

# North Slope Borough

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*Edward S. Itta, Mayor*

December 29, 2006

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Submitted Via Mail and Email to [akeis@mms.gov](mailto:akeis@mms.gov)

Re: Comments on Draft EIS for Chukchi Sea Oil and Gas Lease Sale 193

Dear Sir or Madam:

The North Slope Borough (Borough) appreciates this opportunity to comment to the Minerals Management Service (MMS) on the draft environmental impact statement (DEIS) for proposed Chukchi Sea Outer Continental Shelf (OCS) Oil and Gas Lease Sale 193. It remains our strong belief that oil and gas leasing, exploration, and development should not occur in the Chukchi Sea given the paucity of critical baseline environmental data, extraordinarily harsh weather and ice conditions, remoteness from existing industrial infrastructure, and the failure of the oil industry to demonstrate the capability to effectively respond to a major spill.

To begin, we must put MMS on notice that the unavailability of hard copies of this DEIS and other recent documents is an issue in our communities. Many of our residents do not have computers. Many, and especially many of our elder residents in particular, are not computer-literate. Only having CD or downloadable copies widely available is a hardship for many village residents. Ample numbers of hard copies and *ample time* for review should be available within our affected communities, as our residents are most likely to be impacted by this lease sale.

**General Comments**

**Insufficient Range of Alternatives**

The DEIS does not present a meaningful range of alternatives. Indeed, MMS recognizes this when it explains “the differences in effects between the proposed sales and their alternatives are so small that we cannot distinguish measurable differences between the combined estimated effects in the cumulative case analysis.” (DEIS at ES-vi) Besides the no action alternative, which is not being seriously considered, only two other very similar alternatives are proposed, both of which are inadequate. The deferral area described in Alternative IV is derived from a 20-year old Biological Opinion. MMS should use more recent information to form the basis of the alternatives.

006-001

**Lack of Analytical Clarity**

This DEIS suffers from the same deficiencies as other recent MMS documents we have reviewed and commented upon, including the DEIS for the 2007-2012 OCS Oil and Gas Leasing Program and the Beaufort Sea OCS Lease Sale 202 environmental assessment (EA). The DEIS repeatedly cites to outdated research, offers conclusions not supported by meaningful analysis, presents contradictory statements, and uses undefined or inexact terminology.

MMS, for instance, tends to use definitive words or phrases when making statements in support of oil and gas activities in the Chukchi Sea. In finding low levels of risk to bowhead whales, for example, the DEIS concludes that “whales habituate” or that “effects will be short-term”. The document continually (and somewhat annoyingly) refers to “an unlikely large oil spill” despite a large spill risk estimate fixed at 40% with a range of 33-51%. Those figures seem to us inconsistent with use of the qualifier “unlikely”. A computer search of the document found the term “unlikely” used 114 times, most often in reference to the probability of an oilspill occurring. The word is used 14 times in the brief Section D.2. of the Executive Summary discussing effects in the event of an (unlikely) oilspill. In contrast, the Executive Summary states only once that the probability of a large spill is 33-51%. This imbalance in the presentation of data can be quite misleading to decision makers and reviewers. Clearly, 51% cannot be considered “unlikely” in any statistical sense. Furthermore, nowhere does the Executive Summary state that the estimated sum of mean large platform and pipeline spills is 0.51 (95% confidence interval (CI) = 0.32-0.77) per billion barrels with a 41% chance (range = 27-54%) of a spill occurring over the life of the project (Appendix A, page A.1-18 and Table A.1-25).

006-002

When discussing more significant potential impacts, however, qualifying words are often used, such as “the effect *might* be expected” or “the number *likely* would be small if the spill contacted”. MMS must discuss these issues objectively and honestly. If there is uncertainty MMS must acknowledge it. If there are effects or impacts, MMS must also acknowledge them.

Further, MMS readily admits that with respect to most subsistence species, there is an almost total lack of baseline data. The ability to mitigate spill effects and other industrial impacts, or even identify and evaluate impacts, would be compromised by the absence of baseline data for comparison. It is irresponsible to take such a risk in an area that is so biologically productive and vulnerable in the absence of data and with large uncertainty surrounding the data that do exist. What MMS proposes is essentially a huge experiment that will, with up to a 51% probability, allow us to examine the effects of a large spill on the biological resources of the planning area and the human health and cultural well being of the communities that depend upon those resources.

006-003

Also, the DEIS is lacking references. In many sections, it appears that MMS did not conduct a comprehensive literature review. Before finalizing the EIS, the most recent and available information must be used in the analysis of impacts. In some sections, references are provided, but those references are not included in the bibliography. It is impossible to provide alternative explanations or interpretations of data or study results if MMS does not provide the pertinent references.

006-004

### **Oilspill Risk Analysis**

Throughout the DEIS, MMS acknowledges repeatedly significant uncertainty about the effects of a large spill. MMS appears to be willing, however, to look past those statements and offer the Chukchi Sea planning area for lease. The agency must be willing to acknowledge that under weather and ice conditions that may occur for approximately 8-9 months of the year in the Chukchi Sea, a significant oil spill could not effectively be cleaned up with current technology. With the dynamic moving ice conditions in the region, it would often be too risky to deploy manpower and equipment for spill response. Moving forward with Lease Sale 193 when the risks from an oil spill are so high and the ability to clean up spilled oil is so low, is unacceptable.

006-197

Also troubling are apparent inconsistencies between this DEIS and other MMS documents as they relate to spill probabilities. The MMS 2007-2012 Leasing Program DEIS seems to provide consistently lower estimates of foreseeable industrial activities and their associated impacts than does this DEIS for Lease Sale 193. The 5-Year DEIS suggests that there would be fewer small and large oil spills than would be apparent if summing estimates for Lease Sale 193 with future lease sales (assuming similar estimates as Sale 193) were planned in the 5-year program. Also, the amount of discharge per exploratory well is lower in the 5-year DEIS than estimated in this DEIS. MMS is not being consistent between documents. This inconsistency is troubling in that the estimates of impacts appear to be consistently lower in the 5-year document, which is used by decision makers to set the course for MMS activities during the next 5 years. The inconsistencies create confusion for reviewers, and make providing advice to MMS extremely difficult. MMS must be consistent between EIS documents, especially when more than one is out for review and comment at the same time.

006-198

### **Inappropriate Significance Thresholds**

The different “significance thresholds” that MMS uses for determining how to describe the expected levels of impacts to different resources and uses are also a great frustration to us. MMS has decided that an impact to subsistence harvest patterns is only “significant” if “one or more important resources would become unavailable, undesirable for use, or available only in greatly reduced numbers for a period of 1-2 years”. The threshold for significant impact to sociocultural systems is “chronic disruption . . . that occurs for a period of 2-5 years with a tendency toward the displacement of existing social patterns.” See page IV-5. Use of these standards is insulting and shows a clear lack of understanding of our traditional cultural and nutritional needs. Furthermore, the significance threshold for environmental justice merely contains a restatement of the subsistence and sociocultural impact thresholds, rather than also establishing a significance threshold for human health. It also seems throughout the effects analysis that as often as not, conclusions with respect to significance are strained in favor of findings of lesser, rather than greater significance. These conclusions are often unsupported by data or analysis. For many species, for instance, no justification is provided for assertions that recovery following an oil spill would occur in, what seem to our knowledgeable hunters, a very few generations. We are willing to work with MMS to establish criteria that more accurately reflect the way we live and the seriousness of impacts that can occur if leasing in our waters continues.

006-005

### **Cumulative Effects**

As is the case with respect to the other MMS documents we have recently reviewed, the focus of the cumulative effects analysis here is too narrow and too shallow. An incomplete range of potential effects-producing factors are considered in the analysis, and nothing appears to have been done with the conclusions that are reached in terms of their impact on the choice of a proposed leasing alternative. MMS has not fully described or analyzed:

1. Upper-end scenarios for oil and gas development in the South, Northeast, and Northwest NPRA Planning Areas, including roads, pipelines, port and coastal staging area facilities, and marine transport. Special attention should be given the potential development of Barrow as an industrial hub given its use this winter season for support of Northeast NPRA exploration via an extended snow road.
2. The Nikaitchuq prospect in the Beaufort Sea and the purchase of the Kulluk drillship by Shell and the company’s announced plans to utilize it to develop resources in the Camden Bay area.
3. Expansion of the Delong Mountain Terminal portsite or Red Dog Mine.
4. Coal and hard rock mineral development within and outside of the NPR-A, including announced ASRC plans to develop coal reserves on corporation lands.
5. Increasing onshore and offshore industrialization and commercialization of the eastern Russian Arctic.
6. Industrial and other activities in the Canadian Beaufort Sea.
7. Full analysis of effects due to arctic warming, including the near-term potential for a commercial northern sea route, the northern expansion of commercial fishing into the Chukchi Sea, thawing of permafrost, shifts in plant and animal

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species abundance and distribution, increased incidence and severity of ocean storms and coastal erosion, changes in transportation routes to subsistence use areas and loss of ice cellars to thawing and the need for more frequent hunts, and shorter tundra travel openings and other increased technological challenges.

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### **Subsistence, Sociocultural Organization and Environmental Justice**

The DEIS does not adequately analyze the impacts of oil and gas development on our subsistence practices, our sociocultural organization, or on environmental justice. Routine activities and oil spills will significantly impact our communities.

The conclusion regarding the effects from noise on subsistence activities is arbitrary. The DEIS concludes that effects of noise and disturbance are expected to be “short term (generally < 1 year), *see* DEIS at IV-333, although the DEIS recognizes that noise will deflect the bowhead whale migratory path and that noise will be generated over multiple years from seismic surveys, exploration, and development. While disturbance that makes hunting more difficult for even one day is significant, the noise from oil and gas development in the Chukchi will last for many years and cannot be considered short term. As MMS recognizes, “any disruption of the Barrow bowhead whale harvest could have significant effects on regional subsistence resources and harvest practices.” DEIS at IV-333. MMS also recognizes elsewhere in the DEIS that disruption from seismic surveys alone “could impact sharing networks, subsistence task groups, and crew structures as well as cause disruptions of the central Inupiat cultural value: subsistence as a way of life. Over time, these disruptions also could cause a breakdown in family ties, the community’s sense of well-being, and could damage sharing linkages with other communities.” (DEIS at IV-337)

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Although MMS relies on mitigation measures to downplay these effects, our past experience with seismic testing, exploration and development in the Beaufort Sea suggests that it is not possible to sufficiently mitigate the effects of noise on bowheads and other whales, and as MMS recognizes, it may not be possible to mitigate the effects of multiple seismic surveys. *See* DEIS at IV- 333.

The DEIS is also contradictory in its discussion on the effects of noise on beluga whales. The DEIS states, “When not restricted, they appear not to be particularly sensitive [to noise].” (DEIS at IV-334) However, the DEIS recognizes elsewhere that beluga whales are sensitive to noise, and the DEIS is correct in explaining that the Inupiat have long understood this to be the case. *See* DEIS at IV-292 (noting that “The observations about the effects of noise on beluga whales are widespread and probably very old in traditional knowledge.”)

006-008

The conclusions regarding the effect of a large oil spill correctly note that subsistence could be affected for at least one harvest season or longer, *see* DEIS at ES-v, but this is a misleading understatement of the effect of a large oil spill on our communities. The DEIS is incorrect in stating that “Effects from an unlikely large oil spill would not be of a size that would displace or alter the fundamental long-term relationship between

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subsistence harvest and sociocultural systems . . . As such, sociocultural systems of Alaskan Native villages should not be affected in the unlikely event a large spill.” (DEIS at ES-v) A large oil spill has the potential to permanently change our entire way of living. It could take years for the environment and whales to recover, and in that time the relationship between subsistence and our sociocultural systems will be forever altered. As MMS recognizes elsewhere, “Disruption of subsistence-harvest resources, such as that created by a large oil spill, would have predictable and significant consequences and would affect all aspects of sociocultural resources-social organization, cultural values, and institutional organization.” (DEIS at IV-340)

006-009

MMS cannot rely on mitigation to eliminate the effects that a large oil spill would have on our sociocultural organization. As MMS correctly notes, “Far from providing mitigation, oil-spill-cleanup activities more likely should be viewed as an additional impact, causing displacement and employment disruptions.” (DEIS at IV-342)

The DEIS environmental justice analysis is also inadequate and arbitrary. The DEIS concludes that “No ‘disproportionately high adverse effects’ as defined by the Environmental Justice Executive Order are expected to occur from planned and permitted activities associated with the lease sale evaluated in this EIS.” (DEIS at ES-iv) However, as MMS recognized in the DEIS for the OCS Oil and Gas Leasing Program for 2007-2012 (5-Year Plan), “any effect arising from Alaskan OCS activity is liable to have EJ implications.” (DEIS for 5-Year Plan at 229)

006-010

The DEIS states that “Because of the NSB and NWAB’s homogeneous Inupiat population, it is not possible to identify a ‘reference’ or ‘control’ group within the potentially affected geographic area (for purposes of analytical comparison) to determine if the Inupiat are affected disproportionately.” (DEIS at IV-364) It is not necessary to identify a control group within such a narrow and specific geographic area in order to properly evaluate whether the proposed project would have a disproportionately high adverse effect on certain populations. Indeed, the purpose of an environmental justice analysis could always be circumvented if the relevant geographic area chosen were limited to the area populated by the minority population of concern. MMS should examine environmental justice issues from a broader perspective of both the entire state and the entire country, as did the DEIS for the 5-Year Plan. *See* 50Year Plan at IV-228. MMS can also compare Inupiat to non-Inupiat households in the North Slope. *See id.* at IV-229. As the 5-Year Plan correctly explains, “any OCS activity in Alaska is likely to significantly affect a specific local minority.” *Id.*

Again, MMS cannot assume that mitigation measures will reduce the impacts to a non-significant level. Offshore oil activity has already had a significant impact on our communities, despite the mitigation measures that are in place. As MMS recognizes, “Limited data also limit our assessment of the effectiveness of mitigation measures. practices. Development already has caused increased regulation of subsistence hunting, reduced access to hunting and fishing areas, altered habitat, and intensified competition from nonsubsistence hunters for fish and wildlife.” (DEIS at V-61)

Here also, we must again demand that MMS address in its cumulative effects and environmental justice analyses the already significant levels of widespread North Slope community anxiety and disillusionment associated with multiple onshore and offshore, federal, state, and industry leasing program, lease sale, and project-specific planning processes. MMS has never fully addressed these culture-wide impacts in the context of its cumulative effects or environmental justice analyses. There is an increasing sense in our communities of being overwhelmed by multiple planning processes; both in terms of a lack of time and expertise on a community and individual level to process all that is occurring, and in terms of a seeming inability to ever meaningfully influence the decisions being made. It is simply unreasonable to expect a small community to engage in any meaningful way in a host of concurrent planning processes of this magnitude. The increasing burden of project reviews initiated by multiple agencies and companies is more than our community can deal with.

006-010

The fact that a single agency, MMS, is responsible for much of this burden, and has resisted calls for additional review time, raises clear and significant environmental justice issues. Within only the last quarter of this year, our institutions and residents have been faced with reviews of the Beaufort Sea Sale 202 EA, the 2007-2012 Leasing Program DEIS, the arctic seismic programmatic EIS, and this Sale 193 DEIS. Adding BLM planning efforts dealing with the South and Northeast planning areas of the NPR-A, and many other project-specific, state, and other federal reviews of which you must be aware as well, it is clear that we are dealing with an all-out assault by the Department of the Interior. It must end, and it is the legal and moral obligation of the DOI to see that it ends immediately. We have raised this issue with other agencies as well as with MMS, and await any indication that measures have been identified and implemented that will mitigate this significant impact.

### **Human Health Effects**

On December 15, 2006, the MMS invited Dr. Aaron Wernham, our consultant on health-related issues, to draft sections on health concerns for the FEIS. We appreciate the MMS' willingness to accept our input on health impacts. Recognizing that there has not been enough time to complete a detailed, systematic analysis, we look forward to the inclusion of our suggested public health comments as a substantial improvement to the DEIS. The comments below represent our concerns with the DEIS in the absence of any substantial improvement.

006-011

Neither this DEIS nor any MMS environmental review to date has adequately recognized and addressed as a component of its cumulative effects analysis the fact that the most likely long-term impacts of an increased industrialization of the Arctic will be on the human residents rather than on the wildlife resources of the region. There are numerous studies funded by the petroleum industry and others concluding that many potential impacts to wildlife can be mitigated to varying degrees. We are unaware, however, of any comparable literature finding that an adequate approach to mitigation of impacts on subsistence activities has been identified and employed.

The DEIS refers to a wide array of potential human health impacts associated with the proposed action and the cumulative case, yet includes little or no analysis of these impacts. Some public health issues are briefly mentioned in the “sociocultural” impacts and “environmental justice” discussion, yet there has not been an effort to systematically and thoroughly address human health concerns.

The issue of community health has become a prime concern for the Borough. We feel strongly that this issue must receive the same level of analysis accorded other environmental concerns through the NEPA process. For the purposes of discussion with MMS and other responsible agencies, we have employed the World Health Organization’s definition of health, since it is the most widely used and accepted definition:

*A state of complete physical, mental, and social well-being,  
and not merely the absence of disease or infirmity.*

There are many human health concerns referenced in the DEIS yet there is little analysis of the concerns. The document also identifies potential effects that would predictably impact public health, but with no discussion of the obvious public health concerns. For example, compromised subsistence, acknowledged as a possible impact of the proposed action and the cumulative scenario, represents the potential for a significant dietary change. Subsistence diets are well known to be protective against diabetes, hypertension, and cardiovascular disease. These issues must be addressed in the Final EIS. Also, the DEIS acknowledges the possibility of displacement of subsistence resources requiring longer travel distances, with no discussion of the potential for increased accidents and exposure-related injuries resulting from such changes.

It is particularly troubling that the DEIS has not utilized the best available information to assess human health impacts. There are a number of readily available sources of information that would render more complete and useful the analysis regarding the health issues raised in this document. The following sources of information are readily available, and would contribute valuable information to the discussion of health issues raised in this DEIS:

- a. Arrest and social service records in the Borough would allow a readily available comparison of indicators of social pathology in the Borough and a comparison between communities.
- b. Baseline prevalence of respiratory illness.
- c. Baseline elder mortality rates.
- d. Rates of accidental injuries and death.
- e. Epidemiology of mental illness, including prevalence of depression, suicide rates, etc.

MMS has not used the accepted and best available methodology to assess human health impacts. We have discussed this point with MMS officials, and hope to discuss our expectations with state officials as the process of updating best interest findings for North Slope areawide sale areas begins. Health Impact Assessment (HIA) is a methodology in



wide use outside of the U.S., and is increasingly employed within the U.S. by local planners and universities. The World Bank has used it for large oil and gas projects such as the Chad-Nigeria pipeline. Canada regularly incorporates it into environmental impact assessments. Recognizing its value in guiding planning and development decisions to prevent adverse human health outcomes, the U.S. Centers for Disease Control advocates its use. The World Health Organization has recognized its value for protecting human health and encouraging responsible development, and also strongly advocates its use in evaluating any large industrial project. There is no justification for employing substandard methodology when it comes to protecting the health of our North Slope communities. It is our belief that MMS, as well as the Bureau of Land Management and other federal agencies, must use HIA to satisfy requirements under NEPA to fully assess the potential impacts of their actions on the quality of the human environment.

The MMS is legally and ethically required to include a rigorous, systematic assessment of human health impacts in its NEPA analyses. The federal trust responsibility for American Indian/Alaska Native culture and subsistence practices requires that MMS analyze human health impacts. NEPA, the C.F.R., and Executive Order 12898 provide a very strong and consistent legal foundation requiring a more systematic and rigorous analysis of human health concerns than the MMS has provided here. Consider the following:

1. NEPA discusses human health in detail, with 6 references to health concerns, including objectives such as:
  - a. To “stimulate the health and welfare of man.”
  - b. To “ensure for all Americans safe, healthful, aesthetically and culturally pleasing surroundings.”
  - c. To “attain the widest range of beneficial uses of the environment without degradation, risk to health and safety”
  - d. To “prevent or reduce adverse effects that endanger the health and well-being of man”
  - e. 40 C.F.R., which is often quoted as requiring evaluation of the “human environment” (40 C.F.R. §1500.2), specifically defines the “effects” of a NEPA action to include: “ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative.”(40 C.F.R. § 1508.8) 40 C.F.R. goes on to direct agencies to consider “the degree to which the proposed action affects public health or safety” when evaluating the intensity of an impact (40 C.F.R. § 1508.27).
2. CEQ guidelines on E.O. 12898 require that agencies “consider relevant public health data and industry data concerning the potential for multiple or cumulative exposure to human health or environmental hazards in the affected community.”

The Borough has provided to MMS as attachments an expanded treatment of our concerns regarding human health assessment, including our expectations with respect to

this and future sale-specific NEPA reviews, and suggested language for inclusion in the relevant EIS sections.

### **Sabotage as a Spill Risk Factor.**

The North Slope Borough Science Advisory Committee pointed out in its 2003 review of oil spill risk the very real risk of sabotage against oil infrastructure (Section 6: SAC-OR-130). The Committee stated:

*Unfortunately, the tenor of the times requires that sabotage be considered among the risk factors for oil spills in Alaska. In fact, the first incidence of sabotage against arctic oil field contributions was shortly after startup of the Trans-Alaska Pipeline (TAPS) in 1977 (Maxim and Niebo, 2001).*

*Our discussions were, of necessity, very general. Probably, there are three basic and very different categories of potential sabotage attempts: (1) random spontaneous malicious destruction (i.e. the recent shooting of the TAPS); (2) deliberate destruction of production sites or pipelines (i.e. the bombing of TAPS in 1978; and (3) some maximum level horrific impact such as against the Valdez Marine Terminal (VMT) or a loaded oil tanker.*

*We did not attempt to assess the risk of spills from sabotage in Arctic Alaska. We note, however, that the two incidents against the TAPS spilled a total of 22,800 barrels of North Slope crude oil. The first, a bombing on February 15, 1978, released 16,000 barrels. The second, a malicious mischief type shooting on October 4, 2001, released 6,800 barrels. These two instances of sabotage caused the loss of 60% of the total amount of crude oil (38,000) barrels spilled from the TAPS.*

*From startup in 1977 to November 30, 2002, a total of 13.95 billion barrels of North Slope crude oil was delivered to the VMT through the TAPS. Though the total volume of oil spilled is a miniscule fraction of the total through-put (0.0000016%), cleanup costs have been high. Environmental impacts are still being evaluated.*

*Coping with the risk of sabotage entails several issues, including but not limited to design features and security.*

The Borough recommends that sabotage be considered and described as an oil spill risk where offshore pipelines transition to onshore facilities, and at offshore facilities themselves.

### **Specific Comments**

Pg. ES-iii, last lines: note "There is a high potential for marine and coastal birds to experience disturbance and habitat alteration. However, little recent site-specific data are available on habitat and use patterns, routes, and timing of specific species using the arctic environment. Short-term, local disturbance could affect subsistence-harvest

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006-013

resources, but no resource or harvest area likely would become unavailable, and no resource population would experience an overall decrease.” This is an early example of the many internal inconsistencies and unsupported conclusions reached in the DEIS. Despite having little recent site-specific data, MMS states without qualification that no resource population would decrease under its proposed leasing alternative.

