February 7, 2007.

This consultation will be conducted by the Endangered Species Branch of the Fairbanks Field Office. In order to expedite communication please address future documents or requests concerning this consultation to Ted Swem, Branch Chief, Fairbanks Fish and Wildlife Field Office, 101 12th Avenue, Room 110, Fairbanks, Alaska 99701.



United States Department of the Interior

FISH AND WILDLIFE SERVICE

1011 E. Tudor Rd.

Anchorage, Alaska 99503-6199

RECEIVED

MAR 28 2007

MAR 28 2007

IN REPLY REFER TO:

FWS/AFES/FFWFO

REGIONAL DIRECTOR, ALASKA
Minerals Management Service
ANCHORAGE, ALASKA

Memorandum

To: Regional Director – Minerals Management Service

From: Regional Director – Region 7 *Thomas O. Melum*

Subject: Chukchi Sea Lease Sale 193: Endangered Species Act Section 7 Consultation

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) in accordance with Section 7 of the Endangered Species Act of 1973, as amended (Act), on the effects of the Mineral Management Service's proposed Chukchi Sea Lease Sale 193 to listed and candidate species (attached). The BO evaluates effects of the action on the threatened spectacled eider (*Somateria fischeri*), threatened Steller's eider (*Polysticta stelleri*), and the Ledyard Bay Critical Habitat Unit designated for spectacled eiders. At your request, we have also evaluated potential effects on the candidate species Kittlitz's murrelet (*Brachyramphus brevirostris*) to aid in planning in the event that it is listed under the Act during this project's life, but the current document does not represent a formal BO for the Kittlitz's murrelet.

Lease Sale 193 would authorize the sale of oil and gas leases in 34 million acres of Federal waters in the Chukchi Sea, and may ultimately result in development and production of oil and gas in this area. The MMS has statutory authority to complete its OCS energy development actions as incremental step consultations under the Act. In accordance with this authority and the applicable regulations, this BO includes analyses and conclusions as to whether: 1) the incremental step of leasing and exploration (including seismic surveys and exploratory drilling) would violate Section 7(a)(2) of the Act (i.e., whether these steps would likely jeopardize listed species or cause destruction or adverse modification of critical habitat); and 2) there is a reasonable likelihood that the entire action of leasing, exploration, development, and production that may result from Lease Sale 193 would violate Section 7(a)(2) of the Act. Additionally, for the first incremental step, we have estimated and authorized incidental take, and provided reasonable and prudent measures, and associated terms and conditions intended to reduce take.

Based on the available information, it is the Service's BO that it is unlikely that leasing and exploration activities will violate Section 7(a)(2) of the Act. Incidental take of a small number of Steller's and spectacled eiders is anticipated from collisions during exploratory drilling; this incidental take and potential impacts from spills are mitigated through the reasonable and prudent measures, and terms and conditions, which are mandatory for the MMS to implement. It is also our BO that the entire action, which may also include development and production, would

not jeopardize the continued existence of the spectacled or Steller's eider, or destroy or adversely modify designated critical habitat. This conclusion is based upon the fact that population-level impacts, although possible depending upon what is proposed at a later date, are not reasonably expected to occur based on the information available at this time.

We caution, however, that consultation at future incremental steps in this phased oil and gas process is crucial in order to fully evaluate project specific information about particular development and production plans, and whether or not they are likely to jeopardize listed species or destroy or adversely modify critical habitat. We wish to provide clear notification that consultation on subsequent incremental steps may reach different conclusions depending on the scope, location, and nature of what is proposed. Based on our analyses, we believe that some potential development proposals, while not reasonably likely at this time, could ensue from Lease Sale 193 that would jeopardize listed species or cause destruction or adverse modification of critical habitat. Therefore, consultation on subsequent incremental steps will require careful consideration of all information available at that time, including up-to-date evaluations of listed species status, the environmental baseline, and project-specific considerations such as spill risk assessments and spill trajectory models to evaluate risk to listed species. To this end, we have provided guidance on ways to minimize the likelihood of conflict between listed species and proposed development, and we have identified information needs that will provide for well-informed consultation on subsequent incremental steps.

We commend you for taking a proactive approach to Kittlitz's murrelet conservation, and we also appreciate the considerable efforts made by your staff to provide all the information necessary for our consultation. We look forward to working with you to implement the terms and conditions of the BO, address our shared information needs, and assess future phases of the project.

As you are aware, the Service published a 12-month finding and proposed rule in the Federal Register on January 9, 2007, that found listing of the polar bear as threatened under the Endangered Species Act (Act) to be warranted. For proposed species, such as the polar bear, the Act requires action agencies to *conference* with the Service. Conference is a process of early interagency cooperation designed to identify potential conflicts between an action and species conservation, and to minimize or avoid adverse effects to proposed species or proposed critical habitat. Several key distinctions between the consultation and conference processes are important to identify. First, the "trigger" for consultation and conference is different. While agencies are required to consult with the Service when their actions "may affect" the continued existence of listed species or critical habitat, action agencies are only required to confer with the Service for those actions "likely to jeopardize" the continued existence of the proposed species or result in the "destruction or adverse modification" of proposed critical habitat. Based on our experience to date with agency consultations in northern Alaska, including those related to oil and gas development, and given that Alaska comprises only a small portion of the circumpolar range inhabited by the species proposed for listing, we believe that conference will technically be required in few if any instances in the coming months. As we have discussed, we look forward to working with your staff in the near future on this issue.