Pg. ES-iv, 2<sup>nd</sup> paragraph: states that “Sociocultural systems would not be altered, because the sale and possible follow-up activities would result in few new residents. Furthermore, the activities represent the continuation of an important and long-time aspect of many of the area’s communities.” An influx of new residents is clearly not the sole determinant of impacts to sociocultural systems. MMS has failed to grasp the magnitude of sociocultural impacts that have already occurred as a result of OCS leasing and activities. We are not only dealing with the impacts of the single production facility at Northstar, but also the exploratory drilling operations that have been conducted, the dramatically increased level of seismic activity we saw this past open water season, and the impacts of the constant planning processes themselves. The fact that in only a very few weeks, our organizations, communities, whaling captains, and other residents have been faced with reviews of multiple large, complex, and extremely important planning documents all produced by MMS alone is an enormous impact on us all. On this list of current projects are the Beaufort Sea Lease Sale 202 EA, the 5-Year OCS Leasing Program DEIS, the joint NMFS/MMS Seismic Programmatic EIS, and this Chukchi Sea Lease Sale 193 DEIS.

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MMS states that, “No resource population would experience an overall decrease.” This conclusion is unsupported and contradicts conclusions made elsewhere in the DEIS. For example, the DEIS recognizes that “several species or species-groups have a high probability of experiencing substantial negative impacts. The risk that several regional bird populations could experience significant adverse impacts is high.” DEIS at II-34.

006-015

There are repeated conclusions stated throughout the DEIS with respect to many resources and values that impacts “could be” significant or that there is the “potential for” significant impacts. None of these conclusions seems to have affected the MMS decision to proceed with leasing. MMS fails to acknowledge that such conclusions, so often reached, are impact-producing in and of themselves. They increase already significant levels of widespread anxiety and disillusionment associated with multiple onshore and offshore, federal, state, and industry leasing program, lease sale, and project-specific planning processes. MMS has never fully addressed these culture-wide impacts in the context of its cumulative effects or environmental justice analyses. There is an increasing sense in our communities of being overwhelmed by multiple planning processes; both in terms of a lack of time and expertise on a community and individual level to process all that is occurring, and in terms of a seeming inability to ever meaningfully influence the decisions being made. We have raised this issue with other agencies as well as with MMS, and await any indication that measures have been identified and implemented that will mitigate this significant impact.

As we stated in our October 6 comments to MMS on the Sale 202 EA, it is not difficult for us to recognize a clear link between truly oppressively high numbers of agency and

industry planning processes and community-wide stress and anxiety and other impacts to our cultural and physical health:

With oil prices high as we described earlier, industry interest and the level of activities are high. There were no seismic surveys in the Chukchi Sea for perhaps 15 years. This season there are three. There are multiple exploration and development projects being conducted, under construction, or in the planning stages right now. The number of industry and agency meetings and contacts in affected communities has skyrocketed. These are in addition to meetings and contacts associated with lease sale planning processes like that this EA. In some communities, it would be virtually impossible to prepare for and attend all of the meetings and have any kind of satisfying life beyond that activity and a day job. There is stress associated with deciding what meetings to attend and what meetings not to attend. There is stress associated with attending frequent meetings and being away from family and friends and other pursuits. Most subsistence hunters already have the dual commitments of a day job and all of the responsibilities associated with learning, teaching, and engaging in traditional subsistence practices. Free time is always in short supply. Most subsistence harvest activities take hunters away from their homes for varying periods of time. Efficiency and safety in harvests is success. Increased industry activity in subsistence use areas has always meant reduced harvest success. Hunters have to travel farther and more frequently for game. The risks of exposure-related and other injuries, and wear and tear on subsistence gear are increased. With oil prices high, the price of fuel for snowmachines, ATVs, and boats is high. The price of heating oil is high. The prices are far higher on the North Slope and elsewhere in bush Alaska than they are in urban centers. Subsistence success may be down, but with high transportation and heating oil expenses, cash may be tight and the ability of many residents to purchase alternative foods at local stores is compromised. Besides, we Inupiat need our Native foods to sustain us. The detrimental effects of a shift from Native to non-Native foods have been well documented.

006-016

This discussion should be just the beginning of MMS' analysis of the complex interrelated ongoing and foreseeable future cumulative effects of many influences on subsistence use patterns, sociocultural systems, and human health.

In addition, MMS makes a brief reference to development of 190 billion cubic feet of natural gas and to the effects from a natural gas release. However, impacts from gas development are not analyzed in the DEIS. If gas development is reasonably foreseeable, the impacts must be fully analyzed and not briefly mentioned in the executive summary.

006-017

Pg. ES-v, fifth paragraph: MMS states that the "Effects from an unlikely large oil spill would not be of a size that would displace or alter the fundamental long-term relationship between subsistence harvest and sociocultural systems. . . . As such, sociocultural systems of Alaskan Native villages should not be affected in the unlikely event a large spill." However, on the previous page, MMS acknowledges that a large oil spill could have significant impacts on subsistence hunting. (DEIS at ES-iv) This statement belies the central role that subsistence hunting plays in our culture. A large oil spill will significantly impact sociocultural systems on the North Slope.

006-018

Pg. ES-v, D.3 Cumulative Effects: The section begins with the statement that "In the cumulative effects analysis, we assess the estimated contribution of Sale 193 to the

combined estimated additive, countervailing, and synergistic effects of all the past, present, and reasonably foreseeable activities that are likely to affect the *same resources that may be affected by Sale 193*". (emphasis added) On just the next page, however, in Section E discussing the effects of Alternatives II – IV, there appears a lengthy self-serving discussion of the global impacts of importing oil versus producing it domestically. If MMS is going to discuss effects on this scale, the potential environmental benefits of energy conservation and use of alternative fuels, as well as the contribution of domestically produced oil to greenhouse effects, ought to be discussed to a comparable degree.

006-019

Pg. II-1: The unavailability of hard copies of the DEIS is an issue in our communities. Many of our residents do not have computers. Many, and especially many of the elder residents in particular, are not computer-literate. Only having CD or downloadable copies widely available is a hardship for many village residents. Ample numbers of hard copies and ample time for review should be available within our affected communities, as our residents are most likely to be impacted by this lease sale.

006-020

Pg. II-4, Paragraph 5, Line 4: Add mating to the activities that occur in this area.

006-021

Pg. II-4, Paragraph 5, Line 5: Add gray whales and beluga whales to the list (bowheads are the only cetaceans noted).

006-022

Pg. II-5, Stipulation No. 1: The stipulation provides little mitigation. The first sentence states that "If previously unidentified biological populations or habitats that may require additional protection are identified in the lease area by the Regional Supervisor, Field Operations (RS/FO), the RS/FO may require the lessee to conduct biological surveys to determine the extent and composition of such biological populations or habitats." As written, this stipulation actually discourages industry from conducting appropriate surveys for important and unique populations or habitat. If a lessee identifies these populations or habitat, additional surveys may be required. Given the acknowledged lack of good baseline biological data for the Chukchi Sea, the stipulation should require pre-operation surveys, with independent peer-review of study design and results. These surveys must be conducted before any exploratory or production activities occur so important populations that reside or migrate through the areas or habitats are not disturbed. Such a measure would be comparable to measures adopted by the Bureau of Land Management (BLM) that require multiple years of study before operations are allowed in potentially important waterfowl and caribou habitat within portions of the National Petroleum Reserve-Alaska (NPR-A).

006-023

Pg. II-7, Stipulation No. 4: Line 4 should read "polar bears". Ice seals should also be included in the subsistence species list that is in the 1<sup>st</sup> sentence of the 1<sup>st</sup> paragraph. Further, the Ice Seal Commission should also be listed as one of the co-management organizations. The penultimate sentence in the 1<sup>st</sup> paragraph discusses the amount of time allowed for co-management organizations to comment on monitoring program plans. This amount of time needs to be adjusted. A large number of oil and gas companies are interested in operations in the Chukchi Sea. If there are a large number of plans to review

and the plans do not become available until late in the spring, then 30 to 60 days is not enough time to review and comment on monitoring plans. If a limit of 30 to 60 days is placed on co-management organizations to comment on plans, then there needs to be a cut-off date of March 1 for submission of monitoring plans. Otherwise, subsistence activities in spring and early summer will conflict with review of the plans. Finally, MMS must clarify how the agency and oil companies will respond to and incorporate into the plan the comments they receive from the co-management organizations.

Pg. II-8, Barrow: This paragraph does not accurately capture the area that is used by Barrow for subsistence hunting of bowheads. Occasionally, Barrow hunters will travel as far to the east as Smith Bay to hunt bowheads. This paragraph also does not capture the importance of ice seals to the Barrow community.

006-025

Pg. II-9, Point Lay: This paragraph does not accurately capture the timing or location of the beluga hunt. Typically the beluga hunt occurs between the middle of June and the middle of July. Hunters can travel as far north as Utukok Pass or as far south as Cape Beaufort while looking for belugas.

Pg. II-9, Stipulation No. 5, 1<sup>st</sup> paragraph: The standard employed is the prevention of “unreasonable conflicts” with subsistence, but it is never defined. MMS should replace the inadequate “unreasonable conflicts” standard of Stipulation 5 governing impacts to subsistence, with the MMPA standard of “no unmitigable adverse impacts”.

2<sup>nd</sup> paragraph: MMS should require industrial operators to avoid conflict with the subsistence harvest of all marine species, not only bowheads. Operators should also consult with co-management organizations that deal with belugas, walrus, polar bears and ice seals if their plans call for activities to occur during the seasons of harvest for those species.

006-025

Pg. II-10, and 11: See comments above (Pg. II-8 and 9) about Barrow and Point Lay.

Pg. II-11, Paragraph 4: This paragraph states that this stipulation has been effective in the Beaufort Sea. We have found, however, that these stipulations only work when industry follows the rules. MMS should state how it would ensure compliance of operators with the stipulations.

006-026

Pg. II-19, last bullet statement: This paragraph states that seismic operations will not cause “undue harm to aquatic life”. It is not clear how MMS defines “undue harm”. This term must be defined.

006-027

Pg. II-20: Paragraph 3, #1: The exclusions zone of 180 dB for cetaceans may be insufficient (specifically, for bowheads) to avoid physical harm. MMS should acknowledge the limitation in knowledge that surrounds these decibel zones. A zone of 180 dB is not sufficient for avoiding harassment. To ensure avoiding taking bowheads by harassment, monitoring and mitigation zones should be set to 120 dB and perhaps lower.

006-028

Pg. II-21, bullet statement #4: Ramp up is a mitigation measure used by seismic operators. We are not aware of data indicating the effectiveness of the measure. If there are such data, appropriate studies should be cited. If MMS only presumes that this mitigation approach works, then it should say so.

006-029

Pg. II-21 to 24, Alternative Mitigation for Seismic Surveying: MMS must include monitoring and mitigation zones to the 160 and 120 dB isopleths. As MMS stated in the recent Programmatic Environmental Assessment for 2006 arctic seismic surveys, it is known that migrating bowheads are impacted by seismic sounds down to 120 dB and possibly lower. Given the known sensitivity of bowheads to industrial sounds, the lack of current information, and the uncertainty in existing information, MMS must use a precautionary approach to permitting seismic activities in the Chukchi Sea. Further, the alternative mitigation measures focus solely on bowhead and gray whales. MMS must also develop mitigation measures for belugas, walrus, ice seals and polar bears, and ensure that operators follow the mitigation measures and conduct the appropriate monitoring studies.

006-030

Pg. II-29 to 36, Summary of Impacts: There are a few references in this entire section. MMS makes statements and conclusions about how bowheads and other resources have responded to or were impacted by oil and gas activities. It is not possible for decision makers or the public to adequately evaluate MMS' statements without citation to sources. Every statement that references a study or study results must have a reference.

006-031

Pg. II-32, Endangered and Threatened Species, 3<sup>rd</sup> paragraph: One of the only references cited by MMS in this section is very old. There are many more current studies that show that bowheads continue to respond to low levels of noise from industrial activities even after years of operations (e.g. BP's Northstar studies) and do not habituate. MMS must not be selective in the references they use. The penultimate sentence is misleading. First, MMS does not provide the reference for this study. It is Richardson (1999). The data do not support the conclusion that whales re-occupy areas where seismic operations occur within 24 hours. The data were limited, preliminary and easily interpreted in other ways. It is reasonable to interpret the data in Richardson (1999) to indicate that whales had not reoccupied seismic areas within 96 hours, when data collection had ceased. The Borough has made this same comment in reviewing other MMS documents over the past 4 or 5 years. MMS must cease making conclusions from preliminary (as indicated by the authors of the report) and inadequate data.

006-032

4<sup>th</sup> paragraph: MMS must also acknowledge the importance of monitoring. The focus of this paragraph is on mitigation, but our recent experiences with seismic operations in the Chukchi Sea in 2006 show that it is impossible to assess either impacts or the effectiveness mitigation if there is inadequate monitoring. Preliminary results released by operators indicate that it will likely not be possible to determine the effects from this season's seismic operations on marine mammals. Most monitoring occurred in the immediate vicinity of the seismic vessels and few data were collected "over the horizon", in areas where marine mammals could be impacted by the loud sounds from seismic.

006-033

MMS must acknowledge that inadequate monitoring will not provide the data needed to evaluate the effectiveness of the mitigation measures.

Penultimate paragraph, last paragraph: MMS concludes there will not be any “significant adverse impacts” if whales are deflected during feeding. There are no data to support this conclusion. The sentence must be rewritten or qualified.

006-034

Pg. II-33: MMS does not reference the Bowhead Whale Aerial Survey Program (BWASP) that they fund. BWASP provides data on bowhead distribution in the Beaufort Sea during the autumn. Recent analyses by MMS indicate that bowheads may either have been deflected away from a sizable area offshore of Prudhoe Bay, or have somehow modified their behavior in a way that renders them difficult to observe. MMS must reference and discuss these data, especially given that it is the agency’s own data.

006-035

3<sup>rd</sup> complete paragraph, sentence near the middle of the paragraph: The sentence begins “Prolonged exposure...” and states that few whales would be impacted by a large oil spill during the open water period. There are no data to support this statement. Further, there are data to indicate that the opposite might occur. Bowhead whales might aggregate to feed in areas with higher densities of zooplankton, thus a large oil spill could impact many whales. MMS must revise this paragraph.

006-036

Penultimate paragraph: In the first sentence, MMS states that marine mammals would “most likely experience temporary, nonlethal effects.” There are no data to support this statement. MMS must refrain from making conclusions without any data. The penultimate sentence in this paragraph states that a large oil spill will be “unlikely”. It is not clear why MMS chooses to use the word “unlikely” when there is a 40% chance of a large oil spill for the preferred alternative (Pg. IV-25, last paragraph). MMS must be consistent and honest. A large spill is likely with the proposed action.

006-037

Pg. II-34, 1<sup>st</sup> complete paragraph: This paragraph is not completely true. In 2006, there were monitoring requirements associated with seismic surveys in the Chukchi Sea; however, the monitoring was not sufficient to document impacts to marine mammals or effectiveness of the mitigation measures. MMS must acknowledge the unproven and uncertain effectiveness of the mitigation measures and monitoring in offshore areas.

006-038

Pg. II-35, Marine Mammals: It is unclear why only polar bears are discussed in this section. There are many other marine mammals that must be discussed.

006-039

Pg. II-36: MMS states that “Routine activities . . . could cause noticeable disruption to social organization, cultural practices, and institutional organizations . . . However, the combination of effects would not be sufficient to displace existing social patterns at the Regional level.” DEIS at II-36. Our communities are connected, sharing subsistence, family, and cultural ties. Impacts in one community have an effect on other communities in the North Slope, as MMS recognizes elsewhere in the DEIS. See DEIS at IV-302. Thus, MMS it is not clear how MMS can conclude that effects on our society will not be

006-040



significant at a regional level. In addition, this statement implies that impacts to our people are somehow less substantial if they do not affect our entire populace.

MMS also states that “Wainwright could experience other effects to social organization, cultural values, and institutional organization for a period exceeding two to five years. Collectively, these other effects represent a chronic disruption. Given the resiliency of social systems and their ability to adapt, the chronic disruption can be successfully accommodated.” DEIS at II-36. MMS fails to explain how the chronic disruption can be successfully accommodated, and reveals the agency’s lack of appreciation for the impacts to our communities that have already occurred and that have not been “successfully accommodated.”

006-041

Pg. II-39, 1<sup>st</sup> paragraph: This alternative would preclude development and production of oil within Corridor I; however, MMS could allow seismic surveys. It is unclear how deferral of Corridor I will adequately protect marine resources if seismic surveys are allowed to occur. MMS should not allow seismic surveys in Corridor I.

006-042

Pg III-20-21, Air Quality, and Pg. IV 56-60, Discharges (Air Emissions) from the Development and Production Phase:

The statement that the “air quality of the Chukchi Sea area is well within the NAAQS standards” is not justified. EPA NAAQS sets standards for 6 “criteria pollutants.” The NAAQS standards include acceptable levels for coarse (PM 10) and fine (PM 2.5) particulate (MMS enumerates this standard in table III.A-5.) To our knowledge, fine particulate is not monitored on the North Slope; it is not included in the referenced table of North Slope data (III A-6, erroneously referenced as III A-5 in the DEIS).

006-043

According to the EPA, PM 2.5 is associated with “increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing, for example; decreased lung function; aggravated asthma; development of chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease.”<sup>2</sup> The significance of PM 2.5 with regard to human health is acknowledged later in the DEIS, when the MMS states that “the smallest particles pose the highest health risks (pg. IV-54). But again, no data are included regarding either baseline air quality or predicted contributions from the proposed action with regard to fine particulate.

PM 2.5 is one of the primary pollutants produced by combustion of hydrocarbons, and one of the main components of haze, and must therefore be discussed in terms of baseline levels, projected emissions, and potential impacts on human health.

Pg. III-41, Threatened and Endangered Species: MMS must cite the most current and available scientific information. MMS did a very good job of summarizing available data in the 2006 Programmatic Environmental Assessment that allowed seismic surveys during the most recent open water season. It is unclear why this DEIS has not continued to cite the most current and available information.

Pg. III-42, 1<sup>st</sup> paragraph: MMS states that “conservation concerns include: ...hunting in calving, migration and feeding areas...”. This is not true. The International Whaling Commission, the National Marine Fisheries Service and the Alaska Eskimo Whaling Commission closely manage the hunt for bowhead whales. The carefully managed subsistence harvest of bowhead whales is not a conservation concern. The sentence must be revised. A later sentence states “available information indicates that bowheads that use the Chukchi Sea Planning Area are resilient at least to the level of human-caused mortality and disturbance that currently exists.” This sentence is absolutely true and highlights why North Slope residents are especially concerned about increased industrial activity in the Chukchi Sea. Impacts from seismic sound, vessel traffic, development and production, and oil spills could lead to mortality of bowheads, the slowing of population recovery or potentially even a population decline.

006-044

Pg. III-43, 1<sup>st</sup> paragraph: MMS should use the most recent information available. In this paragraph MMS mentions a meeting scheduled for spring 2006 about bowhead stock structure studies. This meeting did occur in spring 2006 and representatives of MMS attended the meeting.

Pg. III-42 to 51, bowhead whale: Most of the references in this section are not included in the bibliography. It is not possible for reviewers of the DEIS to adequately review and comment of this section without being able to independently examine the pertinent references.

006-045

Pg. III-44, 3<sup>rd</sup> paragraph: As stated in the text, George *et al.* (2004) suggested that the recovery of the BCB bowhead stock is in part due to the relatively pristine habitat in which it lives. The antithesis is also true - an industrialized habitat could halt the recovery of the BCB population, or even lead to a population decline.

006-046

Pg. III-46, Spring Migration, 3<sup>rd</sup> paragraph: MMS does not use the most pertinent information. George *et al.* (2004, and references within) provide the most recent and complete dataset on spring migration past Barrow. The final sentence in this paragraph is confusing. It is unclear what is meant by “[cow/calf pairs] rate of spring migration was ...more circuitous than other bowheads”?

006-047

Pg. III-46, Summer Migration: This section is incomplete and inaccurately cites references. For example, Melnikov *et al.* (1998) did not observe bowheads feeding in Barrow Canyon. Instead they postulated that Barrow Canyon was a good feeding area. The 3<sup>rd</sup> paragraph is confusing. Bowheads in the Chukchi Sea in the summer are by definition from the Western Arctic population. Further, it is not clear what surveys (“since the time of the last surveys”) are being referred to in the 2<sup>nd</sup> sentence of the 3<sup>rd</sup> paragraph.

006-048

Pg. III-47, Fall Habitat Use and Migration: 2<sup>nd</sup> paragraph, 2<sup>nd</sup> sentence: This sentence is incorrect. Large whales are the first to arrive at Barrow in the autumn and the small ones are last to arrive. Here again, MMS does not reference a substantial study that it funded, the BWASP surveys. Results from those surveys should be included in this section.

006-049

Pg. III-48, Known Use of the Chukchi Sea by bowheads: This section must also comment on the lack of current information about how bowheads use the Chukchi Sea Planning Area. Given the amount of feeding in the western Beaufort Sea, the northeastern Chukchi Sea may also be an important feeding area.

006-050

Pg. III-49, 4<sup>th</sup> complete paragraph, 1<sup>st</sup> sentence: It is not clear why MMS states “far more than 10% of the bowhead” feed in the Beaufort Sea. Later in the paragraph, MMS references data that 73% (77 of 106 whales) of landed whales had food in their stomachs. This sentence should be modified to be more accurate and reflect the most data.

006-051

Pg. III-52, 1<sup>st</sup> paragraph: MMS is right to acknowledge the broad range of the unknowns in the Chukchi Sea. There are no recent data on distribution, abundance (in summer), or habitat use in the Chukchi Sea Planning Area.

006-052

Pg. III-59, III.B.5.b(1). Murres. 3rd paragraph. Misspelled piscivorous.

Pg. III-62, Waterfowl: MMS has not done a reasonable literature review for this section. There are numerous references that have not been included. MMS has relied on outdated information for a large portion of this section.

006-053

Pg. III-62 and 63, Yellow-billed Loon: For some reason MMS focuses the discussion on the nesting areas of Yellow-billed Loons. Instead, MMS must focus on the use of the Chukchi Sea Planning Area or the areas immediately adjacent. The entire Yellow-billed Loon population that nests on the North Slope of Alaska and some that nest in northwest Canada migrate through or adjacent to the planning area. Thus, the entire population of Yellow-billed Loons, which is very small, is vulnerable to an oil spill or other perturbations caused by oil and gas activities in the Chukchi Sea.

006-054

Pg. III-63, Long-tailed Ducks: The entire North Slope population of Long-tailed Ducks migrates through the planning areas during the spring and autumn. In spring they migrate along the lead system during May and early June. In autumn they likely use a broader area as they move through the region in August to October. Because they are often confined to the spring lead or to a relatively narrow corridor in autumn, Long-tailed Ducks are very susceptible to oil spills during migration.

006-055

Pg. III-64, King Eider: There are many references available on King Eider migration past Barrow in the spring, summer and autumn. The most recent is Suydam et al. (2000). MMS must use the most current and best information for the analysis of impact.

006-056

Pg. III-64, Pacific Brant: The 1<sup>st</sup> sentence states that Black Brant are “not known to nest near the Chukchi Sea coast in appreciable numbers” but goes on to state that the “current status of Pacific Brant along the Chukchi Sea coast is unknown.” These sentences must be reconciled.