A complete administrative record of this consultation is on file at the Fairbanks Fish and Wildlife Field Office, 101 12th Ave., Room 110, Fairbanks, Alaska 99701. A chronology of the consultation history is provided in Appendix 1. If you have any questions, please call Ted Swem at (907) 456-0441.

Attachment

Appendix D

Summary: Analysis of Seismic Survey Mitigation Alternatives

Appendix D. Summary: Analysis of Seismic Survey Mitigation Alternatives.

The following mitigation alternatives related to conducting seismic surveys were analyzed as part of the “*Final Programmatic Environmental Assessment (PEA), Arctic Ocean Outer Continental Shelf Seismic Surveys – 2006,*” dated June 2006 (OCS EIS/EA MMS 2006-038):

Alternative 1. No seismic-survey permits issued for geophysical exploration activities (No Action). (*Referenced in Chukchi 193 DEIS as Seismic Survey Mitigation Alternative 1*)

Alternative 2. Seismic surveys for geophysical-exploration activities would be permitted with existing Alaska OCS G&G exploration stipulations and guidelines. (*Referenced in Chukchi 193 DEIS as Seismic Survey Mitigation Alternative 2*)

Alternative 3. Seismic surveys for geophysical exploration activities would be permitted incorporating existing Alaska OCS G&G exploration stipulations and guidelines and additional protective measures for marine mammals, including a 120-decibel-(dB)-specified exclusion zone. (*Referenced in Chukchi 193 DEIS as Seismic Survey Mitigation Alternative 3*)

Alternative 4. Seismic surveys for geophysical-exploration activities would be permitted incorporating existing Alaska OCS G&G exploration stipulations and guidelines and additional protective measures for marine mammals, including a 160-dB-specified exclusion zone. (*Referenced in Chukchi 193 DEIS as Seismic Survey Mitigation Alternative 4*)

Alternative 5. Seismic surveys for geophysical-exploration activities would be permitted incorporating existing Alaska OCS G&G exploration stipulations and guidelines and additional protective measures for marine mammals, including 160-dB- and 120-dB-specified exclusion zones. (*Referenced in Chukchi 193 DEIS as Seismic Survey Mitigation Alternative 5*)

Alternative 6. Seismic surveys for geophysical-exploration activities would be permitted incorporating existing Alaska OCS G&G exploration stipulations and guidelines and additional protective measures for marine mammals, including a 180/190-dB-specified exclusion zone. (*Referenced in Chukchi 193 DEIS as Seismic Survey Mitigation Alternative 6*)

The sections that follow are summarizing excerpts from the PEA which described the potential impacts of Alternatives 1, 3, 4, 5, and 6. Alternative 2 was dropped from detailed analysis in the PEA because of its potential to cause unavoidable significant impacts. See the PEA for a more detailed and thorough description and discussion of the potential impacts of conducting seismic surveys and the mitigation measures proposed to protect the biological resources of the Arctic Ocean.

Fish/Fishery Resources and Essential Fish Habitat (EFH)

Alternative 1 (No Action) poses no adverse impacts to fish/fishery resources or EFH.

Alternatives 3 through 6 would have adverse but not significant impacts on fish/fishery resources and EFH. The analysis in the final PEA notes specific issues that were afforded additional assessment given their importance to fish survival and reproduction and human uses, including impacts to migration and spawning, rare species, subsistence fishing, and operation of coincidental multiple seismic surveys. However, based on the above assessment, MMS concludes that the potential for impacts to these issues (e.g., migration, spawning, rare species, and subsistence fishing) also is adverse but not significant.

Alternatives 3 through 6 all equally employ mitigation measures to avoid or limit the potential for impacts to fish resources and EFH. As these measures apply across Alternatives 3 through 6, there remains little difference across the various alternatives as to the degree of impacts for this species group and related issues. In theory, the alternatives with the more restrictive exclusion zones for marine mammals

(Alternatives 3 and 5) would provide more protection for marine fish and invertebrate species if seismic survey shutdown were to occur, but again this would be considered only incrementally more protective for fish, invertebrates and related issues.

The following mitigation measures are specifically designed to limit potential impacts to migration, spawning, rare species, subsistence fishing, and operation of multiple seismic surveys:

- Seismic cables and airgun arrays shall not be towed in the vicinity of fragile biocenoses, unless MMS determines the proposed operations can be conducted without damage to the fragile biocenoses.
- Based on the information provided by MMS on the known locations of fragile biocenoses in the Chukchi and Beaufort seas, the applicant shall clearly explain to what distance their operations will avoid fragile biocenoses and how they will avoid damaging fragile biocenoses.
- Permittees shall report to MMS if damage to fragile biocenoses occurs as a result of their operations. Additionally, Permittees shall notify MMS if they detect any fragile biocenoses otherwise not documented in their permit application.
- Vessels shall not anchor in the vicinity of any documented fragile biocenoses (e.g., the Boulder Patch, natural gardens of coral/sponge or macroalgae [e.g., kelp beds]), unless an emergency situation involving human safety specifically exists and there are no other feasible sites to anchor at the time.

Threatened and Endangered (T&E) Species

T&E Marine Birds.

Alternative 1 (No Action) would mean that spectacled and Steller's eiders and Kittlitz's murrelets in the Beaufort and Chukchi seas would not be exposed to disturbance and noise from seismic vessels and associated seismic activities.

The most likely effects of Alternatives 3, 4, 5, and 6 involve disturbance and bird/vessel collisions. Eiders will either dive or fly in response to a disturbance. All the alternatives implement monitoring a marine mammal-exclusion zone. Mitigation measures for marine mammals likely necessitate the use of high-intensity lights at night and during inclement weather to search for marine mammals in the vessel path. Seismic surveys would cease when the marine mammal-exclusion zone could not be effectively monitored, but the high-intensity lights could remain on to search for marine mammals. The zone is monitored using observers that are onboard and/or in aircraft, and would need the use of high-intensity lighting to maintain vigilance for marine mammals when the surveys are being conducted during periods of darkness or poor visibility (e.g., during rain or fog). Use of high-intensity lighting would be independent of the size of the exclusion zone, as these lights would be useful only in areas closest to the seismic-survey vessel.

In the Chukchi Sea, spectacled eiders molt in Ledyard Bay, an area designated as critical habitat. Males and/or females are present in this area from early July through the middle of October or possibly later. As day-length decreases during the late summer, eiders migrating to the molting area in darkness would be more likely to encounter vessels using high-intensity lights. Spectacled eiders often migrate at night and flying at night they can become disoriented by high-intensity work lights and strike vessels. Eiders flying during low-visibility conditions of rain or fog can also strike vessels.

The risk of collisions with spectacled eiders is lowest beyond 60 km offshore, because females tend to travel within 60 km and males travel within 35 km. Within these distances from shore, the risk of collisions might increase, especially during poor visibility. The greatest risk of a vessel strike would exist if the seismic-survey vessel was using high-intensity lighting while transiting through areas of high spectacled eider density at night during fog or rain.

The most likely effects of seismic surveys to Steller's eiders in the Beaufort and Chukchi seas involve the same type of disturbances and collisions associated with spectacled eiders. Due to the extent of sea ice, it is unlikely that seismic surveys would begin in the Beaufort Sea when males are passing through, so impacts to Steller's eiders are unlikely. Males could be encountered in the Chukchi Sea in the summer and fall, and females might be encountered in both the Beaufort and Chukchi seas during the seismic-survey period. Limited data exist on breeding Kittlitz's murrelets. Breeding pairs in the Chukchi Sea are solitary and nested well inland on the tundra. They forage at sea during nesting and chick rearing, but their foraging distances during this period in the Chukchi Sea are unknown. In glaciated areas in Alaska, they typically forage within a few hundred meters of shore. An estimated 15,000 Kittlitz's murrelets have been observed in the pelagic waters of the Chukchi Sea beginning in late August, but their presence is sporadic, suggesting there are additional factors that influence their distribution and that there is large interannual variation in abundance. Accordingly, the potential for disturbance from or collision with seismic-survey vessels or aircraft is small. It is possible, during the course of normal feeding or escape behavior that a murrelet could be near enough to an airgun to be injured by a pulse. A mitigation measure to "ramp up" airgun noise when seismic surveys begin can help disperse birds before harm occurs. During ongoing surveys, murrelets also are likely to hear the advance of the slow-moving survey vessel and associated airgun operations and move away.

T&E Marine Mammals

Alternative 1 (No Action) would not expose T&E marine mammals (bow head, fin, and humpback whales) in the project area to noise associated with seismic surveys and their associated support vessels (air and sea)..

Alternatives 3 through 6 are similar but have varying levels of protection for T&E marine mammals. This variation in protection primarily is in the noise level set as the shut-down criteria and monitoring that is required to effectively monitor that noise-level radii, or shut-down/exclusion zone.

While all alternatives other than the Alternative 1 (No-Action) meet the objectives of this environmental assessment, they also potentially could adversely affect bowhead whales and other marine mammals, principally through incidental harassment due to exposure to seismic survey noise. Possible harassment likely would be most pronounced if large feeding aggregations of whales, or cow/calf pairs of bowhead whales, are affected. Alternatives 3 through 6 have the potential for causing adverse but not significant impacts.

Alternatives 3 through 6 would prohibit seismic surveys around bowheads in the spring lead system and thereby reduce the potential for adverse effects of seismic surveys on bowhead calving, cow/calf pairs, and newborn calves. The effect of seismic surveys on these components of the population is very uncertain, and avoidance of their exposure is the most effective way to reduce the potential for an adverse effect on these bowheads. Even at a 120-dB isopleth shut-down zone (included in Alternatives 3 and 5), bowhead whales might still detect seismic survey airgun sounds, icebreaker sound, or vessels associated with seismic surveys.

Variability in the size and configuration of the airgun arrays, water depth, and bottom properties all can influence these noise-level radii, which is expected to vary from one location to another and between different seismic operations. Therefore, field verification is included as a mitigation measure to verify the actual noise-level radii. Shut-down or safety zones may be as large as 30 km for the 120-dB zones and as small as 100 m for the 190-dB zones, depending on the size and energy output of the airgun array and environmental conditions. It is likely that monitoring will be required using one or more of these: aerial surveys; passive acoustic monitoring; and boat-based surveys. If these methods of monitoring are not effective, then additional mitigation measures may be set in place (i.e., adaptive management schemes where specific areas of higher marine mammal concentrations are avoided on a temporal or spatial basis).

Alternatives 3 through 6 provide monitoring requirements meant for observers to visually monitor the exclusion zone, regardless of size, and be able to call for a shut down if marine mammals enter the exclusion zone. The ability of observers to effectively monitor the exclusion zone, and be able to call for a

shut down if bowheads enter the zone, is critical to the success of the protective measures described in Alternatives 3 through 6, although it is generally not possible to observe all bowheads within the exclusion zone, especially during foggy weather or at night. Additional monitoring techniques, such as aerial surveys, vessel-based systems, or passive acoustics, could enhance the ability to detect bowhead whales and other marine mammals in larger exclusion zones.