006-057

Pg. III-65, Lesser Snow Geese: Ritchie et al. (2006) has the most current information about snow geese nesting in northwestern Alaska.

006-058

Pg. III-68, Paragraph 3: While it is good that MMS has noted that there are no reliable estimates for ringed seal population, estimates are critical to have *prior* to allowing industrial operations in order to evaluate the possible effects of development or evaluate whether significance thresholds have been met. The reality of the situation is that with accelerating global climate change, serious changes in population (both number and demographics) may be occurring. These data are key to have prior to development. Again, a mitigation measure requiring pre-operation surveys similar to that required by the BLM in the NPR-A for caribou and waterfowl is appropriate. (This same comment applies to spotted, ribbon and bearded seals and walrus as well.)

006-059

MMS notes that these stocks are not listed as “depleted” under the MMPA, but if recent populations estimates are not available, this statement is relatively meaningless.

Pg. III-72 to 73: The walrus population in Alaska may be in decline. Climate change and receding pack ice may have led to reduced numbers of walrus. The situation is unlikely to improve for walrus and other ice-dependant species in the foreseeable future. This concern underscores an even stronger case for having sufficient biological and population data before selling leases in areas critical to walrus in the Chukchi Sea.

006-060

Pg. III-83, Section III.B.7.a(1): Throughout the EIS, MMS should change the abbreviation TLH (Teshekpuk Lake Herd) to the more conventionally used TCH (Teshekpuk Caribou Herd).

006-061

The Western Arctic Herd (WAH) winter range extends farther north than it is described in the DEIS. The herd ranges as far north as Wainwright and Barrow. (Dau, J. 2005. Units 21D, 22A, 22B, 22C, 22D, 22E, 23, 24, and 26A caribou management report. Pages 177-218 in C. Brown, editor. Caribou management report of survey and inventory activities 1 July-2002-30 June 2004. Alaska Department of Fish and Game. Juneau, Alaska.)

006-062

Recent population estimates for the TCH are needed. The TCH was estimated to be 45,000 in 2002. (Carroll, G. 2005. Unit 26A caribou management report. Pages 246-268 in C. Brown, editor. Caribou management report of survey and inventory activities 1 July-2002-30 June 2004. Alaska Department of Fish and Game. Juneau, Alaska.)

006-063

A more detailed description of the CAH seasonal range should be included. Additionally, the most recent population estimates must be included. The CAH was estimated at 31,857 in 2002. (Lenart, E.A. 2005. Units 26B&C caribou management report. Pages 269-292 in C. Brown, editor. Caribou management report of survey and inventory activities 1 July-2002-30 June 2004. Alaska Department of Fish and Game. Juneau, Alaska.)

006-064

Pg. III-83, III.B.7a(2) Migration: In the spring migration section delete the word “very leisurely pace” when referring to the fact that non-parturient cows and bulls rate of movement is less than that of parturient cows. Also, use the reference Carroll (2005).

006-065

A citation should be provided for the statement that non-parturient cows and bulls remain on the wintering grounds until June. If there is no reference, the statement should be removed.

006-066

The following citation should be used for the sentence that describes how snow can delay spring migration. (Carroll, G.M., L.S. Parrett, J.C. George, and D.A. Yokel. 2005. Calving distribution of the Teshekpuk caribou herd, 1994-2003. Rangifer 16:27-35)

006-067

The authors should review Griffith et al. (2002) in Arctic Refuge coastal plain terrestrial wildlife research summaries. (USGS Biological Resources Division, Biological Science Report USGS/BRD/BSR-2002-2001. ed. Douglas, Reynolds, Rhode.) The report contains information about vegetation green-up that is applicable to all caribou herds on the North Slope.

006-068

The authors should review Dau, 2005 (see above) for more recent WAH wintering information. They should also see: Prichard A.K. and S.M. Murphy (2004. Analyses and mapping of satellite telemetry data for the Teshekpuk caribou herd 1990-2002. Final report prepared for North Slope Borough Department of Wildlife Management, Alaska Department of Fish and Game, U.S. Bureau of Land Management. ABR, Inc. Box 80410 Fairbanks, Alaska.) This report will provide a better review of the TCH wintering areas.

006-069

Pg. III-85, III.B.7.b. Muskoxen: Recent population estimates and distribution should be included. This information can be found at:

[http://www.wildlife.alaska.gov/pubs/techpubs/mgt\\_rpts/mu05mt.pdf](http://www.wildlife.alaska.gov/pubs/techpubs/mgt_rpts/mu05mt.pdf)

See Lenart, E.A. 2005 Units 26B and 26C.

006-070

Pg. IV-2, last paragraph, 1<sup>st</sup> sentence: “Other possible, but unexpected, activities include: (1) oil spill accidents...” This sentence is not consistent with other sections of the DEIS. In the next paragraph, MMS shows the information about the probability of an oil spill. The probability of a large oil spill is 40% (Pg. IV-3 and IV-23) and “accidental oil spills are likely to occur” (Pg. IV-45). The section of “Basic Assumptions” must contain consistent information with the remainder of the DEIS. MMS needs to modify this section to state that oil spills are likely to occur as a result of leasing in the Chukchi Sea.

006-071

Pg. IV-3, 1<sup>st</sup> paragraph: It is not clear why MMS is trying to explain away the high probability of an oil spill. Instead of simply stating the results of the oil spill analysis, the text appears to trying to justify Sale 193 by suggesting that spill effects will be small, i.e., “the reader should remember that the estimate of one or more oil spills, greater than or equal to 1,000 barrels occurring from the proposed lease sale and contacting any environmental resources area ranges from less than 0.5 to 7% within 30 days over the life of the project.” There is no citation provided for these figures. Industry has not demonstrated the capability to clean up spilled oil in arctic marine waters that contain ice.

006-072

MMS asserts that industry could begin cleaning up oil “within hours or minutes of the detection of a spill”. This assertion is hard to accept given the remote location of the planning area and the difficulty that has been experienced cleaning up an oil spill at sea in areas without ice and close to infrastructure and personnel.

006-073

Pg. IV-5, Significance Thresholds, Biological Resources: MMS suggests an inappropriate significance threshold for biological resources. “An adverse impact is defined as a “decline in abundance and/or change in distribution requiring three or more generations for the indicated population to recover”. This impact could never be measured. There are no population surveys available for any biological resource (other than bowheads) in the Chukchi Sea that could detect a population decline unless the decline was catastrophic. There are few baseline data and no surveys with sufficient statistical power to detect any substantial change in any biological resource in the Chukchi Sea. It is not clear how MMS or any other federal agency could measure an adverse significant impact let alone determine when a resource had recovered. MMS must develop significance thresholds that are measurable.

006-074

Pg. IV-5, Significance Threshold, Threatened and Endangered Species: In this case, MMS defines an adverse impact as one that results in a population decline requiring one or more generations for recovery. If this criterion were applied to bowhead whales, the population could be affected by MMS actions for ~20 years (the ~generation time of bowheads) or more. Affecting an endangered whale population for 20 years or more is not acceptable.

006-075

Pg. IV-16, Estimates of Drilling Wastes and their Disposal, 2<sup>nd</sup> paragraph: This paragraph states that a typical exploration well will produce 600 tons of rock cuttings and 95 tons of “spent mud” for a total of 695 tons of discharge per exploratory well. This figure is not consistent with MMS’s 5-year DEIS, which estimated 610 tons of discharge per exploratory well. This difference totals to an additional 5100 tons of cuttings not accounted for in the 5-year DEIS. This is a substantial amount of additional discharge not factored into decisions that the agency will make about the 5-year DEIS.

006-076

Pg. IV-19, Oil and Gas Development and Production Activities: The first sentence states that, “there currently are a few oil production facilities on artificial islands in the Beaufort Sea”. There is currently only one (not a few) operating production facility in the Beaufort Sea on an artificial island, although several others are currently being planned or constructed. There are also two developments on causeways. Further, the discussion about sounds propagating from Northstar production island are misleading. MMS states that sound levels associated with Northstar attenuate to near background levels at various distances from the island, depending on the noise source. This statement insinuates that those sounds cannot be heard by marine mammals at greater distances. The studies at Northstar show that, indeed, bowheads are responding to very low industrial sound levels, even when those levels are near or below ambient (Richardson 2006—note the more recent reference than those contained in the DEIS).

006-077

Pg. IV-20, Discharges to the Marine Environment: “Existing pollution occurs at very low levels in arctic waters or sediments and does not pose an ecological risk to marine organisms in the OCS.” This sentence must have a reference. It seems likely that there are no current data on contaminant levels in water or sediments of the Chukchi Sea. Dr. Sathy Naidu presents very outdated information at MMS sponsored meetings, but there do not seem to be any current data. MMS must qualify any statements if they are not supported by data or by very old data.

006-078

Pg. IV-23, Large Oil Spills, 3<sup>rd</sup> paragraph: “We estimate that a large oil spill is unlikely to occur based on a mean spill number ranging from 0.33 to 0.51.” This conclusion is odd. In this section MMS is essentially saying that it is unlikely that an oil spill will occur because it is unlikely that a development will occur. Yet MMS is leasing in the Chukchi Sea with the expectation that development will occur. A more honest assessment is that it is likely that an oil spill will occur. MMS’s own analysis suggests there is a 40% chance of a large spill.

006-079

Pg. IV-25, paragraph 5: A proposed action with a 40% chance, as estimated by MMS, of a large oilspill is absolutely unacceptable to the Borough. Our residents depend for their physical and cultural well being on the resources that come from this planning area. The direct (i.e., health) and indirect (i.e., anxiety about contaminated environment and food sources) costs that would be felt in these communities would be immense in the event of an oilspill. If the spill estimate is accurate, MMS should not allow leasing, exploration or development in the Chukchi Sea.

006-080

Page IV-29, Paragraph 4: For our benefit, and that of the state and the public, MMS should indicate what long-term oversight would be in place of the spill prevention, spill detection, and cleanup capabilities of lessees. This paragraphs states that it is “up to the operator to mobilize sufficient equipment and personnel to control, contain, and clean up the spill to the greatest extent possible”. Judging from the recent pipeline spills and shutdowns at Prudhoe Bay, it seems that mechanisms must be in place to assure the long-term compliance with spill prevention, detection, and response regulations.

006-081

Page IV-38 last paragraph: There are no references listed that deal with the effects of discharged drilling muds on benthic communities. Since two of the major subsistence pinnipeds, walrus and bearded seals, are benthic feeders, and since the number of potential exploratory drill sites is unknown, references to impacts from drilling muds are needed. If there are no data, MMS must acknowledge the uncertainty about these impacts.

006-082

Pg. IV-39, 1<sup>st</sup> paragraph: The penultimate sentence says that impacts to water quality from dredged material will be short term. It is unclear what is meant by short-term. MMS must provide definitions for such terms and statements.

006-083

Pg. IV-45, Paragraph 3: The data listed, with respect to aromatic volatiles, do not state whether the situation is in solid/broken ice areas and appears to be a general statement regarding “cold water” studies. The discussion should be clarified.

006-084

Pg. IV-45 to 47: The discussion seems to pertain to open water spills. A comparable discussion should be presented concerning the fate of broken-ice and under-ice spills, including movement of oil that is frozen into ice. Since ice is present the majority of the time in the Chukchi, these specific scenarios must be represented.

006-085

Pg. IV-46, Paragraph 5: This paragraph states that 68% of spilled Prudhoe Bay crude could persist as individual tarballs floating on the water surface. MMS must discuss the effects of these persistent tarballs (and their associated toxicity) on bowhead whales (which often feed by skimming on the surface) and other species, as well as on vessels and other equipment used for subsistence.

006-086

Pg. IV-52, Paragraph 6: It should be explained what agency oversight will be associated with the discussed maintenance procedures.

006-087

Pg. IV-58, Effects of oil spills on air quality, 2<sup>nd</sup> paragraph: In the second sentence, MMS again states that a large spill is unlikely, yet provides an analysis that identifies a 40% chance of a large spill if production occurs. MMS must be honest with the public and decision makers that a large spill is likely. Use of the word “unlikely” or similar qualifiers must be avoided throughout the EIS when talking about the risk of an oil spill in the planning area. A 40% chance of an oil spill is a likely event.

006-088

MMS must provide a reference for the statement in the last paragraph on this page that “During broken-ice or melting ice conditions, because of limited dispersion of oil, the concentrations might reach slightly higher levels for several hours, possibly up to 1 day”. This seems like an underestimate, especially in heavy ice and freezing temperatures. Further justification for the statement and a reference are needed.

006-089

Pg. IV-60, Summary and Conclusion...: The first sentence must be changed. MMS states that the likelihood of an oil spill is low over the life of the exploration, development and production. Elsewhere in the DEIS, MMS identifies a 40% chance of an oil spill. A 40% chance of an oil spill is not low. Further, about halfway down the paragraph MMS states that the potential contamination of the shore would be limited because activities would occur offshore with the exception of pipelines. This statement is not true. Potential contamination could occur because water currents or wind could move the oil to shore. Additionally, there will likely be substantial industrial activity in the nearshore region adjacent to the planning area as industry conducts re-supply activities from shore-based stations. Thus, nearshore activities could result in nearshore contamination.

006-090

Pg. IV-63, Conclusion: MMS must provide better support for their conclusions. The 2<sup>nd</sup> sentence states that discharges in summer would lead to low effects offshore and slightly greater effects onshore. Given that ice can occur in the planning area any time of the year and that oil would likely accumulate next to floating ice, the potential for more than “low effects” offshore seems likely. The statement in the 3<sup>rd</sup> paragraph that water circulation under the winter ice cover is slow must have references. The water circulation under the Beaufort Sea ice is typically slow; however, the water circulation under the ice in the

006-091



Chukchi Sea can be quite high. If MMS has information about currents in the upper part of the water column in the Chukchi Sea, it should be provided with pertinent references.

006-091

The middle part of this paragraph discusses recolonization of benthic habitat after installation of a pipeline. MMS suggests the pipeline route will be recolonized within 10 years. If there are there data available on this recolonization rate, MMS should provide those data. If not, the statement should be qualified or removed. Furthermore, MMS states “disturbance effects would be assessed and possibly monitored by MMS and the Corps.” [emphasis added] It is not comforting that MMS might monitor effects. MMS needs to provide assurances that effects will be monitored either by the agency or by industry.

006-092

In the latter portion of this paragraph, MMS discusses the advantages of a rapid response capability for cleaning up an oil spill. While this statement is true, MMS must also provide information on the lack of ability to clean up oil in ice-covered waters, especially the Chukchi Sea. Industry might be able to clean up spilled oil under ice in parts of the Beaufort Sea where the movement of ice is minimal. In the Chukchi Sea, where ice is constantly in motion, it will likely often be impossible for industry to even attempt to clean up spilled oil because of human safety issues. This issue must be adequately discussed and evaluated in the Final EIS.

006-093

Pg. IV-64, 1<sup>st</sup> paragraph: “The assessments are consistent with absence of observations of invertebrate “die-offs” during the previous conduct of open water seismic exploration in the Beaufort and Chukchi seas.” More information and support is needed for this statement. If industry has conducted studies to look for die-offs of invertebrates after seismic exploration, those studies must be referenced. It is unclear whether it is possible to observe invertebrate die-offs associated with seismic exploration. Given that there are no vessels within the streamer pattern off the stern of the seismic vessels, it would be very difficult to observe invertebrate die-offs because of the small size of the invertebrates. Even if vessels were within the streamers, they would likely not be able to detect an invertebrate die-off.

006-094

The last two sentences in this paragraph need further explanation. If the effects of seismic exploration on invertebrates has been examined in the Beaufort and Chukchi Seas, those results must be presented in the EIS. If MMS plans on assessing those impacts, as suggested in the last sentence, more information should be provided about how that assessment will be conducted. There does not seem to be any information about how MMS plans to conduct invertebrate assessments or effects to those organisms. Given that this is a large data gap in the Chukchi Sea, MMS should provide more details about how the data gap will be filled.

006-095

Pg. IV-65, 1<sup>st</sup> paragraph, last sentence: MMS anticipates 14 exploratory wells in the Chukchi Sea as a result of Lease Sale 193. The 5-year DEIS suggested there would be 60 exploratory wells for the arctic region. If there are 5 lease sales, as anticipated in the 5-yr DEIS, and there are 14 anticipated wells per lease sale, the total number of wells would

006-096

be 70 and not 60 as suggested in the 5-year DEIS. Clarification of the model used to predict the likely number of wells resulting from a lease sale is needed.

Pg. IV-71, Effectiveness of Proposed Mitigation Measures: Stipulation #1 should be discussed here as well. Documenting populations and important and unique habitats in and adjacent to the planning area is essential to reduce impacts from industrial activities, including oil spills. Without this information the mitigation measures could be meaningless. MMS must strengthen Stipulation #1 so that foreseeable industrial impacts can be more effectively mitigated.

Pg. IV-72 to 113: As a general assessment, the fish section is excellent, and sets a high standard for EIS analysis. The literature review is current and appropriate. The DEIS authors correctly point to the general paucity of information on the biology of fish in the Chukchi Sea in the introduction of this section. The DEIS also points out that the old paradigm about oil toxicity to fish has changed markedly in recent years suggesting that the most significant and long-term chronic effects are to the early life stages and not acute effects to adults. The Borough is reconsidering its position on industrial effects to fish based on this new information:

Pg. IV-90 "Peterson et al. (2003) stated: The ecosystem response to the 1989 spill of oil from the Exxon Valdez into Prince William Sound, Alaska, shows that current practices for assessing ecological risks of oil in the oceans and, by extension, other toxic sources should be changed. Previously, it was assumed that impacts to populations derive almost exclusively from acute mortality. Unexpected persistence of toxic sub-surface oil and chronic exposures in the Alaskan coastal ecosystem, even at sublethal levels, has continued to affect wildlife. Delayed population reductions and cascades of indirect effects postponed recovery. Development of ecosystem-based toxicology is required to understand and ultimately predict chronic, delayed, and indirect long-term risks and impacts.

Such scientific honesty is appreciated. The conclusions of the fish section, which predicts significant effects from an oilspill are well supported by the analysis. The other effects sections of the EIS should be written to an equal standard.

Pg. IV-104, Standard Mitigation Measures Considered in this Analysis: The 1<sup>st</sup> paragraph suggests that Stipulation 1 will lower impacts to fish resources. As currently written, this is a dubious statement at best. The stipulation does not require industry to conduct pre-operation surveys, but only essentially says that important areas must be avoided if they are known. Given how little information is currently available about the distribution, abundance and habitat use of fish and other biological resources in the Chukchi Sea, this stipulation provides virtually no mitigation.

006-097

Pg. IV-104, 9. Ramp Up: If there is any evidence that ramp up provides mitigation for fish or other resources, MMS should provide the references here and other places in the EIS. If not, MMS must state that ramp up is assumed to provide mitigation but that its usefulness has not been documented.

006-098

Pg. IV-113, Conclusion: The conclusion that an oilspill in the inter-tidal area or into coastal spawning streams could have a significant effects seems well supported by the data and arguments presented. MMS should also note that storm surges can raise sea level as much as 3 m along the Chukchi Sea coast, further exacerbating oil effects to natal streams, estuaries, or other coastal environments by pushing oil considerable distances inland (since the stream gradients are so low on the coastal plain).

Pg. IV-116, Potential effects of “key habitat types...”: MMS must provide more information about how few data exist on “key habitat types” in the Chukchi Sea. Aside from the use of the spring lead system, there is very little information about the use of the planning area by bowhead whales, although we do know bowheads use the planning area. Uncertainty must be acknowledged here and a precautionary approach taken to avoid impacts to bowhead whales.

006-099

Pg. IV-117, 1<sup>st</sup> paragraph: In the penultimate sentence, MMS suggests that uncertainty about impacts on baleen whales can be reduced through required monitoring. While in theory this is true, industry showed in 2006 the difficulty that can be experienced in monitoring. Operators refused to fly manned planes in offshore areas, had difficulties in deploying acoustic monitoring devices, and were challenged when flying aerial surveys in nearshore areas. There are no suitable alternatives yet developed to replace monitoring with manned aircraft. If industry cannot or is not going to monitor impacts in offshore areas, which is essentially most of the planning area, then uncertainty will not be reduced “through requirements of monitoring”, as stated in this section of the DEIS. MMS must acknowledge the limitations of monitoring in offshore areas of the Chukchi Sea.

006-100

Pg. IV-118, Principle or Assumption at the top of the page: MMS must state that the bowhead hunt is protected under the MMPA, and appropriately revise the last sentence. Instead of saying that the response of bowhead to oil and gas activities will be heightened because of hunting, the sentence should say that oil and gas activities may affect the ability of subsistence whalers to hunt bowheads unless proper mitigation measures are applied.

006-101

Pg. IV-118, Principle or Assumption at the bottom of the page: Maintaining the monitoring and mitigation measures in Lease Sale 193 as developed for the recent PEA is a positive step. In addition to requiring the monitoring and mitigation measures, MMS should also describe in the Final EIS how it intends to ensure that industry is complying with the measures.

006-102

Pg. IV-123, Paragraph 4: In addition to the lack of data on total energy exposure, there is a large data gap with respect to mysticete auditory anatomy and hearing. It is suspected, from differences noted at the gross anatomical level, that mysticetes perceive sounds quite differently from odontocetes (H. Thewissen, personal communication).

Pg. IV-126, Paragraph 3: Long-lasting increases in hearing thresholds may also impair the ability of marine mammals to produce sounds properly.

Pg. IV-131, 1<sup>st</sup> paragraph: The sentence that begins “For the group of 20 whales at a distance of approximately...” needs a reference. Richardson et al. (1995a) is a book summarizing information about marine mammals and noise, not necessarily a specific study of marine mammals. Therefore, there must be a different reference. Without that reference it is difficult to put this sentence in context or to adequately evaluate it.

006-103

Pg. IV-133, last paragraph: The first part of this paragraph should also note that Inupiat hunters from Kaktovik were unable to harvest any bowhead whales during a year with seismic activity near the village. The hunters reasonably attribute the lack of successful harvest to the active seismic operations.

006-104

Pg. IV-135, 2<sup>nd</sup> paragraph, last sentence: References are needed for many statements in this section of the DEIS. The last sentence needs to be modified. It now states “results indicated that bowheads tended to avoid the area around the operating source, perhaps to a radius of about 20 to 30 km. In reality, whales did (not perhaps) avoid an area of a radius of 20 km around an active seismic vessel and may have started reacting at distances of up to 35 km.

006-105

Pg. IV-135, 3<sup>rd</sup> paragraph: Again, references are needed, but presumably the authors are referring to Richardson (1999 and chapters therein). This paragraph in the DEIS is not justified by the report. Richardson (1999 and chapters therein) states that their results are preliminary because there are few data. Additionally, the results could easily be evaluated completely differently. The last sentence of the paragraph states “within 12 to 24 hours after seismic operations ended, the sighting rate within 20 km was similar to the sighting rate beyond 20 km.” Unfortunately the DEIS does not also provide the information from that same report that the sighting rate within 20 km was statistically lower than beyond 20 km even 96 hours after seismic operation. It is just as valid to evaluate the results as suggesting that whales did not re-occupy seismic areas a full 96 hours after the cessation of seismic exploration. Given that the study did not collect data beyond 96 hours, whales may have avoided the area even longer. As suggested in pervious comments to MMS, this study should not be cited as evidence that whales re-occupy an active seismic area within 24 hours. The data do not support the conclusion.