Evidence shows that bowhead whales and other cetaceans can react behaviorally in the presence of aircraft. The mitigations imposed under Alternatives 3 through 6 all would require that aircraft be flown no lower than 1,000 ft, a level that limits the potential for reactions from marine mammals. Therefore, the use of aerial over flights in monitoring would not be expected to add additional impacts to bowhead whales. The same is true for passive acoustic monitoring where observers simply “listen” for evidence of whale noise. Vessel-based monitoring may impose a degree of additional disturbance, but it would be considered less than what would occur for seismic activity should whales not be monitored but present in the exclusion zone.

Each exclusion zone in Alternatives 3 through 6 would require boat-based visual monitoring (i.e., all observers are scanning areas from the vessel as far as visually possible with appropriate equipment). The additional monitoring techniques (e.g. aerial or vessel-based surveys, acoustic monitoring) that may be necessary for Alternatives 3 and 5 could be costly to implement because the larger exclusion zone associated with the 120-dB isopleth, in theory, would provide a much larger and more difficult area to monitor than the smaller exclusion zones (160-dB isopleth and 180/190-dB isopleth). Smaller exclusion zones are less effective in limiting impacts to cetaceans than larger exclusion zones because larger exclusion zones associated with Alternatives 3 and 5 would by definition require further distance of operating seismic survey vessels from cetaceans than Alternatives 4 and 6. Additional mitigation measures would be set in place (i.e., adaptive management schemes where specific areas of higher marine mammal concentrations are avoided on a temporal or spatial basis) should monitoring measures prove ineffective. Therefore, the varying degrees of impact among the alternatives, as discussed in the paragraphs above, remains the same with the greatest to least level of protection from behavioral disturbance being Alternatives 3, 5, 4, and 6 respectively.

Non-T&E Marine Birds.

Murres. The chance of murres colliding with seismic-survey vessels is relatively low, because most murres should be out of the action area during the male molt and at-sea rearing period. The primary risk of collision occurs during the brief period when murres migrate south to the Bering Sea. Based on telemetry data, most murres would not migrate through the action area.

Puffins. Seismic-survey vessels would remain at least 3 mi from shore, so there is little chance for disturbance of breeding colonies. Most puffins are located near Cape Lisburne in September, but this area represents only a small portion of the action area, and it is possible that this area already might be surveyed prior to September. If surveys were completed prior to September, there would be minimal risk of puffins colliding with the seismic-survey vessel.

Black-legged Kittiwake. Disturbance and risk of collision should be minimal to kittiwakes, as they are mobile (i.e., not molting) and wide ranging throughout the Chukchi Sea. There are no discernable areas of concentration that may increase the impact of disturbance or risk of collision. Most kittiwakes are out of the Chukchi Sea by late September.

Northern Fulmar. If distribution trends are similar to the 1980's, most fulmars would be south of the action area. Furthermore, most fulmars are present in the Chukchi Sea for only a few weeks at the end of summer; it is possible that all survey vessels would be working on survey areas farther north during that time to take advantage of the period of maximum ice retreat in the Beaufort Sea. Both of these factors make the chance of large scale disturbance or collision minimal.

Short-tailed Shearwaters and Auklets. These species are considered together, because they occur in similar numbers and both forage on patchily distributed zooplankton in pelagic waters. The chance of disturbance

is low, because their distribution is patchy and the disturbance is of short duration. A disturbance might lead to a temporary halt in feeding in one area or a switch to a new and possibly less-productive area.

The risk of collisions is a more relevant issue, as shearwaters and auklets are present in the Chukchi Sea until late September or early October. There are about 12 hours of darkness during this period, and seismic surveys could occur 24 hours a day. Large collisions involving crested auklets and lights on commercial-fishing vessels have been documented. Collisions are not documented for shearwaters, but these types of events typically are poorly documented. It appears most likely that large collisions occur when a combination of darkness, fog, rain, or snow exist and high-intensity lights are used on commercial vessels near large aggregations of certain species of seabirds. While there is no certainty that collisions would occur, the chance seems to be the greatest for auklets and, perhaps to a lesser extent, shearwaters in the Chukchi Sea during seismic surveys.

Black Guillemot. These birds usually are closely associated with the ice edge, and the likelihood of disturbance or collisions is limited to a small portion of the action area. Seismic-survey vessels need to follow a specific course during the survey and, therefore, minimize surveys near the ice edge due to the presence of large sections of ice that could cause the vessel to alter course or damage seismic instruments. Accordingly, operations in areas likely to be inhabited by black guillemots are limited, and the chance for disturbance and collisions is minimal.

Gulls and Terns. The likelihood of impacts from disturbance or collisions to Ross' gulls, ivory gulls, arctic terns, and glaucous gulls is minimal. Ross' gulls and ivory gulls are associated with ice and breed well outside the action area. They are present in the action area for a short period before migrating through the Chukchi Sea to overwintering locations. Arctic terns breed near the coast of both seas, but seismic vessels will be operating beyond 3 mi from shore; therefore, disturbance is unlikely. Terns migrate through the Chukchi Sea but are rarely observed in pelagic waters. Similarly, glaucous gulls typically are most abundant within 70 km of shore, thereby reducing the likelihood of disturbance and collisions.

Phalaropes. Both species of phalaropes may be encountered in the Beaufort and Chukchi seas, especially during the postnesting period in late summer and fall. Phalaropes use habitat within a few meters of shore and also pelagic areas; their distribution is generally tied to patchy concentrations of zooplankton. Because seismic-survey vessels would remain at least 3 mi offshore, disturbance to or a collision with phalaropes nearshore is unlikely. In pelagic waters, disturbances may occur but their impact is likely to be minimal, due to the patchy distribution of prey and the transient and short-term nature of seismic surveys. Disturbed phalaropes might move to another prey patch or return to the same area after the disturbance passes. Collisions may occur, especially during inclement weather, but the likelihood of collisions is unknown. Red-necked phalaropes were attracted to lights on a ship in the Gulf of Guinea and reacted most strongly at night in inclement weather. There does not appear to be any other documented cases of collisions involving phalaropes, so the incidence of collisions may either be low or unreported.

Jaegers. The chance of impacts to jaegers by disturbance or collision is minimal. Although they are present throughout the Chukchi Sea in the fall when there are several hours of darkness and frequent inclement weather, jaegers are not known to occur in high concentrations in any area.

Loons. In the Beaufort and Chukchi seas, loons typically migrate close to shore until they are south of Cape Lisburne, when they travel over pelagic waters on their migration to wintering areas. Impacts from disturbances or collisions are unlikely, because loons migrate nearshore in most of the action area, and seismic-survey vessels would remain 3 mi offshore.

Long-Tailed Ducks. Impacts from disturbances or collisions are unlikely, because long-tailed ducks molt in lagoons on the coast of the Beaufort Sea. Seismic-survey vessels would remain 3 mi offshore during surveys. After molting, these birds move south following the Chukchi Sea coast and typically remain 45 km offshore along the 20-m isobath. Observations farther offshore are uncommon. The chance of disturbance is small due to the small portion of the action area within 45 km from the coast. Collisions are possible, especially in inclement weather.

Common Eider. Impacts to common eiders likely would be similar to those described for spectacled eiders, although the implications of potential impacts probably are less significant. Common eiders molt near several locations along the Alaska Chukchi Sea coast including Point Lay, Icy Cape, and Cape Lisburne. Like spectacled eiders, their molt locations probably coincide with areas of high-density prey items. Disturbance at molt locations could impose additional stress during this energetically demanding period; the degree of stress would depend on the magnitude and frequency of disturbance. Collisions are possible, especially during nighttime when there is inclement weather. Most common eiders follow the 20-m isobath, which is ~45 km from shore in the Chukchi Sea and 13-16 km in the Beaufort Sea. Because most of the action area lies well beyond these distances from shore, eiders are at risk of collisions for a small portion of the surveys. Implementation of mitigation measures would reduce the likelihood of collisions.

King Eider. Impacts would be similar to common eiders in both the Beaufort and Chukchi seas, except that king eiders molt at locations in the Bering Sea. Migration distances from shore are similar, so the collision impacts are likely similar to common eiders.

Non-T&E Marine Mammals.

The most likely effects on marine mammals from seismic activity and the proposed alternatives include disturbance reactions to seismic vessels and associated aircraft traffic, and altered prey availability. Responses, such as fright, avoidance, and changes in behavior and vocalization patterns have been observed in marine mammals at ranges of tens to hundreds of kilometers from a sound source. Sound could also affect marine mammals indirectly by changing the accessibility of their prey species. Populations could be adversely affected if feeding, orientation, hazard avoidance, migration, or social behaviors are altered. Serious long-term consequences could also result from chronic exposure. Baleen whales (bowhead, fin, humpback, gray, and minke whales) are the most sensitive marine mammal species to anthropogenic noise in the action area.

The No Action alternative (Alternative 1) would not expose marine mammals in the project area to noise associated with seismic surveys and their associated support vessels (air and sea). Other methods to collect geophysical and geological data (as yet undetermined) may disturb animals in the project area in unknown, but possibly similar ways.

Alternatives 3 through 6 are essentially the same with varying levels of protection for marine mammals depending on the size of an exclusion zone and related monitoring. They all are environmentally sound, as they all contain protective measures to mitigate possible impacts on marine mammals. Theoretically, when effectively monitored, alternatives with the lowest dB isopleth exclusion zone (e.g., Alternative 3 at 120-dB) provide a greater level of protection for marine mammals from harm and harassment than those alternatives having a higher dB isopleth exclusion zone (e.g. Alternative 6 at 180/190-dB). In addition, Alternatives 3 through 6 would prohibit seismic surveys around marine mammals in the spring lead system.

Field verification of the exclusion zone would be required under these alternatives, and the appropriate size of the exclusion zone would be based on these results. It is likely that the exclusion zone for these bigger arrays would be larger than what has been previously used, and this may result in an increased area where marine mammals may be harassed. In addition, as the safety zone increases in size (from 190/180-dB to 120 dB; Alternatives 3 through 6), the ability of vessel-based visual observers to effectively monitor the exclusion zone decreases. Therefore, additional monitoring techniques (i.e., aerial surveys and acoustic monitoring) or mitigation measures would be required for the alternatives with larger exclusion zones.

Pinnipeds (Ringed, Spotted, Ribbon, and Bearded Seal and Pacific Walrus). The NMFS' current Level A harassment threshold for pinnipeds (excluding the Pacific walrus) is 190 dB. Pacific walrus are managed by the FWS, and they recently implemented a 180-dB exclusion zone for walrus.