006-106

Pg. IV-139: The Scientific Committee of the International Whaling Commission reviewed impacts from seismic operations on marine mammals at its 2006 meeting. The recommendations from that IWC review should be included in the Final EIS. There were several recommendations related to bowheads and the effects on bowheads. These recommendations included the need to better understand the high sensitivity of bowheads to low levels of industrial sounds, document areas important for bowheads in regions within which seismic operations are proposed, and develop a better understanding of the biological significance of impacts from seismic activities.

006-107

Pg. IV-143, 3<sup>rd</sup> complete paragraph: MMS correctly states that there are insufficient data to accurately predict the area impacted by seismic vessels and their supply vessels. Without these data, MMS should not be allowing seismic vessels to operate in the

Chukchi Sea. It is not possible to mitigate impacts if data on the zone of influence of seismic vessels are not known.

Pg. IV-150, 1<sup>st</sup> complete sentence: “Behavioral studies have suggested that bowheads habituate to noise ...”. MMS only provides one reference. If there have been additional and more recent studies that have suggested bowheads habituate to noise, references should be provided. If not, MMS must revise this paragraph. It should also be noted that Inuit hunters have been aware for millennia that bowheads are very sensitive to human produced sounds. These long-term observations provide evidence that bowheads do not habituate to noise.

006-108

Pg. IV-162, Noise generating activities: References are needed for the 3<sup>rd</sup> and 4<sup>th</sup> paragraphs. The last paragraph is not quite accurate. Inupiat hunters are concerned about any type of anthropogenic sound, not just noise from drilling ships. The concerns are not just about drillships and icebreakers, but also about any sound that is generated by industry. The paragraph should be expanded.

006-109

Pg. IV-163, 2<sup>nd</sup> complete paragraph: The reference given in this paragraph is outdated as are the results found in Richardson et al. (2004). The more recent reference is Richardson (2006), which incorporates recommendations from the North Slope Borough Science Advisory Committee. The revised results show that bowheads are deflected by industrial sounds associated with Northstar Island.

006-110

Pg. IV-163, Vessel and Aircraft Traffic, 1<sup>st</sup> paragraph, last sentence: MMS suggests that vessel and aircraft traffic for production activities will be similar to levels for exploration. This is not the case. Production activities occur in one area over many years compared to exploration that is mobile (seismic) or temporary (exploratory drilling). Thus, vessel and aircraft traffic for production will occur repeatedly in the same location. These two situations are fundamentally different and will impact cetaceans differently. MMS must address these differences in addition to discussing the similarities.

006-011

Pg. IV-163 to 164: The paragraph that overlaps these two pages addresses the potential for the development of facilities for liquefied natural gas. This is confusing. In both the 5-year DEIS and Lease Sale 193 DEIS, the scenarios put forth by MMS only include oil development and not natural gas. MMS must be consistent throughout the DEIS. If natural gas is a part of the development scenario, the discussion and analysis of that component of the scenario should be clear.

006-112

Pg. IV-164, Abandonment: The 1<sup>st</sup> paragraph in this section suggests that marine mammals could be killed or injured during decommission of development wells. Yet the next paragraph suggests that overall the impacts are expected to be low. One of these paragraphs requires clarification.

006-113

Pg. IV-165, Paragraph 2: This paragraph mentions that bowheads are unlikely to be affected by drilling muds and cuttings that may cover portions of the seafloor because the area affected would be inconsequential compared to the available habitat. Bowhead prey

is a patchy resource, and depending upon where any release occurs, there could be effects. MMS must ensure that these materials will not be dumped in important habitats for marine mammals.

Pg. IV-165, 4<sup>th</sup> paragraph: The statement that “most of the calving of bowhead whales” occurs between Bering Strait to Point Barrow is largely correct, however it should be noted that calves are seen by St. Lawrence Island hunters, females with term pregnancies are taken at Barrow in spring (and would likely calve further east in the Beaufort Sea), and that neonates have been seen in the Canadian Beaufort Sea (Koski, 1993). In the appropriate section, it should be noted that the character of the neonate skin is quite different than an adult, being thicker (~3.5 cm) and softer. Hence, it could be more susceptible to injury from oil contact.

006-115

Pg. IV-166. There is no reference to Albert (1981), NRC (2003) or Lambertson *et al.* (2005). These are major omissions since all these references suggest far more deleterious effects from oil exposure to bowhead whales than postulated by MMS in this DEIS.

006-116

Pg. IV-166, Paragraph 2: The embryotoxic and teratogenic effects of oil are mentioned, but needs to be discussed in greater detail. Depending upon species and season, a large segment of a given population could be exposed and reproductive effects could be felt *at the population level* in the event of an oil spill.

006-117

Page IV-166, Paragraph 3: The last sentence states that “Marine mammals also can be affected indirectly after a spill due to oil and cleanup disturbance and damage to prey resources. This issue deserves far more discussion.

006-118

Pg. IV-168, Paragraph 4/bullets: Bowheads could also be affected by oiling of eyes/conjunctival membranes (in addition to skin).

006-119

Pg. IV-173, Food Source: MMS contends that any amount of zooplankton killed in an oilspill would be small compared to the prey sources available in the eastern Beaufort Sea. Unfortunately the reference provided is relatively old. It was published before the more recent data highlighting the importance of zooplankton advected from the Chukchi Sea to the western Beaufort Sea. MMS funded this study (see Lowry et al. 2004) and should use the results in the analyses of impacts for Sale 193. If an oilspill occurred in the Chukchi Sea, a substantial portion of prey used by bowhead whales could be impacted. This impacted prey would likely not be compensated for by eastern Beaufort Sea zooplankton. Furthermore, the 4<sup>th</sup> paragraph in this section suggests that phototoxic effects of oil contamination and sunlight could cause ecosystem disruptions. This statement is contradictory to the 1<sup>st</sup> paragraph in the section. Clarification is needed.

006-120

Pg. IV-174, 3<sup>rd</sup> paragraph: It is purported by marine mammal scientists that killer whales were impacted by the Exxon Valdez oil spill. MMS chooses only the literature about humpbacks that suggests there were few impacts from the oilspill to whales but does not include killer whales in the analysis. A discussion of impacts to killer whales from the Exxon Valdez oil spill is needed.

006-121

Pg. IV-174, 4<sup>th</sup> paragraph: Analyses from Northstar show that bowheads are responsive to low levels of noise, mostly vessel traffic noise (Richardson 2006). MMS must include those results in any discussions about impacts to bowheads from vessel traffic instead of just the old studies that were not designed to quantify impacts, and therefore show fewer impacts.

006-122

Pg. IV-174, last paragraph: This last paragraph on the page is not realistic. When an oilspill occurs there will be many overflights. The analyses provided by MMS in this section primarily examined the effects of a single overflight. A more realistic assessment is needed.

006-123

Pg. IV-175, Extraordinary Circumstances: From all information included in the previous section, it can be inferred that an oilspill could potentially be catastrophic to bowhead whales, especially if it occurred in the spring lead system. To prevent this potential catastrophe, MMS should develop and analyze potential stipulations designed to avoid such spills during spring migration. One approach would be to shut down pipelines during the spring.

006-124

Page IV-175, Paragraph 3: MMS first acknowledges with respect to the spring lead system that the agency “is uncertain of the potential severity of impact should a large oil spill occur within such a system, especially if spring migration were underway and hundreds of females were calving in or near those leads”. MMS then describes situations in which bowheads would be at particular risk in the event of a large spill. No mitigation measures are described, however, to address those situations and severe risks. This is a significant shortcoming of the document and of the proposed action. MMS seems perfectly willing to proceed with leasing despite identified significant risks and significant unknown risks.

006-125

Pg. IV-175, last paragraph: MMS references observations of bowhead aggregations by Tracey (1998). This study occurred in Beaufort Sea. It is unclear what the relevance of the frequency of such aggregations in the Beaufort Sea is to the likelihood of such aggregations occurring in the Chukchi Sea. This section should be reconsidered by MMS.

006-126

Pg. IV-176, Paragraph 2: MMS notes that spill response is effective for solid ice situations. Unfortunately, the Chukchi Sea planning area does not have a “solid ice season”. The ice in the Chukchi Sea is constantly moving, especially in the planning area. Thus research in other places with solid ice is not terribly relevant to the Chukchi Sea. Further, MMS states that research on spill cleanup in broken ice is “ongoing”. Broken ice occurs in the Chukchi Sea during the majority of the year. Plans for oil and gas development should not progress until the technology to clean up oil spilled in the Chukchi Sea is developed. This is essential given MMS’s estimate that there is a 40% chance of a large oil spill.

Pg. IV-176, Probabilities of contacting an oil spill: MMS does not provide an estimate of the probability of bowheads coming into contact with spilled oil. MMS has calculated an

006-127

estimated chance of a large oilspill. The number of bowheads that migrate through the Chukchi Sea twice a year is known. Therefore, MMS should be able to estimate the chance of oiling bowheads.

Pg. IV-178, Summary and Conclusions: MMS states “Our primary concern related to these activities [which include production] is that they could potentially produce sufficient noise and disturbance that bowhead whales will avoid an area of high value...” It is unclear why oilspill effects are not also included.

006-128

Pg. IV-183, Vessel Presence and Noise: MMS does not discuss the Spectacled Eider critical habitat in Ledyard Bay. Even though this section is not about threatened species, the Ledyard Bay area is important to many non-endangered and non-threatened species of birds, especially King and Common eiders. A thesis that MMS recently funded shows that King Eiders use this area considerably (Phillips 2005). Additional studies are also available. MMS must include the most current information in the analyses of impacts.

006-129

Pg. IV-185, IV.C.1.g(2)(b) Collisions with Vessels and Aircraft. Last paragraph. MMS should also address the issue that aircraft could cause displacement of birds (i.e. potentially displacing birds from feeding areas, nesting areas or breeding areas, which could mean failed nests or could cause separation of adults and young.)

006-130

Pg. IV-187, IV.C.1.g(3)(a)3) Spatial Extent. MMS must provide more specific information about the spatial extent of impacts, instead of simply referring to spatial extent in relative terms, such as “relatively large”.

006-131

Pg. IV-188, IV.C.1.g(3)(a)4) Environmental Factors. MMS must be more specific about the extent of impacted areas. MMS must also take into account other factors such as the size of oil spills or the season. It is inappropriate for MMS to say that oil spills could result in a relatively small impacted area, when not all the factors are evaluated. Further, if there is a spill, the area impacted will be greater, not “could” be, with conditions of strong currents or high winds.

006-132

Pg. IV-191, Increased Subsistence Activity: The assumption that subsistence activity will increase if a permanent road is constructed is not valid, unless MMS has data to show otherwise. In Nuiqsut, hunters have abandoned areas previously used for hunting because of oil and gas infrastructure. Hunting near infrastructure is not viewed as safe or appropriate for subsistence activities.

006-133

Pg. IV-191, Increased predator populations: The National Research Council (NRC) (2003: reference in DEIS) report discussed at length the increase in predator numbers related to oil and gas infrastructure and the impacts to tundra nesting birds. MMS should include a discussion about the NRC results and recommendations in this EIS.

006-134

Pg. IV-192, Paragraph 3: Should add “exposure to harmful vapors” to the reasons for deaths in seabirds.

006-135



Pg. IV-194, Paragraph 3: Insert a paragraph about what oil does to incubating eggs. In a study by Couillar and Leighton (1989), pathological changes and decreased body weights were found in chicken embryos exposed to Prudhoe Bay Crude Oil (PBCO). Embryos exposed to 10 or 20 µl PBCO developed marked ascites or subcutaneous edema, extensive liver necrosis, dilation of the heart, and cellular casts and mineralization in renal tubules.

006-136

Pg. IV-194, Paragraph 4: A source should be provided for the statement: "Benthic habitats that support marine invertebrates...would not be expected to experience substantial adverse effects following an oil spill". It is unclear where these data come from and what were the water temps/ice conditions. Caution must be used when extrapolating from oil data from temperate areas.

006-137

Pg. IV-197, Paragraph 3: MMS must add some language that indicates it has factored in the fact that oiled birds (contacted by oil) late in the summer are unlikely to be able to migrate due to 1) the physical presence of oil on feathers and/or 2) toxicity from oil ingestion/exposure. These birds may not die directly from the oil, but they will certainly die as a result of not being able to migrate prior to fall/winter weather.

006-138

Pg. IV-197, Chronic low-volume spills, 2<sup>nd</sup> paragraph: This paragraph states there will be 178 small crude oil spills during the life of this project. MMS's recent 5-year DEIS estimated there would be ~160 small spills as a result of actions associated with all lease sales held in the next 5 years. If this is a discrepancy, it must be explained.

006-139

Pg. IV-201, Anticipated impacts of the proposed action to marine and coastal birds: MMS does not provide any estimates of how many birds might be impacted by actions associated with lease Sale 193. Such estimates are needed so that decision makers can weigh the full range of potential impacts and the public can make appropriate comments to aid decision makers.

006-140

Pg. IV-204, Loons, 1<sup>st</sup> sentence: There are few to no data on loon use of the Chukchi Sea. MMS should provide references, if available, when making statements about the paths used by loons for migration.

006-141

Pg. IV-205, 1<sup>st</sup> paragraph: MMS must provide references throughout this section. Statements and conclusion are made but there are few citations to the source of the information. As an example, it is stated that: "Long-tailed ducks are uncommon farther offshore." The source and age of this information must be made clear.

006-142

Pg. IV-206, 1<sup>st</sup> complete paragraph: It is suggested that the "worst-case scenario" would involve a spill that reached Kasegaluk Lagoon. While this would be devastating, it is likely that a greater number of birds, including both species of eiders that are threatened, would be impacted if a spill occurred in the spring lead system. Hundreds of thousands of birds could be oiled during spring migration.

006-143

Pg. IV-206, King Eiders: As with other portions of this section, few references are provided. This is troubling in part because MMS seems to ignore studies that it has funded. Phillips (2005), with support from MMS, tracked King Eiders with satellite transmitters. These birds used the Chukchi Sea, that information is not described here.

006-144

Pg. IV-207, Pacific Brant: The Pacific Brant population is relatively low and may be decreasing. There is enough concern that agencies have restricted sport hunting and are considering a restriction of subsistence hunting. MMS must provide that type of information here. Additional impacts from oil and gas activities could lead to further declines of Pacific Brant, further restrict hunting opportunities, and potentially lead to a consideration of listing under the ESA.

006-145

Pg. IV-208, Lesser Snow Geese: While no references are provided, it does not appear that MMS has used the most current data. See Ritchie et al. (2006).

006-146

Pg. IV-210, Conclusion. The conclusion here is flawed. While impacts to nearshore habitats would be devastating to birds, impacts to offshore habitats, including the spring lead system, could be equally or more devastating. The entire Beaufort Sea populations of King, Common, Spectacled and Steller's eiders, as well as numerous other species, could be impacted by an oil spill in the spring lead system. In the penultimate paragraph, MMS states that the "most recent data are between 15 to 30 years old, making accurate analysis difficult." While this is true for some species, MMS seems to have avoided using the most recent data that are available and has not assessed impacts for species with good estimates of numbers and distribution. The final EIS should include the most recent data and quantitative assessments of impacts to species for which current data exist.

006-147

Pg. IV-226, 2<sup>nd</sup> paragraph: We understand that Geraci is the "recognized expert" on the subject of direct effects of oil contact to cetaceans. The statement "*He (Geraci, 1990) concluded that although there have been numerous observations of cetaceans in oil after oil spills, there were no certain deleterious impacts*" may be true; however, the Borough still maintains that direct contact of bowhead whales with oil could cause serious health effects such as those hypothesize by Albert (1981). For unknown reasons, some bowhead whales have much longer "fringe hairs" on their baleen plates than others (Figure 1). Some exceed 30 cm in length. In such cases, it does not seem physically possible that baleen could function properly if fouled by a heavy crude oil.

006-148



Figure 1. Photograph of the “inside” of the mouth of a bowhead whale showing the entire baleen rack in situ (looking posteriorly from lingual aspect). Note the length of the baleen fringe hairs that in this case are only of moderate length.

Neither mysticete nor odontocete whales seem to consistently avoid oil, although they can detect it (Geraci, 1990). However, in captivity, bottlenose dolphins avoided an oiled area (Geraci, St. Aubin, and Reisman, 1983). Geraci (1990) reported that fin whales, humpbacks, dolphins and other cetaceans have been observed entering oiled areas and behaving normally. After the Exxon Valdez Oil Spill (EVOS), Dall’s porpoises were observed 21 times in light sheen, and 7 times in areas with moderate to heavy surface oil (Harvey and Dahlheim, 1994). Geraci (1990) summarized available information about the physiological and toxic impacts of oil on cetaceans (Geraci, 1990:Table 6-1). He concluded that although there have been numerous observations of cetaceans in oil after oil spills, there were no certain deleterious impacts.

006-149

Matkin et al. (1994) reported that killer whales had the potential to contact or consume oil, because they did not avoid oil or avoid surfacing in slicks. In the 2 years following the EVOS, significant numbers (13) of individual whales, primarily reproductive females and juveniles, disappeared from the AB pod. This mortality was significantly higher than in any other period except when killer whales were being shot by fishers during sablefish fishery interactions (Matkin et al., 1994). Harvey and Dahlheim (1994) observed 18 killer whales, including 3 calves, and saw the pod surface in a patch of oil. Dahlheim and Matkin (1994) also reported seeing AB pod members swim through heavy slicks of oil. Dahlheim and Matkin (1994:170) concluded that there is a spatial and temporal correlation between the loss of the whales and the EVOS, but there is no clear cause-and-effect relationship.

006-150

Migrating gray whales show only partial avoidance to natural oil seeps off the California coast. After the EVOS, gray whales were seen swimming through surface oil along the

006-151

Alaskan coast. Laboratory tests suggest that gray whale baleen, and possibly skin, may be resistant to damage by oil. However, spilled oil, and the chemical dispersants used to break up surface oil and cause it to sink, could negatively affect gray whales by contaminating benthic prey, particularly in a primary feeding areas (Wursig, 1990; Moore and Clarke, 2002). Any perturbation, such as an oil spill, which caused extensive mortality within a high-latitude amphipod population with low fecundity and long generation times would result in a marked decrease in secondary production (Highsmith and Coyle, 1992). For example, populations of amphipods off the coast of France were OCS EIS/EA MMS 2006-060 October 2006 (IV-227) reduced by 99.3% following the *Amoco Cadiz* oil spill in 1978 (~70 million gallons). Ten years after the spill, amphipod populations had recovered to only 39% of their original maximum densities (Dauvin, 1989, as cited in Highsmith and Coyle, 1992). Bering/Chukchi Sea amphipod populations, with their longer generation times and lower growth rates, probably would take considerably longer to recover from any major population disruption (Highsmith and Coyle, 1992).

006-151

Pg. IV-227, Last paragraph: The number of whales affected would also depend on the age of whales present, as calves are likely to be more significantly impacted than adults.

006-152

Pg. IV-230, 3<sup>rd</sup> paragraph: Belugas are vulnerable to oil spilled throughout the spring lead in the Chukchi Sea, not just near Barrow. These animals migrate from the Bering Sea to the Beaufort Sea during the spring.

006-153

Page IV-233, Paragraph 5: The fact that there are so many unknowns related to where and how beluga whales migrate and spend their time emphasizes, again, that additional baseline data critical to any responsible leasing program are needed before embarking upon this lease sale.

006-154

Pg. IV-246, IV.C.1.i.(1) Conclusion: MMS is correct in pointing out that disturbance to terrestrial animals will occur from aircraft and road traffic but this EIS essentially ignores the impact of terrestrial oil spills to animals. Further, it is possible for a large proportion of any one of the 3 caribou herds on the western North Slope to be influenced by any offshore or onshore spills that could occur during the insect relief season. Large aggregations of caribou are known to wade into coastal waters during mid July to early August.

006-155

MMS must define 'effects' relative to 'significant impacts' (e.g. paragraph 2 and 3) and provide a reference or describe how a '4km displacement' of caribou, bear, and muskoxen was derived.

006-156

Pg. IV-246, IV.C.1.i(3)(a): The literature cited in this section is not current. There should be some discussion concerning how the TCH will respond to overflights given that it is a 'naïve' herd, i.e., one that has been exposed to little aircraft traffic. MMS must describe how the conclusion was reached that caribou reactions to disturbance will be brief. The statement that reaction times of 'a few minutes to no more than 1 hour' will not have effects on caribou herd distribution must be supported. The reference to "...hoofed-

006-157

mammal populations in North America..." begs clarification. Does this mean that dairy cattle are 'tolerant' to aircraft? Haskell et al 2006 is cited throughout, yet the citation is not in the bibliography.

006-157

Pg. IV-250, IV.C.1.(4)(b): The BLM has required that pipelines be elevated a minimum of 7 feet (BLM 2005) in the NPR-A, rather than 5 feet. See Joly et. al. (2006) and Noel et. al. (2004) for recent reviews of road disturbance to caribou. (*in Wildlife Society Bulletin*).

006-158

Pg. IV-251, IV.C.1.i(4)(c): There should be some discussion and associated references regarding changes in snowmelt patterns due to the dust shadows that roads create. It is unclear how this could impact distribution of arctic fox and water birds. Potential problems associated with invasive plant species along linear corridors should also be discussed.

006-159

Pg. IV-252, IV.C.1.i(4)(d)2.: This section completely ignores the problems associated with a spill in the summer when caribou, musk oxen, and bears are growing their winter coat. A spill (from a barge, pipeline, or well blowout etc.) could impact a large percentage of the caribou population because the animals are gregarious and often wade out into coastal waters during the insect season.

006-160

Pg. IV-310, Paragraph 4: MMS should consider that a spill that contacts bowhead habitat does contact the whales.

006-161

Pg. V-5, V.B.: MMS has only included a limited number of human activities in their cumulative effects analysis. Not included are the Red Dog Mine and the associated Port Site, located along the Chukchi Sea coast; potential development of significant coal mining operations south of Point Lay; scientific studies, especially as there will be an increase in research in the future because of International Polar Year activities and on global climate change; international shipping; and expanded commercial fishing activities; among other human activities.

006-162

Pg. V-16, Water Quality: MMS must consider other cumulative effects, including climate change. Many climate change scientists predict large-scale changes in Arctic seas, which may affect water quality. International shipping through the Arctic also must be considered as increased shipping could lead to all manner of hazardous material spills, large and small.

006-163

MMS concludes that Sale 193 will produce little cumulative effects even though there is a 40% chance of a large oil spill. This analysis is flawed. If there is a development (as MMS assumes in the cumulative case), a 40% chance (as MMS analysis points out) of an oil spill will lead to substantial and widespread effects due to both the spilled oil and clean-up operations.

006-164

Pg. V-20 to 21, Lower trophic-level Organisms: It is unclear how MMS can arrive at a conclusion that Sale 193 will contribute little to the cumulative effects on lower trophic-

006-165

level organisms. There has been no drilling in the Chukchi Sea since 1991. Effects from new exploration and development will be substantial.

Pg. V-24, 4<sup>th</sup> paragraph: The 1<sup>st</sup> sentence of this paragraph is misleading. MMS states that available information does not indicate that past and present activities have resulted in long-term cumulative effects on bowhead whales. Aside from the NRC (2003) review, there have been no studies to assess cumulative effects on bowhead whales. Further, there have been no studies to assess the longevity of the effects that have occurred. MMS must be more prudent and careful to assure that their summaries and conclusions reflect the existing data and limitations of the studies that have occurred.