Alternatives 3 through 6 all provide exclusion zones capable of providing protection for pinnipeds in the project area. The exclusion zone would be the smallest for Alternative 6 (180/190 dB) and could be monitored visually by vessel-based observers. Conversely, Alternative 3 would provide the largest exclusion zone (120 dB). Increased disturbance from vessel and aircraft activity could consequently cause

pinnipeds to leave haul-out locations and enter the water, though the response is highly variable. This could have a greater impact if flushing of haul out sites occurs when pups are present, as they can be more easily injured and separated from their mothers. Use of the 160 dB exclusion zone in Alternative 4 and in Alternative 5 would provide an intermediate-sized safety zone. Alternatives 3-5, when properly monitored, would provide exclusion zones which are sufficient for pinnipeds.

The MMS believes the potential for any injuries to pinnipeds from the proposed activity and Alternatives 3 through 6 is very limited, with Alternative 6 providing a slightly greater potential for Level A Harassment as its specified exclusion zone of 190 dB most closely approaches the lower limits of levels set by NMFS for Level A Harassment.

Alternatives 3 through 6 require trained observers to visually monitor the exclusion zone, regardless of its size, and to be able to call for a shut-down if pinnipeds enter the exclusion zone. The ability of observers to effectively monitor the exclusion zone, and be able to call for a shut-down if pinnipeds enter the zone is critical to the success of the protective measures described in Alternatives 3 through 6, though it is often difficult to observe all pinnipeds within the exclusion zone.

Pinnipeds are not likely to be exposed to sound levels which could cause injury, as they would have to swim within extremely close proximity to the seismic array in order to be vulnerable, and there is no specific evidence that exposure to pulses of airgun sound can cause direct injury to pinnipeds. The most likely potential impacts to pinnipeds from seismic surveys and associated activities would be disturbance and possible impacts to food resources.

Alternatives 3 through 6 would require overflights at or above 1,000 ft in order to minimize the potential for behavioral impacts to marine mammals. Therefore, the use of aerial surveys is not expected to significantly increase the potential for harassment of pinnipeds. Therefore, the varying degrees of impact between the alternatives remains the same with the greatest to least level of protection from behavioral disturbance and injury being Alternatives 3, 5, 4, and 6 respectively.

Cetaceans (Beluga Whale, Killer Whale, Harbor Porpoise, Minke Whale, and Gray Whale). NMFS' current threshold for Level A Harassment (potential to injure) of cetaceans is 180 dB. The mitigation measures outlined in Section IV, and which apply to Alternatives 3 through 6, are set to avoid any takes of marine mammals by Level A Harassment. In addition, the MMPA authorization required under Alternatives 3 through 6 would not authorize any Level A takes of marine mammals. Based on the above, the fact that no injuries to marine mammals have been documented from seismic survey activities, MMS believes the potential for any injuries to cetaceans from the proposed activity and Alternatives 3 through 6 is very limited, with Alternative 6 providing a slightly greater potential for Level A Harassment as its specified exclusion zone of 180 dB most closely approaches the lower limits of levels set by NMFS for Level A Harassment.

The NMFS' current threshold for Level B Harassment (potential to disturb) for cetaceans is 160 dB. No studies have shown that toothed whales have reacted behaviorally to seismic sound below the 160 dB received sound level. Studies on most baleen whales, except for the bowhead and gray whale, have also not demonstrated behavioral reaction at a received sound level of less than 160 dB. However, data exists showing that gray and bowhead whales may react behaviorally at received sound levels lower than 160 dB. In comparing Alternatives 3 through 6, looking purely at the size of the exclusion zone and assuming the monitoring requirements will be effective, there are differences in the level of potential behavioral impact across these alternatives. The most protective (i.e., resulting in the least potential for takes by Level B Harassment and avoidance of Level A Harassment) would be Alternative 3 as this provides the largest exclusion zone (120 dB) and would apply for all marine mammals. Given the bowhead whale is the only cetacean in the Proposed Action area to show avoidance near the 120 dB received sound levels from impulse sounds and all other cetaceans in the Proposed Action area have generally demonstrated avoidance at higher received sound levels (i.e., 160 to 180 dB), Alternative 3 would result in the least impact to cetaceans and other marine mammals in the Proposed Action area.

After Alternative 3, Alternative 5 would provide the next most protective level for cetaceans. In this alternative, the exclusion zone would be set at 160 dB unless a certain number of bowhead whales (individuals, reproductive-age females, calves) were present, as determined by MMS and NMFS, where the exclusion zone would be changed to 120 dB. The combination of the two exclusion zones under this alternative would provide all cetaceans with additional protective measures but still would provide an exclusion zone at 160 dB (the level set by NMFS beyond which Level B Harassment is more likely to occur) at all remaining times. Therefore, Alternative 5 provides the next most protective alternative for marine mammals.

Alternative 4 follows Alternatives 3 and 5, respectively, in the degree of potential impacts to cetaceans. This alternative sets the exclusion zone at 160 dB at all times, the level set by NMFS beyond which Level B Harassment is more likely to occur. Therefore, the greatest potential for Level B Harassment exists for Alternative 6 where the exclusion zone for cetaceans is set at 180 dB, which exceeds NMFS' 160 dB determination for Level B Harassment (disturbance) and most closely approaches the NMFS determination for Level A Harassment (injury).

While the additional techniques required for Alternatives 3 and 5 would be costly and a larger exclusion zone in theory would provide a much larger, and possibly more difficult, area to monitor, this does not necessarily mean these larger exclusion zones are less effective in limiting impacts to cetaceans for the following reasons: (1) each exclusion zone in Alternatives 3 through 6 would require boat-based visual monitoring (i.e., all observers are scanning areas from the vessel as far as visually possible with appropriate equipment); (2) larger exclusion zones in Alternatives 3 and 5 would by definition require further distance of operating seismic vessels from cetaceans than Alternatives 4 and 6 with smaller exclusion zones; (3) the aerial survey and acoustic monitoring required in Alternatives 3 and 5 (and not in Alternatives 4 and 6) would provide additional coverage further away from the seismic source; and (4) additional mitigation measures would be set in place (i.e., adaptive management schemes where specific areas of higher marine mammal concentrations are avoided on a temporal or spatial basis) should monitoring measures prove ineffective. Therefore, the varying degrees of impact between the alternatives, as discussed in the paragraphs above, remains the same with the greatest to least level of protection from behavioral disturbance being Alternatives 3, 5, 4, and 6 respectively.

Marine Fissipeds (Polar Bear). Polar bears are managed by the FWS, and they recently implemented a safety radius for polar bears of 190 dB (USDOI, FWS, 2005). Because any polar bears encountered will most likely be on the ice, air gun effects on them are expected to be minor. If polar bears are encountered in the water, received sound levels would be substantially reduced due to the pressure release effects near the water surface (Richardson et al. 1995a). The most likely impacts to polar bears from seismic surveys and associated activities would be disturbance and possible impacts to bears' food resources. Any impacts of seismic activity to polar bear food resources will probably be minor, local and brief in nature. Bearded and ringed seals are the primary prey of polar bears in the action area, and abundance and availability of these seals are not expected to be significantly altered by the proposed seismic surveys and associated activities.

Alternative 6 provides the smallest exclusion zone (180/190 dB) and could be visually monitored by vessel-based observers. As the exclusion zones grow in size, it becomes less likely that the zone can be effectively monitored by vessel-based observers and aircraft-based observers will need to be added (i.e., when 120-dB level is used in Alternatives 3 and 5). Vessel activity should cause only a brief disturbance, with bears resuming normal activities after the vessel passes. Aircraft activity may be more problematic as polar bears often run away from aircraft passing at low altitude (e.g., altitude < 200 m and lateral distance < 400 m). The inclusion of aircraft-based observers has the potential to disturb more polar bears than vessel-based observers alone if the aerial observations are flown at a sufficiently low altitude. Use of the 160-dB exclusion zone in Alternative 4 and in Alternative 5 will provide an intermediate-sized safety zone. For the Chukchi Sea, Alternatives 4 and 5 are essentially identical. The ability of observers to effectively monitor the exclusion zone, and be able to call for a shut-down if polar bears enter the safety zone is critical to the success of the protective measures described in Alternatives 3 through 6.

Subsistence-Harvest Patterns

Because no seismic activity would occur under Alternative 1, no impacts to subsistence resources and practices would be expected.

Alternatives 3, 4, 5, and 6 all would have similar impacts on subsistence harvests. Seismic surveys for prelease geophysical exploration activities would be permitted with existing Alaska OCS exploration stipulations and guidelines and additional specific protective measures for marine mammals, including an isopleth-specified exclusion zone. These alternatives would permit seismic surveys in the Beaufort and Chukchi seas and incorporate standard G&G-permit stipulations and additional protective measures to ensure that fish, wildlife, and subsistence-harvest resources and practices are not adversely impacted. An inability to effectively perform mitigation measures would result in the suspension of a G&G permit until such time that the protective measures can be successfully performed and demonstrated. Theoretically, the larger the exclusion zone coupled with shut-down procedures, the greater protection of marine mammals from potential harassment and injury. Therefore, the 120-dB isopleth-exclusion zone would afford more protection from harassment and injury for marine mammals than the 180/190-dB isopleth-exclusion zone. The more marine mammals are protected, the more subsistence-harvest activities are protected.

An operator could propose to conduct seismic-survey activity in an area critical to whaling during the whaling season; however, if this condition did occur, potential conflict could be mitigated by the cessation of activities during the whale migration. Because fall ice conditions are not predictable events, user conflicts between vessels and whalers due to bad ice conditions might be more difficult to mitigate. Presently, individual companies are coordinating with the whalers through the auspices of the AEW. Such coordination was a requirement under MMS leases for Beaufort and Chukchi Sea Sales 97,109, 144, 170, 186, and 195. The working protocol is for the company to submit a plan of cooperation as a part of their exploration plan. Seismic surveying requires submission of a letter stating that cooperation will occur.

Required mitigation similar to the lease-specific Stipulations No. 4 - Industry Site-Specific Bowhead Whale-Monitoring Program and Stipulation No. 5 - Conflict Avoidance Mechanisms to Protect Subsistence Whaling and Other Subsistence Activities and conflict avoidance measures defined in an IHA would specify any noise-monitoring program for marine mammals required for ongoing seismic operations in the Chukchi Sea and would be considered through the Peer Review Workshop meetings. Because permittees usually seek a Letter of Authorization (LOA) or IHA for incidental take from the NMFS, the monitoring program and review process required under the LOA or IHA generally will satisfy the requirements of Stipulations 4 and 5. Any potential monitoring program would be designed to: (1) assess when bowhead and beluga whales, walrus, and bearded seals are present in the vicinity of potential operations and the extent of behavioral effects on these species due to operations; (2) consider the potential scope and extent of impacts that the particular type of operation could have on these species; and (3) address local subsistence hunters' concerns and integrate Inupiat traditional knowledge.