006-166

Pg. V-24, Introductory information...: Previously in the cumulative effects section, MMS has assumed that there will be a development. The 1<sup>st</sup> sentence in this section suggests that “specific perturbations (large oil spills, ...) are uncertain,...” yet MMS’s own analysis estimates a 40% chance of a large oil spill. A 40% chance of an oil spill from lease Sale 193 is a substantial likelihood.

006-167

Pg. V-25 and 26: Bowhead whales have occasionally become entangled in crab gear and have been hit by ships. Some of these instances have led directly to the deaths of animals. MMS must acknowledge and include these sources of mortality in the cumulative case.

006-168

Pg. V-25 to 27, Subsistence Hunting: MMS must mention in this section that the Marine Mammal Protection Act protects the subsistence hunt for marine mammals, including the hunt for bowheads.

006-169

Pg. V-28 to 29: The paragraph that spans these two pages must be revised. There is ample evidence that the arctic climate is changing, as opposed to MMS’s qualified statement that “if climate changes occur...”. Further, MMS can quantify predictions about climate change, international shipping, and commercial fishing contrary to the assertion that prediction of effects is not possible. There exist data that can be used to predict impacts to bowheads through (1) changes in climate and the resulting impacts to ice cover and zooplankton, (2) the potential of commercial shipping, including the possible number of ships transiting the Arctic, and (3) expanding fishing. MMS should use those data.

006-170

Pg. V-29, Commercial fishing, marine vessel traffic and research activities: MMS states that “based on available data, previous incidental take of bowheads apparently has occurred only rarely...”. This statement is simply not true. NMFS has issued IHAs for vessel traffic and research activities because takes were expected and did to occur. MMS should use data and results from those IHA reports. Additionally, MMS can use data and results from impacts from vessel traffic associated with BP’s Northstar production island to assess cumulative impacts from general vessel traffic and research activities.

006-171

Pg. V-30, 1<sup>st</sup> paragraph: MMS must use the most recent data and analyses in the assessment of cumulative impacts, instead of using outdated information (e.g. Clapham and Brownell 1999). The 1<sup>st</sup> sentence in this paragraph does not acknowledge the results

006-172

from Richardson (2006) on impacts to bowheads from vessel traffic associated with Northstar. Bowheads respond to very low levels of sounds from support vessels. It is unlikely that bowheads respond differently to oil and gas vessels compared to research or general marine traffic.

006-172

Pg. V-29 to 31: The international polar year (IPY) and research on climate change will lead to an increase in the number of research vessels conducting icebreaker trips to the Chukchi and Beaufort Seas. There are already plans for US, Canadian, Chinese, and Japanese icebreaker cruises into the Chukchi Sea in 2007 and 2008. MMS must include these activities in their cumulative effects section.

006-173

Pg. V-31 and 32, Pollution and Contaminants: Toxicologists have documented that organic contaminants have moved toward the poles because the contaminants become volatile in warmer climates and are transported to colder areas. With increased global warming, this effect would be exacerbated. MMS should address this contribution to cumulative effects.

006-174

Pg. V-32 Offshore oil and gas . . . : Oil and gas exploration (and possibly development) are occurring in the Canadian Beaufort Sea and potentially in the Russian Chukchi Sea. MMS must address these types of activities in the cumulative assessment.

006-175

Pg. V-33, Potential impacts of noise from production facilities: MMS has not used the most recent and complete data and analyses. Northstar impacts have most recently been addressed in Richardson (2006). These results show that bowheads are very sensitive to very low levels of industrial sounds. The most recent results from Northstar need to be included in this section. Additionally, MMS has conducted surveys for bowheads for many years. The Bowhead Whale Aerial Survey Program (BWASP) data have not been included here, and must be. Recent results from BWASP show that bowheads are seen less often in an area north of Prudhoe Bay, the area of the greatest and longest amount of industrial activity on the North Slope. MMS has not yet provided an explanation of those results and needs to. The BWASP results and a likely explanation for the lower sighting rate near Prudhoe Bay must be included in this section of the EIS.

006-176

Pg. V-35, 4<sup>th</sup> paragraph: "There is no indication that human activities have caused long-term displacement in bowheads." This assertion by MMS is not true. The above-mentioned BWASP results indicate that bowheads have been displaced over the long-term from north of Prudhoe Bay. MMS must address these data in the EIS. They are directly relevant to potential impacts from development in the Chukchi Sea.

006-177

The 5<sup>th</sup> paragraph on this page states "Native hunters believe that there is potential for increased noise to drive whales farther from shore...". Not only do Native hunters believe this, but they have experienced it firsthand, and the scientific literature also shows these results. Richardson (2006) shows that bowheads are driven farther from shore due to industrial activities associated with Northstar. MMS must include this information in their cumulative assessment.

006-178

The 6<sup>th</sup> paragraph on this page must be revised. Recent investigation (funded by MMS) about bowhead feeding in the Beaufort Sea shows that bowheads depend on zooplankton advected into the northern Chukchi and western Beaufort seas in addition to resources obtained in the eastern Beaufort Sea. MMS must include this recent analysis in the cumulative effects section of the EIS. A large oil spill in the Chukchi Sea has a large potential to impact an incredibly important food resource for bowheads. Given the uncertainty in bowhead use of the Chukchi Sea planning area for foraging, MMS should use extreme precaution if they allow oil and gas activities in the Chukchi Sea.

006-179

Pg. V-36, 2<sup>nd</sup> paragraph: Oil and gas activity in Canada and perhaps Russia occurs in the range of bowheads. MMS must acknowledge and include these activities in the assessment of cumulative impacts.

006-180

Pg. V-36, final paragraph: This paragraph is misleading. There are no data to describe the impacts from oil and gas activities from the mid-1970s through the mid-1990s on the bowhead whale population. True, the population has increased, but impacts from oil and gas are unknown, thus, it is not appropriate to conclude there were no impacts. It is plausible that impacts may have reduced the increase in the bowhead population. Further, because bowheads are so long-lived, impacts to their physical or reproductive health from the 1970s and 1980s might not yet be realized.

006-181

Pg. V-37, 1<sup>st</sup> paragraph: MMS concludes that impacts from industrial activity would result in “no more than temporary adverse effects and less than stock-level effects.” Unfortunately there are no data to support this statement. Little is known about how bowheads use the Chukchi Sea, therefore there is no possible way to conclude effects will be temporary or less than stock level.

006-182

Pg. V-40, Endangered and Threatened Birds: MMS should provide a summary here of the cumulative impacts to endangered and threatened birds.

006-183

Pg. V-40, Marine and Coastal Birds: It is not appropriate for MMS to avoid discussing cumulative effects as they do in the 1<sup>st</sup> sentence of this section. MMS must discuss cumulative effects from seismic activities and other anthropogenic activities in this section. This discussion is especially important because seismic vessels in 2006 intruded into the critical habitat that is designated for Spectacled Eiders but used by many other birds as well. It is reasonable to expect that seismic and support vessels will intrude into this area in the future.

006-184

Pg. V-41, Seismic Surveying: “No significant effects to . . . marine mammal populations are expected from planned seismic activities.” This conclusion is not warranted. Little is known about distribution, population size or habitat use of the Chukchi Sea by marine mammals. If very little is known, then concluding there will be no significant impacts is not reasonable.

006-185

Pg. V-41, Other Marine Mammals: In this section MMS discusses cumulative effects from seismic surveys and climate change. Beluga, walrus and seal populations that occur

006-186



in the Chukchi Sea all migrate to the Bering Sea where there is a large amount of human activity. Further, they also migrate past the Red Dog Mine port site. That site may also become the port facility for a very large proposed coal mining operation adjacent to the Chukchi Sea. MMS must also assess these cumulative effects in addition to the others we have identified above.

006-186

Pg. V-42, Conclusion: MMS suggests that, “close attention and effective mitigation practices . . . are warranted” for non-endangered marine mammals. This is a true statement, but no mitigation measures for any marine mammals other than bowhead or gray whales have been proposed to protect other marine mammals from physical harm or seismic noise. MMS should develop mitigation measures to reduce impacts to other marine mammals.

006-187

Pg. V-54, Vegetation and Wetlands: A more detailed description of the impacts to invasive plants is required. As written, the section downplays the potential effects of invasive species by assuming that many plants are not capable of withstanding the environmental conditions along the North Slope. This assumption is tenuous at best, especially given accelerating arctic warming. It is quite possible that the potential changes to plant community structure from invasive species could be permanent. At a minimum, MMS must suggest possible monitoring efforts and mitigation scenarios to address these problems.

006-188

Pg. V-65, Beluga whales, seals and other marine mammals: This assessment is not sufficient. MMS states, “cumulative impacts [to other marine mammals] will focus primarily on effects of climate change.” For their cumulative impact assessment, MMS must also focus on other anthropogenic effects for these important subsistence species.

006-189

Pg. V-73, Conclusion: MMS’s conclusion is not warranted nor supported by data or analysis. It is acknowledged that an “unlikely” large oil spill would disrupt subsistence harvest patterns, but that sounds from a drilling rig in the migratory path of bowheads would be “a far more significant effect”. It is not clear how MMS could come to this conclusion. Given that spilled oil could not be cleaned up in the Chukchi Sea for about 8 months of the year, the estimate of a large oil spill is 40%, and lessons of ongoing effects from the Exxon Valdez oil spill, MMS’s conclusion is unwarranted and inappropriate. Sound from industrial activities is indeed a grave threat, but a large oil spill in the Chukchi Sea would have much broader and lingering effects.

006-190

Pg. V-73, last paragraph: Conclusions in this paragraph are unfounded. Because bowheads, belugas and other marine mammals migrate through the planning area, these animals would be tainted regardless of where they were hunted. A large oil spill in the planning area would impact all communities that harvest the marine mammals that migrate through the planning area. Thus, the communities outside the planning area would not be able to provide bowhead, beluga or other marine mammals to communities closet to an oil spill. This section needs to be revised.

006-191

### Appendix A.1 Oil Spill Analysis

In general, there appears to be substantive new analysis and research on the subject of oil spill probabilities, statistics (e.g., confidence intervals), and trajectory models. We are pleased to see that these and other recommendations from the Borough's Science Advisory Committee (SAC) (SAC-OR-130) report on oil spill estimates were used in this section.

Pg. A.1-1 We concur with the SAC finding that use of the more robust database of onshore Alaska North Slope historic spills is most appropriate for arctic OCS spill analysis in most cases. We also concur that one of the most likely sources of a spill will be pipelines – either onshore or offshore – as recent spill events on the North Slope suggest.

Pg. A.1-2. 5<sup>th</sup> paragraph. MMS' estimate that the probability of an oil spill from exploratory activities is "very low" is based on 35 wells, which compared with the thousands drilled elsewhere seems very low and could cause statistical bias.

006-192

Pg. A.1.5, 1<sup>st</sup> paragraph. The statement that the spread of oil in the landfast ice would "not be anticipated until breakup" overlooks "break out" events. These events have been documented in the local Traditional Ecological Knowledge (TEK) as well as in the scientific literature. With arctic warming, it becomes even more unlikely that landfast sea ice in the Chukchi or mid-Beaufort seas will remain stable in the future (George et al., 2004).

006-193

Pete Sovalik recounts an incident on the ice near Cross Island in November (year not given) where large waves shattered the landfast ice on a calm day. Hunters were cut off and set adrift for five days on the ice before the ice congealed sufficiently to allow them access to shore.

*" It was good weather. Fine, calm and sunshine.....The last part of November, I go out.....The ice on the other side of the lead looks funny. Moving up and down. What happen? I start wondering what happen that things look like that. Finally, in the middle of the lead big waves show up. Big waves. It was fast. Waves coming toward me like that. I'm too late....I don't know what [caused it], maybe an earthquake? I couldn't travel anymore. Can't travel. The ice all broken. Smash up like paper.. The ice was about two feet thick between the old ice like we have here.....About four or five hours steady pretty well up and down like that. Getting smaller, smaller, smaller. Finally it stop. The water calm down." (Pete Sovalik UAF Oral history Tape H88-26-03).*

Pg. A.1-12. Section C.3. Many of the references for oil trajectory simulations appear to be quite dated (e.g., 1980s) regarding ice movement vectors, etc. We assume there are more recent references, models and data available, which would be more appropriate here. We understand that ice physics has not changed but certainly the persistence and

006-194

amount of ice cover has. Are the most current data on sea ice distribution used in the models? What will be the effects if summer sea ice vanishes entirely as some researchers predict may occur within two decades? W. Maslowsky, pers. comm.

Pg. A.1-13 to14. In general, the models indicate that the probability that a large spill will contact land in the NE Chukchi is quite low; however, this seems counter-intuitive given the amount of driftwood and beach litter along these shores. Further explanation and justification for MMS's conclusions are needed.

006-195

A particularly sensitive area with respect to oil contact is the spring lead system along the Chukchi Sea. A large body of evidence suggests that nearly the entire BCB bowhead whale population migrates through these regions ID-20-23. Table A.2.-54 suggest that oil contact is as high as 34% (ID-22, P9). In our opinion, oil contact with the spring lead system where a large portion of the BCB population is vulnerable to oil exposure, is a "worst case" scenario. Based on the analysis in Haldiman and Tarpley (1993) and NRC (2003), direct effects of oil contact to bowhead whales could be quite detrimental. That is, contact with the eye, skin, oil ingestion and particularly the baleen could be extremely harmful to an animal like the bowhead that has the most highly developed baleen apparatus of any cetacean. Similarly, more recent analysis by Lambertson et al., (2005) of the functional morphology of the bowhead whale mouth (feeding apparatus), suggests that the animal would be seriously challenged by oil and marine debris ingestion. They provide strong evidence through direct observation that the bowhead mouth is far more complex than a simple filtering mechanism, and has mechanical and hydrostatic properties that would be affected by oil and debris ingestion, leading to an energetic drain to the animal. We strongly suggest that findings from this publication be referenced here and in other sections of the EIS such as Sections III and IV.

006-196

### Conclusion

The North Slope Borough's preferred alternative is that no offshore drilling or development be permitted in arctic waters. We are opposed to the placement of industrial facilities in the marine environment. We are willing to work with MMS, however, to allow development of OCS resources in areas where all drilling and infrastructure development could be accomplished from shore. Given what we know about the far offshore location of oil resources in the Chukchi Sea, however, development exclusively from shore locations there does not now seem feasible. We believe, therefore, that the Final MMS 2007-2012 OCS Leasing Program should not include any lease sales in the Chukchi Sea planning area, and that the No Action Alternative should be adopted for Sale 193 if this sale-specific review process will be concluded independent of the 5-Year Program planning process.

In the absence of a halt to leasing in the Chukchi Sea or a restriction to development of OCS reserves only from onshore locations, we support the exclusion from leasing of all areas critical to subsistence. It is not entirely clear how the proposed exclusion of "nearshore tracts, the Chukchi Polynya, and tracts near Barrow" under the Sale 193 Proposed Action and the current MMS 5-year OCS leasing program compares with the

Corridor I and II deferrals, and the 25-mile Chukchi coastal buffer proposed under the 2007-2012 OCS Leasing Program. We support adoption of whichever area is larger, or the greatest area realized by overlaying them all, since it appears that some extend farther offshore than others in different areas.

The Final EIS must cite current research, offer adequate support for all conclusions, eliminate all contradictory statements, and clearly and consistently define all terminology.

We thank you for considering these comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Edward S. Itta", with a horizontal line extending to the right from the end of the signature.

Edward S. Itta  
Mayor

cc John Goll, MMS  
Johnny Aiken, Director, NSB Planning  
Taulik Hepa, Director, NSB Wildlife  
Harold Curran, NSB Law Department  
Karla Kolash, NSB Mayor's Office  
Andy Mack, NSB Mayor's Office, Government Affairs

## References

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## **MMS Responses to North Slope Borough Comments**

### **NSB 006-001**

The MMS believes that the current alternatives, with the standard stipulations and ITL clauses, offer an effective range of options that meet NEPA requirements and the goals and objectives of the OCS Lands Act to offer Federal offshore oil and gas resources for lease and possible exploration and development in an environmentally safe manner.

### **NSB 006-002**

The MMS will conduct a document search and remove qualifying language as appropriate and simply state the numeric outcomes of individual analyses. Where uncertainty exists, this will continue to be stated in the individual analyses.

### **NSB 006-003**

The MMS has used the best available science for the Lease Sale 193 analyses to support the decisionmaking process as outlined in the CEQ regulations (CEQ 1502.22). Where applicable, the EIS acknowledges the uncertainties associated with significant resources occurring in the frontier environment. Information that is available for use in conducting various analyses are provided in the bibliography.

### **NSB 006-004**

We have reviewed the EIS to ensure that relevant and comprehensive literature review has been accomplished for individual analyses. The MMS acknowledges that, despite its concerted efforts, some references may have been unintentionally missed or not included.

### **NSB 006-005**

See the response to comment **Barrow 003-13** on threshold levels.

The MMS extended an invitation to the NSB in May 2006 specifically to discuss the issue of threshold levels for subsistence resources, sociocultural systems, and environmental justice. We have had no reply to this invitation as yet.

Human health issues are discussed in the Section III and IV under Sociocultural and Environmental Justice. Dr. Aaron Wernham, acting on behalf of the Alaska Inter-Tribal Council and the NSB, provided suggested text changes to these sections of the draft EIS as they pertain to health. Many of these suggestions have been incorporated in the final EIS. The MMS supports recent North Slope research initiatives in this area and suggests that this research effort be coordinated with other State and Federal land managers on the North Slope through the vehicle of the interagency North Slope Science Initiative to develop appropriate North Slope-wide health impact assessment protocols.

Ultimately, the most effective strategies to protect human health will depend on developing a monitoring strategy that identifies and tracks important regional health indicators and continuing to develop a more detailed understanding of the ways in which the determinants of health are impacted by development. In turn, this information may inform efforts to both refine existing mitigation measures and develop new measures that target health outcomes and health determinants specifically.

### **NSB 006-006**

We believe that the scope of the cumulative analysis is appropriate for this EIS and is in accordance with the provisions of NEPA regulations to keep EIS's concise and no longer than absolutely necessary (40 CFR

1502.2(c)), to evaluate actions at a level of detail appropriate to focus issues relevant to the decisionmaking process. While the level of detail for this cumulative impact analysis is less broad than that of the 2007-2012 5-Year Program EIS, it is considerably more focused for the level of detail necessary for an individual lease sale. This approach is in keeping with NEPA (40 CFR 1502.20) involving the use of a tiered approach of analyses.

Past and present activities associated with the South, Northeast, and Northwest NPR-A have been considered in this analysis. The MMS acknowledges and includes present NPR-A activities and infrastructure into the Lease Sale 193 cumulative impact analyses but does not include a particular scenario for the various planning units of the NPR-A. The selection of possible scenarios associated with the future of NPR-A development is far too speculative for MMS to include into the cumulative impact analysis for this lease sale.

The MMS has included Nikaitchuq prospect in the Beaufort Sea in the cumulative analysis for Lease Sale 193 (see Section V.B.3. and Table V-1). The drillship Kulluk purchased by Shell was not specifically mentioned in this document because the MMS does not base scenarios on specific industry capital. Exploration activities associated with the Beaufort Sea prospects were considered in this analysis, and it is likely that the drillship Kulluk could be used for exploration within these areas. Description of the Kulluk and associated operations (including potential impacts) would be analyzed in detail within Shell's Exploration Plan Environmental Assessment stage of analyses.

The Red Dog Zinc Mine was considered in the cumulative case for the Lease Sale 193 as well as in the EIS for the 2007-2012 5-Year Program. The MMS recognizes that Northwest Alaska has extensive bodies of ore that might be developed if world metal prices were favorable and extensive coal deposits could someday be mined economically. The MMS information indicates that no firm plans to develop any new mines for ore or coal, although those resources generally are considered in long-term regional planning for Northwest Alaska (U.S. Army Corps of Engineers, 2005). As a result, any long-term plans for the development of coal mines within the geographic vicinity of the Chukchi Sea are considered outside the scope of cumulative impacts for Lease Sale 193.

The MMS considered the OCS activities in the Canadian Beaufort at the programmatic stage of analysis during the 2007-2012 5-Year Program EIS. At present, no process is in place to acquire meaningful information regarding Russian commercialization and industrialization in the high Arctic. While MMS acknowledges the existence of various industrial activities, these activities are not well understood and, as a result, fall into the speculative category of activity as defined in Section V of this EIS.

This EIS presents general discussion regarding impacts to specific arctic resources as a result of arctic warming. However, given the complexities of the processes associated with global warming, a comprehensive discussion and "Full Analysis," as mentioned in the NSB's letter, is neither possible nor appropriate within the confines of a NEPA analysis. The recent publications by the Intergovernmental Panel on Climate Change present a comprehensive discussion of global climate change impacts. An assessment of global climate change on the United States is given in a 2000 report entitled *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change, Overview* prepared by the National Assessment Synthesis Team (2000).

## **NSB 006-007**

This comment was addressed in Section V.C.8.c(3) (page V-51 of the draft EIS). The MMS believes that its analytical approach and its effects, bottom lines for subsistence resources, sociocultural systems, and environmental justice are valid.

See also the responses to comments **Point Lay 001-008** and **Barrow 003-030**.



### **NSB 006-008**

The text has been changed to delete this statement.

### **NSB 006-009**

The Executive Summary has been revised to adopt the language quoted by the commenter (page IV-340 of the draft EIS).

### **NSB 006-010**

The MMS acknowledges the impact of numerous meetings and documents reviews on the planning staff of the NSB and the even more limited manpower available in smaller communities. The accelerated MMS leasing timetable and an increase in the number of seismic survey and exploration permits has taxed the agency, as well.

For further discussion concerning oil spill, cumulative, and psychological impacts, see the discussion on at IV.C.1.m(4)(b), Effects from a Large Oil Spill. See also the responses to comments **NSB 006-007**, **Barrow 003-030**, and **Point Lay 001-008**.

### **NSB 006-011**

See the response to comment **Barrow 003-017** concerning human health impacts.

### **NSB 006-012**

Security for sabotage and other terrorist type activities is covered by the Office of Homeland Security through the U.S. Coast Guard. Studies have indicated that the burial of a pipeline will reduce the risk of sabotage to close to zero. Facility security on the onshore portion of the North Slope is conducted by the operating company. Offshore, the company will be responsible for security with the U.S. Coast Guard establishing a safety/security zone to limit the approach distance to the facility.

### **NSB 006-013**

This comment combines two paragraphs. The section above assumes the project proceeds to full development, where construction of infrastructure and other facilities could have effects across a large geographic area. As an example, the construction of a new road to connect a shore base to existing infrastructure to the east could result in an estimated incidental take of 235 spectacled eiders via loss of nesting habitat and displacement (Appendix C, page 50 of the draft EIS). The calculation of this hypothetical scenario is predicated on habitat densities and other factors that are largely unavailable for other species.

### **NSB 006-014**

See the response to comment **NSB 006-010** on impacts to communities.

### **NSB 006-015**

The MMS has reworded the paragraph in the Executive Summary to place summary information into context and diminish the appearance of a contradictory statement.

### **NSB 006-016**

For a discussion of psychological and local capacity stresses, see the response to comment **NSB 006-010** impacts to communities.