Stipulations and required mitigation and conflict avoidance measures under MMP authorization as defined by NMFS and FWS should be followed in locations where the subsistence hunt is affected. The MMPA authorization obligates operators to demonstrate no unmitigable adverse impacts on subsistence practices. Conflict avoidance agreements between Permittees and the AEW work toward avoiding unreasonable conflicts and disturbances to hunters and bowhead whales. Similar avoidance measures could be required for the subsistence beluga whale hunt by the Alaska Beluga Whale Committee (ABWC), for the subsistence walrus hunt by the Alaska Eskimo Walrus Commission (EWC), and for the subsistence polar bear harvest by the Nanuk Commission (NC). Such conflict avoidance agreements likely would follow protocols similar to those reached annually between Permittees and the AEW for the subsistence bowhead hunt and address industry seismic-vessel activities under provisions of the MMPA. The AEW prefers to negotiate a conflict avoidance agreement with industry on an annual basis using a regional rather than a project-specific approach, so as to address potential impacts from all ongoing projects. With the use of the conflict avoidance agreement methodology, Native subsistence-whale hunters generally have been successful in reaching their annual whale "take" quotas.

For MMS-permitted seismic surveys, NMFS- and FWS-sanctioned observers, usually local Alaskan Natives and biologists employed by the monitoring contractor, are onboard survey vessels. These

observers stop seismic operations when they observe marine mammals within the safety radius designated by the NMFS. Shut down of the airguns occurs if marine mammals are within this radius because of concern about possible effects on marine mammal hearing sensitivity (USDOJ, MMS, 2003a).

Sociocultural Environment

Because no seismic-survey activity would occur (Alternative 1), no impacts to subsistence resources and practices and consequent impacts on sociocultural systems would be expected. However, if other nonseismic field techniques are proposed to be used, they would require additional environmental analysis.

Seismic surveys for geophysical exploration activities covered in Alternatives 3, 4, 5, and 6 would be permitted with existing Alaska OCS exploration stipulations and guidelines and additional specific protective measures, including a specified isopleth-exclusion zone (either 120 dB, 160 dB, 120 dB and 160 dB, or 180/190 dB). Additional protective measures (beyond the existing Alaska OCS exploration stipulations and guidelines) would be identified and incorporated into these alternatives to ensure that fish, wildlife, and subsistence-harvest resources and practices are not adversely impacted. An inability to effectively perform mitigation measures will result in the suspension of a G&G permit until such time that the protective measures can be successfully performed and demonstrated.

Avoidance planning, stipulations and required mitigation, and conflict avoidance measures under MMPA authorization are defined by NMFS and FWS and made a part of each alternative would serve collectively to mitigate disturbance effects on Native lifestyles and subsistence practices and would likely mitigate any consequent impacts on sociocultural systems.

To ensure compliance with the MMPA, MMS also is requiring seismic-survey operators to obtain from NMFS and FWS an Incidental Take Authorization (ITA), which could be in the form of an IHA or LOA, before commencing MMS-permitted seismic-survey activities. The ITA's mitigation and monitoring requirements would further ensure that impacts to marine mammals will be negligible and that there will be no unmitigable adverse impact on subsistence uses of marine mammals.

To achieve this standard, the seismic operators usually negotiate a Conflict Avoidance Agreement (CAA) with the Alaska Eskimo Whaling Commission and the affected villages' Whaling Captains Association. The CAA likely will include a prohibition on conducting seismic surveys during the bowhead whale-hunting season in the Beaufort Sea, describe a dispute-resolution process, and provide emergency assistance to whalers at sea. Implementation of the CAA further ensures that there will not be significant social or economic impacts on the coastal inhabitants of the Beaufort and Chukchi seas by avoiding an adverse impact on subsistence marine mammal-harvest activities.

Archaeological Resources

Alternatives 3 through 6 include potential use of ocean bottom cable (OBC) surveys to gather seismic data. The OBC surveys might occur in the Beaufort Sea but are not anticipated to occur in the Chukchi OCS because of its great water depths and the greater efficiency of streamer operations in deep water.

The OBC seismic surveys potentially could impact both prehistoric and historic archaeological resources in waters inshore of the 20-m isobath or in deeper water, if cables are laid from shallow to deep water. Assuming compliance with existing Federal, State, and local archaeological regulations and policies and the application of MMS' G&G Permit Stipulation 6 (regarding the discovery of archaeological resources) and CFR 251.6 (a)(5) regarding G&G Explorations of the Outer Continental Shelf to not "disturb archaeological resources," most impacts to archaeological resources in shallow offshore waters would be avoided.

Environmental Justice

Because no seismic survey activity would occur under Alternative 1 (No Action), no environmental justice impacts would be expected.

Inupiat Natives could be disproportionately affected by any alternative that allows seismic because of their reliance on subsistence foods; and actions under these alternatives could affect subsistence resources and harvest practices. Avoidance planning, stipulations and required mitigation, and conflict avoidance measures under IHA requirements as defined by NMFS and FWS and made a part of each alternative would serve collectively to mitigate disturbance effects on environmental justice. Mitigating measures likely would incorporate traditional knowledge and the cooperative efforts between MMS, the State, the people of the North Slope, and tribal and local governments. With required mitigation and conflict avoidance measures in place, significant impacts to subsistence resources and hunts would not occur as a result of this action, thereby avoiding significant impacts on sociocultural systems and disproportionately high adverse impacts on low income and minority populations in the region.

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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally-owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.



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Oil and Gas Lease Sale 193 and Seismic Surveying Activities
Final Environmental Impact Statement VOLUME III

U.S. Department of the Interior
Minerals Management Service
Alaska OCS Region