### **NSB 006-017**

The MMS has removed the reference of “190 billion cubic feet of natural gas” from the Executive Summary.

### **NSB 006-018**

See the response to comment **NSB 006-009**.

### **NSB 006-019**

The MMS addresses energy conservation and the use of alternative fuel sources at the program level. The 2002-2007 5-Year Program EIS addresses the use of alternative fuels. The MMS believes that this is in keeping with CEQ 1500.4 concerning paperwork reduction. The Lease Sale 193 contribution to greenhouse effects can be found in Section V.C.2.b, Global Climate Change.

### **NSB 006-020**

The MMS appreciates the comment. To request a copy of the draft EIS either write to Minerals Management Service, Alaska OCS Region, 3801 Centerpoint Drive, Suite 500, Anchorage, Alaska 99503-5823, or call (907) 334-5200 or toll free at 1-800-764-2627. The draft EIS is on the MMS webpage at <http://www.mms.gov/alaska>.

### **NSB 006-021**

Mating may start as early as January and February, when most of the population is in the Bering Sea, but has been observed as late as September and early October (Koski et al. 1993; C. George, cited in IWC, 2004b). Spring migration northward from the Bering Sea is thought to occur after the peak of breeding, which probably occurs in March-April (IWC, 2004b). Post-peak breeding may occur during the spring migration. The first pulse migrants are observed around April 9-10 at Barrow and typically are dominated by juveniles (Koski et al. 2004, cited in IWC, 2004b). Large whales and cow/calf pairs are seen in late May (May 15-June) at Barrow. Post-peak breeding may occur in the Chukchi Sea. The sentence “It also functions as important habitat of the endangered bowhead whale...region.” should read “It also functions as important seasonal habitat of the endangered bowhead whale, which migrates, engages in post peak breeding, calves, feeds, and rears newly born calves in the region.”

### **NSB 006-022**

Gray whales and beluga have been added to the general list of fauna using the Chukchi Sea.

### **NSB 006-023**

The intent of Stipulation 1 is to protect new, currently unknown seafloor resources that are identified during the ancillary activities necessary to develop an Exploration Plan or a Development and Production Plan, or resources that are identified during conduct of activities under an approved plan. Several types of surveys and geotechnical studies are necessary for lessees/operators to develop appropriate plans for proposed exploration or development activities or are required before approval of permit applications. As an example, high-resolution surveys are required for archaeological resource “clearance” of proposed activity areas. If a hard-bottom habitat that could support a benthic community is identified at the site during high-

resolution site-clearance survey work, then the lessee/operator would be required to modify their proposed operations to mitigate the potential impacts, if their operations have the potential to impact that resource. The MMS may require the lessee or operator to complete more extensive surveys to determine the full extent of the resources. Typically, however, the mitigation is avoidance—that is, relocating the proposed activities away from the identified resource. Plans submitted for approval include mitigation to protect known resources and the environmental reviews identify necessary mitigation, which become conditions of approval.

#### **NSB 006-024**

The text of Stipulation 4 has been changed to include the text changes for polar bears, ice seals, and the Ice Seal Commission, as suggested. The MMS is discussing internally the March 1 cut-off date suggested by the NSB.

#### **NSB 006-025**

The paragraphs on Barrow whaling have been changed to include the comments on Smith Bay and ice seals; the paragraphs on the Point Lay beluga hunt have been changed to include the additional hunting times and locations provided; and the text in Stipulation 5 has been changed to specify other marine mammals.

The NMFS has objected to MMS adopting the language of its MMPA standard of “no unmitigable adverse impacts.” The MMS invites the NSB to contact NMFS over this issue and to raise it again during any scheduled meetings concerning threshold levels for subsistence resources and sociocultural systems.

#### **NSB 006-026**

The heart of our inspection program is to ensure that operators are in compliance with current lease stipulations and regulations. To assist with this, MMS has developed a comprehensive list of potential incidents of noncompliance that is used to evaluate an operation during an inspection. In the event an operator is found to be out of compliance, the onsite inspector has the authority to require immediate correction of the problem up to and including the shut down of the operation being conducted. The operator has a defined length of time to correct the problem, after which they are allowed to continue operations. Depending on the severity of the incident, the MMS can seek a civil penalty (monetary fines) from the operator or refer the operator for criminal prosecution.

#### **NSB 006-027**

The referenced statement is not a finding or conclusion that seismic will not cause undue harm to aquatic life. The statement is a requirement on the permittee that their operations *shall not* cause undue harm to aquatic life, create hazardous or unsafe conditions, or unreasonably interfere with other uses of the area. This requirement reflects the OCS Lands Act constraint on technologies permitted for use on the OCS.

#### **NSB 006-028**

The EIS acknowledges that some marine mammal species react to sound levels below 160-dB rms. In the Programmatic Environmental Assessment (PEA) for 2006 arctic seismic surveying, MMS took a cautious approach in analyzing impacts to all resource areas where uncertainty existed (i.e., data on distribution). This approach support the requirement in NMFS-issued IHA’s that a 120-dB rms isopleth be implemented in the presence of 4 or more bowhead cow/calf pairs (to further protect important pair bonding, nursing, etc.) and a 160-dB rms isopleth for aggregations of 12 or more bowhead or gray whales (as aggregating whales likely indicate that feeding is taking place). As discussed in the PEA, the development of these additional isopleth restrictions was based on work by Malme et al. (1984), Clark et al. (2001), and Richardson et al. (1999). The specific requirements for the 120-dB and 160-dB restrictions are being evaluated by MMS and NMFS in an EIS on seismic surveying in U.S. Arctic waters and in this EIS for

proposed Sale 193. These analyses will consider information developed during the 2006 seismic surveying and the new acoustic criteria to be implemented upon completion of a final EIS on acoustic guidelines being prepared by NMFS.

Legal authorization to take marine mammals with Level B Harassment under the MMPA will be a condition of approval for seismic surveys under G&G permit in the Chukchi Sea Planning Area.

### **NSB 006-029**

Ramp up is a standard mitigation measure accepted by the scientific community and the resource agencies. Although not empirically proven, anecdotal evidence on the displacement of marine mammals by sounds and logical reasoning indicate that ramp up is a reasonable mitigation measure. The EIS text will be revised to clarify the status of ramp-up as a mitigation measure.

### **NSB 006-030**

The EIS examines a number of reasonable combinations of mitigation strategies. The various exclusion and safety zones considered in the mitigation alternatives are for all marine mammals, except for those measures specifically applicable to bowheads during migration and subsistence whaling. Monitoring is an integral part of the exclusion and safety zones applicable to all marine mammals.

Pacific walrus are closely associated with sea ice. Because seismic surveys cannot be performed in sea ice, the impacts to the Pacific walrus are reduced *de facto*. In addition, MMS relied on the biological expertise of FWS biologists who determined that, based on the best available data on walrus response to vessels and aircraft, the mitigation measures proposed were appropriate to protect walrus from harm. The MMPA authorizations from both FWS and NMFS must be obtained by permittees before seismic operations can begin. These authorizations may impose additional and possibly more restrictive mitigation measures. The combination of the mitigation measures in the MMS-issued G&G permits and those, if any, imposed under MMPA authorizations will ensure that there are no more than negligible impacts to marine mammals, and there will be no unmitigable adverse impact to subsistence uses.

The specific requirements for the 120-dB and 160-dB restrictions are being evaluated by MMS and NMFS in an EIS on seismic surveying in U.S. Arctic waters and in this EIS for proposed Sale 193. These analyses will consider information developed during the 2006 seismic surveying and the new acoustic criteria to be implemented upon completion of a final EIS on acoustic guidelines being prepared by NMFS. Based on presentations at the 2006 Open Water Meetings, industry is funding research that could lead to reduction of noise levels associated with seismic operations and improved monitoring.

### **NSB 006-031**

This comment is in reference to the summary of impacts presented in Section II. The full analyses, with all of the citations reviewed and considered by MMS subject-matter experts, are presented in Section IV.

### **NSB 006-032**

The indicated reference will be added to the sentence. We will review the information again and clarify this statement and what information supports it. The EIS analyses are based on a thorough review of the best available information to date regarding the marine wildlife in the Chukchi Sea. At times, the best available information is older or sparse. At times, the best available information is preliminary information, which is considered by MMS experts with other information in the appropriate context. The EIS notes where information is lacking for a particular resource. When information gaps are found, MMS takes steps, such as the initiation of studies, to address them. This comment is in reference to the summary of impacts presented in Section II. The full analyses, with all of the citations reviewed and considered by MMS subject-matter-experts, are presented in Section IV.

### **NSB 006-033**

This comment is in reference to the summary of impacts presented in Section II. The full analyses, with all of the citations reviewed and considered by MMS subject-matter experts, are presented in Section IV.

The EIS examines a number of reasonable combinations of mitigation strategies. Monitoring is an integral part of the exclusion and safety zones. The specific mitigation and monitoring requirements are being evaluated by MMS and NMFS in an EIS on seismic surveying in U.S. Arctic waters and in this EIS for proposed Sale 193. These analyses will consider information developed during the 2006 seismic surveying and new acoustic criteria to be implemented upon completion of a Final EIS on acoustic guidelines being prepared by NMFS. Based on presentations at the 2006 Open Water Meetings, industry is funding research that could lead to reduction of noise levels associated with seismic operations and improved monitoring. For example, Shell and ConocoPhillips have sponsored test demonstrations of unmanned aerial systems (UAS; drones) and some use of this monitoring technique may be used on a test basis during 2007.

In addition, Stipulation No. 4 Industry Site-Specific Monitoring Program for Marine Mammal Subsistence Resources requires lessees to monitor marine mammals during ancillary activities and exploration drilling.

### **NSB 006-034**

This statement appears in the summary of impacts presented in Section II. The full analyses, with all of the citations reviewed and considered by MMS subject-matter experts, are presented in Section IV.

This conclusion statement references MMS significance thresholds presented in Section IV.A.1. In compliance with NEPA and CEQ regulations and guidance, MMS's significance thresholds are based on consideration of both intensity and context of potential impacts. Specifically for bowhead whales, our significance threshold has been defined in the context of population-level impacts. The 2006 Arctic Region Biological Opinion from NMFS resulted in a nonjeopardy opinion for OCS activity effects to bowhead whales. Both MMS and NMFS experts have concluded that impacts from OCS activities will not result in population-level impacts that could jeopardize the stock of the endangered bowhead whale.

### **NSB 006- 035**

This comment is in reference to the summary of impacts presented in Section II. The description of the resources with citations is provided in Section III and the full analyses with citations are presented in Section IV. The data from the MMS Bowhead Whale Aerial Survey Program (BWASP) is incorporated into the description of the resources and the analyses. The data from the BWASP is cited by the author(s) of the reports: see Monnett and Treacy, 2005 and Treacy, 1997, 1998, 2000, and 2002 in Sections III.B.4.a(1) and IV.C.1.f(1).

### **NSB 006-036**

This comment is in reference to the summary of impacts presented in Section II. The full analysis is presented in Section IV.C.1.f(1). The likelihood of prolonged exposure of bowhead whales to freshly spilled oil in open water is expected to be small for several reasons, including: (1) because bowhead whales avoid anthropogenic sound sources, few whales are expected to be near activities from which large spills could occur; (2) bowheads whales would be expected to exit an area where they contact oil; and (3) noise from oil-spill-response activities is expected to deter bowhead whales from coming into the area affected by a spill.

### **NSB 006-037**

This comment is in reference to the summary of impacts presented in Section II. The full analysis presented in Section IV.C.1.f(1). The MMS believes that the data do support the conclusion that impacts

from noise associated with routine OCS activities are temporary and non-lethal. The MMS is unaware of credible information to the contrary.

The 40% likelihood for spill occurrence is a conditional probability, with the condition being the production of 1 billion barrels (Bbbl) of oil. The MMS estimates that the likelihood of 1 Bbbl being produced as a result of proposed Sale 193 is about 10%.

### **NSB 006-038**

No monitoring plan is capable of documenting all of the impacts to marine mammals. The monitoring requirements used in 2006 have been used successfully by NMFS for many years. During that time, there have been no documented cases of injury to marine mammals due to seismic operations.

### **NSB 006-039**

Additional explanatory text has been included in the final EIS.

### **NSB 006-040**

The summary conclusion in Section II relies on the detailed analysis and conclusions presented in Section IV.C.1(m)(4) and the characteristics analyzed in Table IV.C-2. Please note that the table provides a more detailed explanation. Effects from routine activities are attributed primarily to the proximity of onshore infrastructure development activities to the community (Wainwright in the example). Effects to communities further removed from the site of the development are not expected to exceed the significance threshold.

### **NSB 006-041**

See the response to comment **NSB 006-040**.

### **NSB 006-042**

Leasing would not occur within the Corridor I Deferral Area if Alternative III is selected by the Secretary of the Interior for the configuration of Chukchi Sea Lease Sale 193. Potential industry bidders would not be expected to request permits to conduct 3D exploration seismic surveys over blocks that would not be offered for lease. Subsequent to a lease sale and exploration drilling resulting in identification of an oil field, a lessee might propose additional 3D seismic surveying to further delineate the field. This additional surveying conceivably might include area within the Corridor I Deferral Area, if the potential extent of the field reaches into that area. Further, operators would be required to complete high-resolution site-clearance seismic surveying along any proposed pipeline route if commercial quantities of hydrocarbons are identified and development and production is proposed.

### **NSB 006-043**

The statement "air quality of the Chukchi Sea area is well within the NAAQS standards" describes the existing air quality of the Chukchi Sea. As discussed in the EIS, the Chukchi Sea is considered a pristine area for air quality, because there are few industrial sources and no sizeable population centers nearby.

The USEPA established annual and 24-hour NAAQS for fine particulate matter (PM<sub>2.5</sub>) for the first time in 1997. Table III.A.6 shows measured air pollution concentrations at Prudhoe Bay from 1986-1996. Data are not included for PM<sub>2.5</sub> in the referenced table, because the originating air-monitoring programs were conducted prior to USEPA establishing PM<sub>2.5</sub> standards. The table shows that NAAQS was met in an area of the most significant source or industrial emissions in Alaska, the Prudhoe Bay/Kuparuk/Endicott oil-production complex. The reference to the table has been corrected in the Final EIS.

#### **NSB 006-044**

The MMS acknowledges that the hunt for bowhead whales is closely managed and that because the quota for the hunt is tied to the population size and population parameters (IWC, 2003a; NMFS, 2003b), it is unlikely this source of mortality will contribute to a significant adverse effect on the recovery and long-term viability of this population.

The concern being identified in the text referenced in the comment is *noise and disturbance* associated with hunting in the calving, migration, and feeding areas. The sentence has been revised to make this distinction clear. Text from the 2006 Arctic Region Biological Opinion (ARBO) from the NMFS has been added to the EIS section to clarify the discussion.

The MMS analysis does not support the conclusion that effects from seismic sound, vessel traffic, development and production, and oil spills could lead to mortality of bowheads, the slowing of population recovery, or a population decline. The 2006 ARBO from NMFS resulted in a nonjeopardy finding for OCS activities in the Chukchi and Beaufort seas, including activities that may result from proposed Chukchi Sea Sale 193.

#### **NSB 006-045**

The missing citation has been added to the bibliography.

#### **NSB 006-046**

As stated in the text, George et al. (2004) suggested that the recovery of the BCB bowhead whale stock is in part due to the relatively pristine habitat in which it lives. The antithesis is also true—an industrialized habitat could halt the recovery of the BCB population, or even lead to a population decline.

Section III, Existing Environment, presents the past and current population abundance and does not speculate on what could occur. The EIS presents, discloses, and analyzes reasonable alternatives for the oil and gas lease activities that could occur in the Planning Area. This analysis takes into account the fact that MMS and industry are required to avoid, minimize, monitor, and mitigate industry impacts that would jeopardize the recovery and survival of endangered bowhead whales.

#### **NSB 006-047**

George et al. (2004) confirms bowhead migration occurs in pulses some years and has been added to the citations accordingly. The MMS appreciates the comprehensive 1978-2001 dataset for spring migration past Barrow. Koski et al. (2004, as cited in IWC, 2004b) provides further confirmation in more recent years.

The MMS agrees the last sentence is confusing. “Their” references the cow/calf pairs in the previous sentence. The sentence has been revised.

#### **NSB 006-048**

The text has been revised to correct and clarify the information.

#### **NSB 006-049**

Our review of the literature indicates that Braham et al. (1984, as reported in Moore and Reeves, 1993) stated that Eskimo whalers report that smaller whales precede large adults and cow/calf pairs on the fall migration. The MMS welcomes the opportunity to continue to review and incorporate other information and would be happy to consider any additional information related to fall migration of bowhead whales provided by the NSB.

## **NSB 006- 050**

The EIS acknowledges and discusses the limits and uncertainty of the available information in Section IV.C.1.f(1)(a).

As indicated in the response to comment **NSB 006-048**, the EIS acknowledges information that indicates that the northeastern Chukchi Sea may be an important feeding area of bowhead whales.

## **NSB 006-051**

The text has been revised to clarify the information.

## **NSB 006-052**

This typographical error has been corrected.

## **NSB 006-053**

The comment **NSB 006-147** concurs that updated species information for the Chukchi Sea is largely unavailable. Our literature reviews focus on published scientific literature, which likely would not identify references such as the one provided in comment **NSB 006-058**. We would appreciate receiving any additional references the NSB can provide that are relevant to the analysis, but we point out that our intent is to evaluate the significance of environmental consequences, not necessarily the numerical quantification of those impacts (see also the response to comment **NSB 006-140**).

## **NSB 006-054**

We agree that certain segments of the yellow-billed loon population are vulnerable to spill impacts from the proposed lease sale. This has been considered in the analysis in Section IV.C.1.g(6)(a). We concur with comment **NSB 006-140** that there are few to no data on loon use of the Chukchi Sea.

The analysis describes how the yellow-billed loon was petitioned for listing under the Endangered Species Act several years ago and the USDOJ, FWS has not acted on the petition but has instead focused on protection of North Slope nesting areas using an interagency Conservation Agreement. We address this issue by recommending the incorporation of the Conservation Agreement provisions into terrestrial components of oil/gas development, should they ever be proposed.

## **NSB 006-055**

We concur that long-tailed ducks are vulnerable to oil spills during migration and have stated so. Section IV.C.1.g(4)(a)2) describes the percent chance that spilled oil would contact specific polygons that represent important long-tailed duck habitats. Section IV.C.1.g(6)(a) describes the potential direct spill impacts to long-tailed ducks.

## **NSB 006-056**

Section IV.C.1.g(6)(a) states that the king eider population is relatively large and stable. We have revised this section to provide the latest population status information.

## **NSB 006-057**

We believe this section accurately conveys that the Chukchi Sea coast does not support a large number of nesting brant, but rather that it is more important to large numbers of postbreeding brant during molt and



migration. We reported results from a June 2005 aerial survey; however, additional information would be needed to compare/update the extent of seasonal use as previously described during dedicated studies conducted in August 1989.

#### **NSB 006-058**

We sought to describe how lesser snow geese used the project area. Our search of published literature did not identify the Ritchie et al. report to the NSB. We have since obtained a copy of this annual report (Ritchie et al., 2006) and have incorporated relevant information into the final EIS.

#### **NSB 006-059**

The amount and detail of information needed for a NEPA decision depends on the decision it is intended to support. The MMS agrees that more detailed information would be necessary for the NEPA evaluation and decision on proposed development activities. The MMS would determine the adequacy of the available information at the time a development and production plan is submitted. In the meanwhile, MMS has a robust Environmental Studies Program that is initiating various baseline information studies in the Chukchi Sea Planning Area.

#### **NSB 006-060**

See the response to comment **NSB 006-059**.

#### **NSB 006-061**

The suggested change has been made throughout the EIS.

#### **NSB 006-062**

This information and citation are already presented in Section III.B.7.a(1).

#### **NSB 006-063**

As suggested, text has been added to Section III.B.7.a(1) of the EIS.

#### **NSB 006-064**

As suggested, text has been added to Section III.B.7.a(1) of the EIS.

#### **NSB 006-065**

The suggested change has been made.

#### **NSB 006-066**

The statement has been removed.

#### **NSB 006-067**

The suggested citation has been added.

#### **NSB 006-068**

The suggested reference has been reviewed and cited.

### **NSB 006-069**

The suggested references were reviewed and range information has been updated.

### **NSB 006-070**

The suggested reference was reviewed and the distribution and population information has been updated.

### **NSB 006-071**

The text in the draft EIS on page IV-2, last paragraph, first sentence has been modified.

The text in section IV.A.4a(1) states:

We estimate the chance of one or more large pipeline spills is 26%, and the chance of one or more large platform spills is 19% for Alternative I - the Proposed Action over the production life of the project. The total is derived from the sum of the platform, wells and pipeline mean number of spills. The chance of one or more large spills total is 40% for Alternative I - the Proposed Action over the production life of the project. For Alternative I - the Proposed Action, the percent chance of one or more large spills total ranges from 27-54% at the 95% confidence interval over the production life of the project.

The information presented on page IV-45 under Water Quality (Sec. IV.C.1.a(6)) was inaccurate, and the text has been replaced with the correct information.

### **NSB 006-072**

A reference has been added to clarify that these are the combined probabilities cited in Section IV.A.4a(2) and are the results of the oil-spill-trajectory analysis discussed in Appendix A and listed in Table A.2-75.

### **NSB 006-073**

As offshore activities move to more remote locations, industry will be required to have oil-spill-response equipment in close proximity to the operating area to reduce the time between a release and the onset of response activities. This could include spill-response barges anchored near the facility and larger caches of spill-response equipment stored at the facility to ensure that response operations begin as soon as possible.

### **NSB 006-074**

The NEPA does not require the use of significance thresholds for analysis in an EIS. The MMS attempts to incorporate the best available information at the time of the preparation and analysis of the lease sale EIS and has developed significance thresholds specific to individual resources as tools to capture potential impacts, both positive and negative. The MMS is always willing to further consider new scientific information to better define existing significance thresholds. However, MMS uses the best available science and information, as well as professional judgment by staff biologists, geologists, and engineers as to the application of the existing information in developing an appropriate analysis. The MMS believes that the existing information that is available supports analyses with adequate detail to inform the decision makers at the lease sale stage of the OCS Oil and Gas Program.

### **NSB 006-075**

See the response to comment **NSB 006-074**.

## **NSB 006-076**

Different drilling assumptions were used in the 2002-2007 Programmatic EIS and the Sale 193 draft EIS. Evidently, the average well depth assumed for the previous document was slightly deeper than assumed for the later document. However, “up to 60” wells having an average discharge of 610 tons was used for the 5-Year Programmatic analysis. For the present analysis, it was assumed that an average of 695 tons of drilling waste would be generated by each of 7-14 exploration and delineation wells. The differences in these two documents stem from the development assumptions. The previous analysis was based on the full economic potential, whereas the current analysis is based on a more reasonable level of activities according to historical trends. Although there are other differences between the two documents, only comments directed to the possible deficiencies in this Sale 193 draft EIS, are, or can be addressed by this document. We cannot change what was published in 2001. See also the response to comment **NSB 006-096**.

## **NSB 006-077**

The text has been revised to clarify artificial island status regarding production facilities.

The text has been revised to clarify the information regarding sound attenuation, whale response, and relative importance. Appropriate review of the noted more recent reference, Richardson (2006) will be included.

## **NSB 006-078**

This statement is supported by the assessment within Section III.A.5, Water Quality, which discusses the existing water quality.

## **NSB 006-079**

The text has been reworded to provide consistency within the information presented.

## **NSB 006-080**

The MMS acknowledges that significant impacts on subsistence resources and harvest patterns, sociocultural systems, and environmental justice would result from a large oil spill.

See also the responses to comments **Barrow 003-022**, **Barrow 003-029**, and **NSB 006-009**.

## **NSB 006-081**

The MMS oversight and compliance inspections will occur throughout the life a project. Lessees must conduct operations and maintain and operate equipment and facilities in accordance with MMS regulations and approved plans and permits. Lessees are required to maintain records of equipment and facility maintenance and testing and to submit reports to the MMS on a scheduled basis throughout the life of the project which are monitored by the MMS for regulatory compliance. Lessees are required to review and update an oil spill response plan every two years or within 15 days of any changes to the oil spill response capabilities described in the approved plan, or changes to the activity that affect the worst-case spill response scenarios. Lessees must exercise (demonstrate) their oil spill response capabilities at least every three years. MMS is required by law to inspect each facility at least once a year. It is the Alaska Region’s practice to conduct onsite inspections of the lease operations and oil spill response organizations referenced in an approved oil spill response plan more often.

## **NSB 006-082**

The NSB requested references to the effects on benthic communities. The section referenced in the comment is about water quality rather than benthic communities. A reference has been added to the section about effects on benthic communities and other lower trophic-level organisms. A paragraph referencing the water quality section has been added (Sec. IV.C.a (4)(a) on draft EIS page IV-39).

### **NSB 006-083**

A timeframe reference is presented in the next sentence which states: Conditions typically return to ambient conditions within hours to days, depending on the amount, composition, and frequency of the disposed material.

### **NSB 006-084**

The estimated mean spill number, for Alternatives I, III, and IV ranges from approximately one-third to one-half (0.33-0.51) of a large oil spill. This is calculated by adding the estimated mean number of pipeline and platform spills over the life of production. To elaborate on this process, we divide large oil spills in to two major categories, pipelines and platforms, and estimate the mean number of spills from each. For Alternative I, the Proposed Action, we estimate 0.30 pipeline spills and 0.21 platform (and well) spills for a total over the life of Sale 193 production of 0.51 spills. That is approximately one-third of a pipeline spill and one-fifth of a platform spill for a total of approximately one-half a spill over the production life of Alternative I. Because the estimated mean number of spills, adding together both platforms and pipelines, is slightly greater than one-half over the life of the project, we defined a spill as unlikely.

The MMS understands that in reality a large spill is either 0 or 1; there is no such thing as a fractional spill. For purposes of analysis we assume 1 spill of either 1,500 or 4,600 bbl and estimate the impacts from such a spill on social, economic, and environmental resources.

We understand the NSB's views regarding the probabilities of spill occurrence. In Section IV.A.4, we have included additional explanatory statements. Regardless of the chance of one or more spills occurring, we do assess the effects of oil spills on various environmental, social, and economic resources.

### **NSB 006-085**

Within Section IV.A.4.a, the assessment describes that the analysis simulates two general scenarios, one in which oil is spilled into open water and one in which oil freezes into ice and melts out in 50 % ice cover. The assumption is that open water is June through October, and a winter spill melts out in June.

### **NSB 006-086**

The question of addressing the assessment of tar balls was initially discussed in-house MMS, within the preliminary scoping discussions of the possible effects resulting from Chukchi Sea OCS activities. The issue was not identified within any community nor agency prescoping/scoping meetings. On preliminary review of existing scientific data and information relevant and applicable to the arctic conditions and to bowhead whales in particular, it was decided that the oil-spill assessment would address spills as single causalities, and treat all resulting states of spilled oil the same, as the worst-case scenario.

### **NSB 006-087**

The MMS will review and inspect all portions of operations conducted by an OCS operator. Permits are required for all well operations as well as for production and pipeline activities.

### **NSB 006-088**

The text has been changed to state the percent chance of one or more large spills occurring. The reader is referred to the responses to comments **Anchorage 005-004** and **NSB 006-084**, as well as Appendix A of the EIS.

### **NSB 006-089**

The MMS believes this statement is general in nature and is merely trying to capture, in general terms, the characteristics of oil-spill dispersion within different sea conditions. The MMS recognizes that a multitude of variables exist, all of which would and could directly affect the behavior of an oil spill in the arctic environment.

### **NSB 006-090**

The text has been changed to state the percent chance of one or more large spills occurring over the production life of Sale 193. Please note this is not the chance of one large spill occurring. The reader is referred to the responses to comments **Anchorage 005-004** and **NSB 006-084** as well as Appendix A of the EIS.

The sentence that the NSB objects to must be read in context. The paragraph summarizes the effects of an oil spill on air quality, not water quality. The context of the sentences is to summarize the potential effects to the shore from an offshore oil-spill fire (i.e., soot fallout). Potential contamination would be limited because of the distance that an oil-spill fire, either set intentionally or accidentally, would be from the shore. Under the Proposed Action, exploration, development, and production, excluding pipelines, would be at least 8 nautical miles offshore, allowing for dispersion and settling of soot particles before contacting the shore.

### **NSB 006-091**

This section is a brief introductory summary of the effects rather than a detailed assessment. References are provided in the detailed sections; for example, references for the effects of discharges on lower trophic level organisms are provided in Section IV.C.1.c (3)(a)2).

The text on effects of discharges has been modified to indicate “relatively” low effects at “deep” offshore locations.

The NSB requested references for the statement that water circulation under the winter ice cover is slow. As noted above, references are provided in the detailed sections after the summary. In this case, Section IV.C.1.e(3)(a)2 refers to a study by Woodgate, Aagaard, and Weingartner (2005) on the exchange rate of water on the Chukchi shelf throughout the year. The summary of the information from Woodgate, Aagaard, and Weingartner was clarified, specifying that the measurements are for the entire water column, including the upper part under the ice cover.

### **NSB 006-092**

This section is a brief introductory summary of the effects rather than a detailed assessment. References to recolonization rates are provided in the following detailed section about possible disturbance from production projects (Sec. IV.C.1.c(4)(a)1). It and Section III.B.1.b summarize information and recent references for recolonization rates.

The text has been revised to explain that disturbance probably would be monitored by the pipeline company, MMS, or the U.S. Army Corps of Engineers.

### **NSB 006-093**

Information on the clean up of spills in ice-covered waters is provided in Section I.A.5, and a reference to that section has been added.

### **NSB 006-094**

A statement was added to the EIS section explaining that the 193 EIS conclusion is similar to the conclusion in the draft EIS for seismic surveys in the Chukchi Sea, and that the exploration would occur under standard stipulations. The location of the stipulations on the MMS web site was provided also. See also the response to comment **NSB 006-095**.

### **NSB 006-095**

The NSB requested further explanation of the process for assessing proposed seismic surveys. A statement was added to the EIS section, explaining that the exploration would occur under standard stipulations, and the location of the stipulations on the MMS web site. See also the response to comment **NSB 006-094**.

### **NSB 006-096**

The assumptions in the 5-Year Program EIS are not necessarily the same as used later for Sale 193, so direct comparisons cannot be made. For the 5-Year EIS, offshore areas were compared on the basis of their full economic potential, whereas the scenario for Sale 193 was based on more realistic assumptions regarding the first commercial development in this unproven area. The full economic potential is calculated by computer assessment models that simulate the discovery and development of all prospects that might occur in an area. In the real world, companies who are constrained by sound business practices and cash flows will certainly not drill hundreds of wells to test all of the prospects identified. Also, industry would probably not pursue projects that are only marginally profitable (many of the prospects are too small to consider for development). Computer models provide estimates of the total endowment of potential oil and gas resources, but they cannot determine the location or timing of future commercial projects. A scenario, such as the one used for Sale 193, provides a reasonable framework for the analysis of potential environmental impacts associated with realistic commercial activities. No one can accurately predict future leasing patterns or the location of future discoveries. It is misleading to apply simple math to such a complex situation, so it is not reasonable to argue whether future exploration will involve 60 as opposed to 70 wells. To-date, five exploration wells have tested some of the largest identified prospects in the Chukchi. Because small prospects will probably not be economic to develop, our estimate of 60 future exploration/delineation wells is viewed as optimistic.

### **NSB 006-097**

The intent of Stipulation 1 is to protect currently unknown seafloor resources that are identified during the ancillary activities necessary to develop an Exploration Plan or a Development and Production Plan, or resources that are identified during conduct of activities under an approved plan. Several types of surveys and geotechnical studies are necessary for lessees/operators to develop appropriate plans for proposed exploration or development activities or are required before approval of permit applications. As an example, high-resolution surveys are required for archaeological resource "clearance" of proposed activity areas. If a hard-bottom habitat that could support a benthic community potentially important to rare fish species is identified during site-clearance surveys, then the lessee/operator would be required to ensure their proposed operations avoided potential impacts to these resources. The MMS may require the lessee or operator to complete more extensive surveys to determine the full extent of the resources. Typically, however, the proposed activities would be moved away from the identified resource to avoid impacts. Plans submitted for approval include mitigation to protect known resources and the environmental reviews identify necessary mitigation, which become conditions of approval.

## **NSB 006-098**

See the response to comment **NSB 006-029**.

## **NSB 006-099**

The statement in this specific section is simply meant to identify that the analysis will take into consideration the potential effects from the Proposed Action on “key habitat types” for the bowhead whale. The uncertainty regarding bowhead whale distribution and life-history traits in the Chukchi Sea is noted in the assumptions that follow. The MMS believes this issue is adequately addressed as written, and no changes are needed to the specific section referenced in the comment above.

## **NSB 006-100**

The MMS and NMFS believe that uncertainty about impacts on baleen whales and the effectiveness of required mitigation measures can and will be reduced through required monitoring. The EIS examines a number of reasonable combinations of mitigation and monitoring strategies. The specific mitigation and monitoring requirements also are being evaluated by MMS and NMFS in an EIS on seismic surveying in U.S. arctic waters. Based on presentations at the 2006 Open-Water Meetings, industry is funding research that could lead to improved monitoring. Effective monitoring is likely to require a combination of approaches and technologies. Additional text has been added to the EIS to acknowledge and discuss the limitations of current monitoring approaches. See also the response to comment **NSB 006-030**.

## **NSB 006-101**

The section noted in the comment above covers potential effects to bowhead whales and not subsistence harvest activities. Potential impacts to subsistence are instead covered in Section IV.C.1.1. However, MMS has ensured that the language in Section I.C.3 clearly describes the statutory requirements of the Marine Mammal Protection Act to ensure that the MMPA IHA’s do not result in an “unmitigable adverse impacts to subsistence.” Otherwise, MMS believes the paragraph cited in the comment above is appropriate as written.

## **NSB 006-102**

Monitoring for the bowhead whales would be covered by the IHA/LOA through NMFS and FWS.

## **NSB 006-103**

The MMS agrees this statement needs a reference. The reference Reeves, Ljungblad, and Clarke (1983) has been added to the end of the paragraph.

## **NSB 006-104**

Kaktovik whalers did not harvest a bowhead whale in 1985 and 1987. Both years had seismic operations in the area. However, Kaktovik whalers were successful in harvesting whales in all other years from 1981 to present. Several of these years had multiple seismic operations conducted in the area, demonstrating there is not a one-to-one correlation between seismic activity and unsuccessful hunts. Other factors such as weather, ice conditions, or other vessel traffic can have significant effects on the hunt. A conclusion that the seismic operations resulted in an unsuccessful hunt cannot be made without knowing the other factors that also could have resulted in an unsuccessful hunt.

### **NSB 006-105**

The MMS believes the statement is appropriate as written. Although available information indicates that bowhead whales can respond to seismic survey noise within 20-30 km, there also are studies where no specific response was apparent at closer ranges (see Ljungblad et al., 1988; Fraker et al., 1985; Richardson et al., 1995). Given these results, it is appropriate to state that bowheads tend to avoid seismic survey noise at these distances, but we cannot state with certainty that they “would” always avoid the noise at these distances.

### **NSB 006-106**

The MMS believes this paragraph is appropriate as written and the interpretations from Richardson (1999) and Miller et al. (1997) are accurately written.

### **NSB 006-107**

The text has been revised to update the information.

### **NSB 006-108**

This statement specifically states that: “Behavioral studies have suggested that bowheads habituate to noise from distant, ongoing drilling or seismic operations (Richardson, Wells, and Wursig, 1985), but there still is some apparent localized avoidance (Davis, 1987).” The emphasis here deals with “distant” and “ongoing” drilling and seismic noise. Richardson, Wells, and Wursig (1985) cite a number of studies that support this statement. Other sections throughout the bowhead whale analysis within this document and within the conclusions also show that bowhead whales tend to avoid seismic noise at closer ranges. The MMS believes the paragraph is appropriate as written.

Traditional and local knowledge is a rich source for information in the Chukchi Sea areas, and the EIS references information obtained from such sources. Local knowledge also was obtained during MMS public hearings on the Draft Proposed 5-Year Program (2007-2012) and previous MMS-prepared NEPA documents. The traditional and local knowledge gathered represents some of the best information available to complete the EIS. The MMS welcomes the opportunity to continue to receive and use traditional and local knowledge about the Arctic Ocean and the subsistence resources it supports.

### **NSB 006-109**

For paragraph 3, the reference should be Richardson et al. (1995). The fourth paragraph has been changed to reflect the additional Inupiat concerns noted in the comment above.

### **NSB 006-110**

The text has been revised to update the information.

### **NSB 006-111**

The comment raises valid points regarding marine vessel and aircraft traffic. Although the total number of trips might be similar, the frequency and location certainly would be different. During exploration, vessel and aircraft trips would be more frequent; however, the trips would be to different locations during the summer months. During development/construction, trips would be even more frequent, but they would be to only one location over a period of a few years. During the production stage, trips would be less frequent but would be to the same site over decades. In terms of adverse impacts, more frequent trips perhaps would be more disruptive, but the effects would be temporary. In contrast, less frequent trips to the same



production facility would cause lower levels of disturbance, but they would occur over longer periods of time.

### **NSB 006-112**

A discussion of possible gas-transportation strategies is beyond the scope of the present analysis and will be removed from the document. There are many conceptual strategies on how to commercialize the gas resources stranded in northern Alaska. However, this NEPA analysis is focused primarily on reasonably foreseeable activities and cannot analyze all possible commercial options, particularly when these gas resources have not been discovered yet. When (or if) the present conditions change, future analysis will be expanded to treat both oil and gas production.

### **NSB 006-113**

Abandonment activities involve plugging wells, decommissioning pipelines and removing production platforms and equipment. Exploration and delineation wells would be “plugged and abandoned” when they fail to encounter commercial quantities of oil. Successful exploration and delineation wells would be converted to production wells whenever possible to minimize field-development costs. Ultimately, all well components (casing and control equipment) are removed from a prescribed depth below the seafloor. The methods used to decommission wells depend on whether the wells are on-platform or off-platform (e.g., subsea wells).

### **NSB 006-114**

Refer to Sections I.C.7, The Clean Water Act, and I.E.9, Discharge and Pollution Regulations. The USEPA has the authority to issue national Pollutant Discharge Elimination System (NPDES) permits to regulate discharges into waters of the U.S. so as not to have environmental consequences. The NPDES discharge is not part of this action, and the USEPA must consult with NMFS and FWS on effects of that program on marine mammals. Under the NPDES General Permit, exploration wells may result in drilling mud and cuttings discharged into Chukchi Sea waters and deposited on the ocean floor in localized sites. Such deposits would become assimilated into the ocean floor sediments and ecosystem dynamics within 1-2 years (Hurley and Ellis, 2004). It is unlikely that such microscale and short-term localized events would be of consequence to pelagic zooplankton productivity of a magnitude to impact bowhead whale foraging requirements in the comparatively very large Chukchi Sea. Habitat availability for whale foraging is dynamic. Pelagic zooplankton production and distribution is dependent on current transport and not localized factors as small as a single exploratory well waste-discharge zone. Oil and gas development and production activities require individual NPDES permits that specifically identify discharge allowances and required operational practices for each facility. Refer to Section IV.A.2.g, Estimates of Drilling Wastes and Their Disposal.

### **NSB 006-115**

Please refer to Section III.B.4.a(1)(d) for the discussion and verification of the calving you note in your comments. It is noted that calving is likely to occur in mid-May to mid-June between the Bering Strait and Point Barrow. Reese et al (2001) said this is consistent with other observations in the region, including (a) relatively few neonate-cow pairs reported by whalers at St. Lawrence island, (b) many neonates seen during the whale census in late May, (c) relatively few term females taken at Barrow, (d) taken females with term pregnancies appeared close to parturition (and would reasonably calve further east an unknown distance in the Beaufort Sea), and (e) most of the herd believed to have migrated past Barrow by late May. The statement in Section IV.C.1.f(1)(g) is correct in asserting that “most” of the calving for this population occurs between the Bering Strait and Point Barrow.

The MMS acknowledges that bowhead neonate skin is not as thick as older bowheads. It could be more susceptible to injury from oil contact; however, there is not conclusive research documentation to indicate this is the case for cetacean skin, neonate or older animals. Geraci and St. Aubin (1990) concluded that a

cetacean's skin is an effective barrier to the noxious substances in petroleum. These substances normally damage skin by getting between cells and dissolving protective lipids. In cetacean skin, however tight intercellular bridges, vital surface cells, and the extraordinary thickness of the epidermis impede the damage. The authors could not detect a change in lipid concentration between and within cells after exposing skin from a white-sided dolphin to gasoline for 16 hours in vitro. White-sided dolphin skin may or may not be comparable to neonate bowhead skin, but it is thinner and softer than older bowhead whale skin and may offer a reasonable comparison.

#### **NSB 006-116**

The intent of the section the comment refers to is to provide general information about potential effects of oil on marine mammals. Rigorous discussion of potential adverse effects of oil on bowhead whales can be referenced in the Biological Evaluation (BE) for the Programmatic EA Arctic Ocean Outer Continental Shelf Seismic Surveys 2006, which was also adopted as the BE for the Chukchi Sea Lease Sale 193 consultation, and this discussion does include the references noted. Actual documentation of effects of oil on bowhead whales and other large cetaceans is scarce, and much of the potential effects identified are hypotheses, based on analogous situations, that are not confirmed by experiments or direct observation, and that are uncertain, and often controversial. There are no data on cetaceans to determine, with certainty, the probability of lethal or sublethal effects on individuals or populations.

#### **NSB 006-117**

See the response to comment **NSB 006-116**.

#### **NSB 006-118**

Additional discussion has been added as requested.

#### **NSB 006-119**

The text has been revised to add eyes and conjunctive membranes to bullet item 4.

#### **NSB 006-120**

Bratton et al. (1993) referenced bowhead whale summering grounds and not specifically the eastern Beaufort Sea in comparing or compensating for the potential zooplankton prey base that could be lost to a large oil spill in either the Chukchi or Western Beaufort seas. The MMS recognizes the implications of Lowry, Sheffield, and George (2004) of the importance of advected zooplankton prey into the Chukchi and Western Beaufort Sea from as far as the Bering Sea. There are many factors that influence whale exploitation of advected prey. The dynamics of biomass productivity, timing, and rate of transport via currents (water and wind); recruitment/replacement rate of biomass; and dilution and depth of effective mortality rates over time and space in case of an event are understandably difficult to measure and predict or gauge. The MMS reaffirms that zooplankton populations would not be permanently affected, as plankton undergo annual productivity cycles and do not occur totally as isolated residential populations. Local plankton populations, especially in shallow depth nearshore where vertical migration is limited can experience mass PAC/phototoxic related mortality of local relatively short-term ecosystem consequence. This is considered very small in relation to the bowhead ecosystem components related to prey availability, distribution, and productivity available in the Chukchi and Beaufort seas.

#### **NSB 006-121**

Additional discussion has been added as requested.

### **NSB 006-122**

The MMS believes the information currently provided in this paragraph is appropriate as written and has also updated the paragraph with results from Richardson (2006).

### **NSB 006-123**

The MMS agrees, and a more descriptive discussion has been added to the assessment.

### **NSB 006-124**

The MMS is cognizant of the potential seriousness of oil spills if they occur in the spring lead system during the time period that bowhead whales are calving, breeding, migrating, and staging. Specifics of spill-prevention and cleanup plans, technical application of leak detection and pipeline shutdown, location and specifications of pipelines construction, type of hydrocarbon product transported via pipelines would be covered in more detailed site-specific analysis as would the mitigations and technical requirements for specific development and transport of production products. You are correct that it is MMS's obligation to reinitiate consultation with NMFS relative to bowhead whales and develop and analyze appropriate measures to avoid spills during migration. This will be an integral part of any Development and Production Plan analysis.

### **NSB 006-125**

See the response to comment **NSB 006-124**.

### **NSB 006-126**

The relevance of noting that such large aggregations of bowhead whales occur in the Beaufort Sea could reasonably infer that such aggregations and composition (cows and calves) potentially also could occur in the Chukchi Sea. Language to this effect has been included in the text. Similar stimuli and subsequent behavior of aggregating bowheads likely would be consistent whether they are in the Beaufort Sea or the Chukchi Sea. Until further survey data verify whether such aggregations occur in the Chukchi Sea, the indications that aggregations are likely in the Chukchi Sea are from the aggregation behavior exhibited and documented in the Beaufort Sea.

### **NSB 006-127**

The objective of the OSRA is to estimate relative oil-spill risks associated with production and transport of oil and gas from the proposed lease areas and not intended to develop and implement a model to develop specific scenarios, progressions of site specific spill events, and to probability of resource effects. The time periods identified as VULNERABLE in Tables A.1-14 indicate the risk periods for bowhead whales to experience exposure to oil from spill events represent "relative" risk in terms of temporal degree of risk as in Vulnerable or not vulnerable. Tables A-2-1 through-2-5 indicate the probability of a large oil spill originating from particular locations to contact certain ERA's within various time periods following a spill event. If bowhead whales are present in the specific ERA during the Vulnerable period as indicated in Table A.14, the probability of oil exposure (whale oiling) would be the same as the probability of the spill materials contacting the ERA as modified by a number of variables, including the continuity of the spill materials, ice conditions, amounts of oil bound by ice, age and form of free floating oil on the water surface, proportion of the ERA affected by the materials, and others. Probability estimates for bowhead whales oiled could vary from small probabilities to presenting a substantial oiling probability to a large percentage of the stock and with potential for population-level effects. Other variables that further modify probability of oil exposure include seasonal migration timing and speed, seasonal nonmigrating whale distribution and movement, bowhead whale sex and group age structure, behavior, type(s) of oil exposure, prey availability and distribution, availability of alternate nonaffected routes or escape routes, origination point of spill relative to the active ice zones, and many other situation-specific variables that do not lend

themselves to a estimation of consistent probability of bowhead whale oil exposure. Oil-spill-response activities could become a factor in the probability of whales moving into oil-exposure areas. There are some data deficiencies about migratory patterns and nonmigratory movement, distribution, and abundance of bowhead whales in the Chukchi Sea that would complicate rigorous analysis for all ERA's and OSRA hypothetical scenarios.

The MMS Alaska OCS Region uses the OSRA in the EIS prepared for the lease sale. Analysts preparing the EIS identify ERA's at risk from large oil spills based on experience, knowledge, and available data. Site-specific analyses to estimate probability for bowhead whales contacting oil-spill materials incorporating OSRA and bowhead whale distribution and abundance were not done by MMS, and we do not think it would be warranted given the layers of uncertainty that would pertain. While such analyses would be possible and would provide an estimate of chances of oiling bowhead whales, these would be based on assumptions regarding a wide array of significant variables that are unknown: location, date, ice, weather conditions, etc. Analyses could require time-dependent bowhead whale-density estimates; possible application of density models such as Amstrup, Durner, and McDonald (2001) generated for polar bears; OSRA information; date; ice conditions; and other factors as noted above.

Such analyses, however, would yield an estimate of numbers of whales exposed to oiling and the comment is specific to estimating the chance or "probability" of oiling, not numbers.

### **NSB 006-128**

Oil spills in themselves do not produce noise and human activity-induced disturbance such as vessel and air traffic and equipment deployment and personnel on site. Required oil-spill-response activities could occur during exploration, development, and production phases. Large spills probably would be associated with development and production phases, and response to large spills could entail substantial noise and disturbance such that bowhead whales would avoid an area of high value. The MMS has added to the bulleted statements list.

### **NSB 006-129**

Use of the Ledyard Bay Critical Habitat Area by king eiders was described in Section III.B.5.f(3), King Eider. This section is now correctly identified as Section III.B.5.f(4) in the final EIS.

Section III.B.5.f of the draft EIS described spring use of offshore leads of the Chukchi Sea by common eiders and other waterfowl. Some of these are in Ledyard Bay. Later in the summer, Kasegaluk Lagoon and Peard Bay seemed more important to common eiders than Ledyard Bay.

We believe the implementation of mitigation measures specific to Ledyard Bay (particularly in regards to seismic and exploration activities) reflects our understanding of the ecological importance of this area.

### **NSB 006-130**

We believe the preceding subsection (IV.C.1.g(2)(a)3 Support Aircraft Noise) is the appropriate location for including these additional impact types. We have revised the final EIS accordingly.

### **NSB 006-131**

The use of the term "relatively" is intended to mean "in comparison to." This term is often used to note the potential scale of an impact when the absolute extent cannot be determined or merely represents one end of a broad range.

### **NSB 006-132**

“Season” would be considered under other environmental variables. The MMS acknowledges there are numerous other environmental variables such as season, ice conditions, ice gouging of the ocean floor, temperature of air and water, etc. Size of spill is not an environmental factor, and “spills” as used herein refers to any spill large or small. “Relatively small” impacted area is used as a comparative mode to the same size spill under conditions that may disperse spill materials more widely and at faster rates. “Could be” terminology also accounts for conditions and situations where environmental factors actually assist in containing a spill in a smaller area, for example, winds opposing the current direction or containing a spill against an ice barrier.

### **NSB 006-133**

We concur there may be some uncertainty regarding how individual communities will make use of new roads that may be constructed near them. For purposes of analysis, and lacking access controls or specific routes, we presented use of new roads by local people as a probability (“likely would”), rather than dismiss the possibility that any use would occur. This impact topic originated in recent Section 7 consultations as a subsistence-hunting issue, and we believed the use of these roads warranted some attention (USDOJ, FWS, 2005c, Final Biological Opinion for Northeast NPR-A). We have revised this section to state that there is the potential that local hunters would use new roads.

### **NSB 006-134**

This potential impact is discussed in Section IV.C1.g(3)(f). Although not specifically addressed as a mitigation measure for this phase of the leasing process, recommendations to address this issue were described in the Biological Evaluation (contained in the draft EIS, now available at [http://www.mms.gov/alaska/ref/Biological\\_opinionsevaluations.htm](http://www.mms.gov/alaska/ref/Biological_opinionsevaluations.htm) or from MMS), and are anticipated to be addressed in a future EIS and Section 7 consultations for threatened birds. We clearly identify a goal of minimizing the potential for enhancing predator populations that could arise from future construction of infrastructure and associated developments.

### **NSB 006-135**

We have revised the text to include the suggested phrase. Inhalation of hydrocarbon vapors is included two paragraphs later in this section and is a complete topic two sections later.

### **NSB 006-136**

This paragraph indicates that returning adult birds could contaminate eggs or young. We have acquired a copy of Couillar[d] and Leighton (1989) and incorporated relevant information on how oil contamination could harm embryos within bird eggs into the final EIS.

### **NSB 006-137**

See the response to comment **NSB 006-136**.

### **NSB 006-138**

The draft EIS described many of the ways that oil can affect birds. For purposes of analysis, the draft EIS assumed that any bird contacted by oil would die, whether immediately by direct exposure or eventually when indirect/secondary contact (e.g., contaminated foods or parental care) impairs fitness. We believe the most important point of this section was to evaluate the significance of all effects (mortalities) resulting from an accidental spill(s).

## **NSB 006-139**

In the Sale 193 EIS, we use the Alaska North Slope record of small spills (<1,000 bbl). We expect the same companies and regulators to participate offshore in the Chukchi Sea as those that are now operating on the onshore Alaska North Slope. We expect similar but not exact environmental conditions. We believe it is reasonable to assume that the rate in the Beaufort Sea will be similar to the rate on the Alaska North Slope. In addition, the NSB Science Advisory Committee recommended using the Alaska North Slope spill record. The MMS Alaska OCS Region has adopted that recommendation.

In the 2007-2012 5-Year Program EIS, Table IV-4 is mislabeled. The last row of the table under scenario elements should read  $\geq 1$  and  $< 50$  bbl. For the same size category in Sale 193 EIS ( $\geq 1$  and  $< 1,000$  bbl), we estimate approximately 46 spills (Appendix A, Table A.1-30). This is in contrast to 110 listed in Table IV-4 of the 2007-2012 5-Year Program EIS. Again, the difference is that one document considers one planning area, and the other considers two.

## **NSB 006-140**

The objective of an environmental analysis is to evaluate the significance of an anticipated impact. Significance criteria, as identified in the draft EIS, are based on the number of generations until a population recovers from an impact, not on an absolute number of birds impacted. The same number of birds affected could be a large proportion of one species, but the same number could be a relatively small proportion of another. We believe the consistent use of significance criteria realistically conveys the relative magnitude of anticipated impacts per alternative on coastal and marine birds.

Fauchild et al. (2002) concluded that the use of restricted survey data in extrapolating and predicting the distribution of seabirds may be misleading. They recommended restricted survey data should mainly be used to identify vulnerable populations on a regional scale. Given the range of impact types and the range of population densities, both of which vary according to year, season, location, and other environmental factors, MMS does not believe the calculation of such numbers would be meaningful to the public or decision-makers as it would imply precision where little exists.

## **NSB 006-141**

Section III.B.5.f(1) attributes this conclusion to Divoky, 1987.

## **NSB 006-142**

General biological information for long-tailed ducks is detailed in Section III, Affected Environment, and is not necessarily duplicated in the subsequent Section IV, Environmental Consequences. Section III.B.5.f(2) contains information and references on long-tailed ducks.

## **NSB 006-143**

Section IV.C.1.g(4) is the first of several sections that evaluate oil-spill effects. There are sections on summer spills and winter spills and the calculated percent chance that either would contact important environmental resource areas. The percent chance that a winter spill would contact the spring lead system is considerably lower than a spill reaching similar areas during the summer (see Sec. IV.C.1.g(4)(a2)). The total number of birds affected under some potential oil spill scenarios could exceed 100,000, but impacts are described by individual species and season, depending on available information.

## **NSB 006-144**

The biology of king eiders is described in the Description of the Affected Environment in Section III.B.5.f(4). Much of this detailed information is not duplicated later in the environmental consequences section, Section IV.

### **NSB 006-145**

The Proposed Action has little to do with the present status of the brant population, which appears to be negatively influenced by other factors, including hunting.

Our analysis (Sec. IV.C.1.g(6)(a)) described the potential impacts to brant nesting and molting along the Chukchi Sea coast. Some impacts are anticipated during the seismic and exploration phases of the lease area, generally resulting from aircraft activity. Overall, however, this section concludes that "...the loss of as much as 45% of the Pacific flyway population of brant [from an oil spill] would be a significant adverse impact and recovery from such an impact would take many generations to occur, if it occurred at all."

### **NSB 006-146**

We sought to describe how lesser snow geese used the area. We were unaware of the reference provided. Our search of published literature did not identify the Ritchie et al. report to the NSB. We have since obtained a copy and have incorporated pertinent information into the final EIS and the reference into the bibliography.

### **NSB 006-147**

See response to comments **NSB 006-140** and **NSB 006-143**.

### **NSB 006-148**

The MMS acknowledges there is evidence that would indicate bowhead contact with oil could cause health effects.

### **NSB 006-149**

These are references that compliment those referenced in the draft EIS in evaluation of marine mammals associated with oil. The MMS, however, acknowledges there also is evidence that would indicate bowhead contact with oil could cause health effects.

### **NSB 006-150**

The MMS has added information to reflect the significant impacts the EVOS had on fish-eating resident killer whales in Prince William Sound, mainly the AT1 and AB pods (see also the response to comment **NSB 006-121**).

### **NSB 006-151**

Please refer to Section IV.C.1.a(10) regarding the requirements MMS-approved Oil Spill Response Plan (OSRP) development and implementation. Evaluation of chemical dispersants and impacts of their use on benthic communities and marine life using benthic organisms as food would be a consideration in the development/approval of each operator's OSRP. In response to this comment, MMS has reviewed the references noted in the comment regarding amphipod recovery capability.

### **NSB 006-152**

While MMS recognizes the vulnerability of different age and sex classes of whales and the greater potential severity of impacts to younger animals, the actual number of whales affected would remain the same; the degree of impact would differ, not the number exposed.

### **NSB 006-153**

The paragraph has been edited.

### **NSB 006-154**

See the response to comment **NSB 006-059**. The analysis in this EIS used the best information available at this time. The MMS will continue to incorporate new information as it becomes available.

### **NSB 006-155**

The text has been edited.

### **NSB 006-156**

“Significant” effects are defined in Section IV.A.1. The citation ‘Cameron et al., 2005’ has been added in reference to the 4-km displacement.

### **NSB 006-157**

Haskell et al. (2006) was added to the bibliography.  
Section IV.C.1.i(3)(a) was edited to address the comment.

### **NSB 006-158**

Section IV.C.1.i(4)(b), Effects of Pipelines, has been edited to address the comment.

### **NSB 006-159**

The text has been added to Section IV.C.1.i(4)(c).

### **NSB 006-160**

Section IV.C.1.i(4)(d)(2), Effects of a Large Oil Spill, has been edited to address the comment.

### **NSB 006-161**

To consider a large oil spill that contacts bowhead whale habitat does contact whales would make false assumptions that 100% of the whale habitat is occupied 100% of the time by whales. Spills can occur, disperse, and be cleaned up during periods when no whales are present in that habitat area due to a wide variety of reasons and result in no oil contact with whales. There may be areas considered whale habitat that are used with relatively rare frequency. Direct or indirect contact of oil and whales may or may not occur depending on the specifics of a given spill event.

### **NSB 006-162**

See the response to comment **NSB 006-006**.

### **NSB 006-163**

The water quality section seeks to define the present water quality of the Chukchi sea area, identify those active process/forces that have a major contribution in defining water quality, and identify possible negative impacts that could result from oil and gas operations. The water quality section is based on reasonably foreseeable impacts and effects. Presently, climate change and the resulting effects on water



quality in the Chukchi Sea in a reasonably foreseeable future does not have general scientific consensus as to probability, effects, or impacts. International shipping through the Arctic and possible resulting spills/release cannot be reasonably anticipated nor quantified. Both issues were considered during scoping of the water quality sections; however, neither issues was brought forward within the discussions due to the lack of scientific data and/or sufficient scientific consensus; and the conjectural nature/tendency of any discussion of these topics.

#### **NSB 006-164**

The MMS recognizes that these are value judgments. However, the oil-spill analysis is predicated on the <10% chance of finding an economically producible field. Should an economically producible field be found, then the oil-spill analyses provide probabilities of spill occurrence.

The assumptions for the analysis of oil spills assume one large spill occurs and a distribution of smaller spills. The oil-spill-occurrence estimate is provided for the decisionmaker to consider. The oil-spill-occurrence estimate is a Poisson distribution based on the mean number of spills. For the Proposed Action, there is approximately a 60% chance of no spills occurring over the 27-year production life of the Proposed Action. There is approximately a 31% chance of one spill, 8% chance of two spills, and a 1% chance of three spills over the life of the Proposed Action. The chance of 0 spills is greater than the chance of one, two, and three spills added together (chance of one or more large spills).

This oil-spill-occurrence analysis was then applied to each of the resources that potentially could be impacted. The MMS does not agree that these analyses are flawed.

#### **NSB 006-165**

The NSB paraphrases the conclusion of the cumulative assessment for lower trophic level organisms, implying that the conclusion states that the proposed sale “will contribute little to the cumulative effects.” Actually, the conclusion states that the cumulative level of effects would be moderate. The cumulative level of effect has not been changed because lower trophic-level organisms, unlike seabirds and marine mammals, do not migrate through adjacent lease areas.

#### **NSB 006-166**

The first sentence of the paragraph simply states that available information does not indicate that the cumulative effects have had “any long-lasting physiological, or other adverse effect(s) on the population.” However, the remaining sentences in the paragraph go on to accurately reflect the uncertainty that exists in assessing any cumulative effects on this bowhead whale population. MMS believes the paragraph is appropriate as written.

#### **NSB 006-167**

The sentence in question uses the term “uncertain” in association with the effects as a result of particular events occurring (oil spills, exposure to noise, shipping, etc.). The sentence does not place a value judgment on the likelihood of one of the events occurring. As a result, the MMS believes the term “uncertain” was appropriately used in context to the subject matter.

#### **NSB 006-168**

The MMS believes this section is appropriate as written. Section V.C.6(a)6 does reference that incidental taking of bowhead whales by commercial fisheries has occurred but rarely, and it also notes that ship strikes have occurred. The section then incorporates by reference the NMFS’ Arctic Region Biological Opinion (NMFS, 2006a) which also reviews this information.

#### **NSB 006-169**

The section noted in the previous comment covers potential effects to bowhead whales and not impacts to subsistence-harvest activities. Potential impacts to subsistence are covered in Sections IV.C.1.1 and in Section I.C.3 (see also the response to comment **NSB 006-101**).

#### **NSB 006-170**

This section covers the ways that climate change may affect bowhead whales. The section also states that “more” changes are likely to occur and in no way suggests that climate change is not taking place. It also emphasizes the uncertainty that exists and how this impacts any definite analysis on potential impacts to bowhead whales. The MMS believes the section is appropriate as written.

#### **NSB 006-171**

MMS agrees and has revised Section V.C.6(a)6.

#### **NSB 006-172**

Richardson (2006) is a report summarizing results from the 2005 acoustic and marine mammal monitoring program for the Northstar facility. The report does not get into details of how bowhead whale react to sound but rather summarizes whale calls and noise levels from Northstar and associated activities (i.e., vessels and barges) and ambient noise levels. Therefore, inclusion of this reference is not entirely applicable for the above comment. In addition, MMS acknowledges in this paragraph and through other places in its analysis that vessel traffic can affect bowhead whales, especially close vessel approaches. The MMS, therefore, believes this issue is already adequately addressed.

#### **NSB 006-173**

Section V.B, Activities We Consider in the Cumulative-Effects Section, includes “activities other than oil and gas, including sport and subsistence hunting and fishing, scientific surveys, and marine transportation...,” which would subsume those activities conducted under the auspices of the International Polar Year (IPY). The analysis explicitly addresses the potential cumulative effects from the entire range of research cruises and other activities without specific reference to individual projects or events such as the IPY.

#### **NSB 006-174**

The possibility, degree, and extent of negative impacts to water quality in the Chukchi Sea that may result with increased global warming does not have reliable or widely accepted scientific data; as such, any discussion of global warming and the resulting effects on Chukchi Sea water quality would be purely conjecture, and not relative or appropriate discussion for the water quality assessment for oil and gas operations within the Chukchi Sea OCS.

#### **NSB 006-175**

See the response to comment **NSB 006-006**.

#### **NSB 006-176**

The MMS agrees and has updated this section with the Richardson (2006). The draft EIS does incorporate information from the MMS BWASP study that has been published to date (i.e., Treacy, 1998, 2002; Monnett and Treacy, 2005). However, this information is mostly relevant to bowhead whale presence in the Beaufort Sea, not the Chukchi Sea and, therefore, a detailed description of the BWASP results is not included in this document.

Even though the Northstar facility is on an artificial island in the Beaufort Sea, many of the issues surrounding the facility are applicable to oil and gas development in the Chukchi Sea. North Slope residents have expressed concern that the bowhead whale autumn-migration corridor might be deflected offshore in the Northstar area due to whales responding to underwater sounds from construction, operation, and vessel and aircraft traffic associated with Northstar. Richardson and Thompson (2004) and other researchers working with LGL and Greeneridge Sciences, Inc. undertook studies during the open-water period to determine both the underwater noise levels at various distances north of Northstar and potential impacts on bowhead whales north of the island, as assessed by locations determined by vocalization locations. Blackwell and Greene (2004) summarized that, in the absence of boats, “During both construction...and the drilling and production phase..., island sounds...reached background values at distances of 2-4 km...” in quiet, ambient conditions. During the normal “open water period” in 2001 (June 16 to October 31), there were approximately 989 roundtrip helicopter flights to Northstar. Data from monitoring programs of the Northstar facility from November 2004 to October 2005 found a “statistically significant, but small, deflection effect in the southern part of the bowhead migration route offshore of Northstar (west of Cross Island) at times when noise from Northstar was at its highest levels” (McDonald, Hildebrand, and Wiggins, 2006). However, the latest annual report from the Northstar monitoring program (see Richardson, 2006) found that although noise and oil spills still are a concern to whalers, they have not reported any impacts to their whaling activities from the presence of the Northstar facility. However, some whalers reported avoided close approaches to the facility. Overall, the available data on bowhead locations, coupled with data on noise propagation, indicate that if noise from Northstar is having an impact on whale movements, the effect, if it exists, is not dramatic.

#### **NSB 006-177**

As noted in the response to comment **NSB 006-176**, MMS has already included information in the draft EIS currently available to the public (i.e., already published) on the BWASP study results. More information will become available as MMS publishes additional results of these studies, and this new information will then be incorporated into the future environmental analyses and decisionmaking.

#### **NSB 006-178**

Richardson (2006) is a report summarizing results from monitoring programs of the Northstar facility from November 2004 to October 2005. The report cited a “statistically significant, but small, deflection effect in the southern part of the bowhead migration route offshore of Northstar (west of Cross Island) at times when noise from Northstar was at its highest levels” (McDonald, Hildebrand, and Wiggins, 2006). However, the report then gave three reasons as to why this deflection (i.e., reduced whale calls in project area) may have occurred, including: (1) natural variations in bowhead whale migratory corridors due to the heavier ice year; (2) higher level of ambient noise from higher mean wind speeds which masked whale calls; and (3) increased presence of non-Northstar barging traffic east of Prudhoe Bay. In addition, Northstar activities actually decreased in 2005 compared to previous monitoring years (i.e., half the number of vessel trips, more use of less impacting hovercraft and helicopters). Overall, Richardson (2006) concluded that, as in past monitoring years, the available data on bowhead locations and noise propagation indicate that if noise from Northstar is having an impact on whale movements, the effect, if it exists, is not dramatic. The MMS believes that no changes are needed to this paragraph.

#### **NSB 006-179**

The feeding behavior of bowheads and their food sources are discussed in Section III.B.4.a(1)(e)6). In Section III.B.4.a(1)(e)5), MMS acknowledges the study that shows that some of the feeding in the Beaufort Sea is on prey transported from the Chukchi Sea by advection. The paragraph in Section V.C.6.a(8) has been revised to reflect this.

### **NSB 006-180**

The MMS has included additional information in Section V.C.6.a (8) to address the comment.

### **NSB 006-181**

This paragraph does assert that *available* data do not indicate an impact to bowhead whales but then goes on to strongly qualify this statement by saying that data are inadequate to fully evaluate potential impacts on whales during this period. The MMS believes these statements are accurate and that no changes are needed to this paragraph.

### **NSB 006-182**

The paragraph referred to in the comment is misplaced. The paragraph has been replaced with the appropriate conclusion summary.

### **NSB 006-183**

Section V.C.6.b provides a brief summary of these effects. The reader is also referred to the Biological Evaluation in (contained in the draft EIS, now available at [http://www.mms.gov/alaska/ref/Biological\\_opinionsevaluations.htm](http://www.mms.gov/alaska/ref/Biological_opinionsevaluations.htm) or from MMS).

### **NSB 006-184**

This paragraph has been revised to indicate that cumulative effect of seismic exploration on coastal and marine birds in the Ledyard Bay Critical Habitat Area would be mitigated (including not allowing seismic activities within this area after July 1 of each year). The original paragraph was intended to refer to the pending NEPA review of programmatic seismic operations in the Chukchi and Beaufort seas.

The MMS conducts its environmental analyses under NEPA and ESA Section 7 consultations with the USDO, FWS based on mitigation measures that are included for the selected alternative. These mitigation measures are incorporated into future permits resulting from the lease sale. The MMS assumes that the lessees will meet the terms of their permits, and that violations to permit conditions will not occur. Agencies and the public should report perceived violations of permit conditions to our Leasing Division.

### **NSB 006-185**

The commenter is correct in stating that little is known about the distributions, population sizes, or habitat use of the Chukchi Sea by marine mammals, and that it is, therefore, difficult to determine if significant impacts will or will not occur to marine mammals. The text has been revised to reflect this.

### **NSB 006-186**

Additional text has been included in Section V.C.8 to address this comment.

### **NSB 006-187**

Section II.B.4 and Appendix D provide a description of mitigation measures for seismic operations in the Chukchi Sea.

### **NSB 006-188**

The MMS acknowledges in Section V.C.10 that climate change in the Arctic may be the greatest potential contributor to impacts on vegetation and wetlands on the North Slope. Possible negative impacts from

climate change in the Arctic on the ecology of the tundra and potential effects of changes in the permafrost depth were also discussed in the EIS for the 2007-2012 5-Year Program. The recent publications by the Intergovernmental Panel on Climate Change present a comprehensive discussion on global climate change impacts. An assessment of global climate change on the United States is given in a 2000 report entitled *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change, Overview* prepared by the National Assessment Synthesis Team (2000). For the Cumulative Analysis on vegetation and wetlands, the MMS analyzed the overall potential contribution of Lease Sale 193 to the impacts on vegetation and wetlands while recognizing that other factors outside of the MMS's control are also potential contributors to impacts.

#### **NSB 006-189**

Other anthropogenic impacts on beluga whales, seals, and other marine mammals are discussed throughout the cumulative effects section for subsistence and in the paragraph following the one cited in the comment.

#### **NSB 006-190**

Our intent was not to juxtapose the two effects producing agents but simply to suggest that another and much more likely source of significant long-term impacts to whales and whaling would be the placement of a drilling structure near the bowhead migration corridor. The text has been changed to make this distinction clearer.

#### **NSB 006-191**

We disagree with this comment. A spill of the magnitude specified in the draft EIS could not be expected to contaminate the entire migrating populations of bowhead whales, beluga whales, or other marine mammals. We believe that the sentence that states: "Harvesting, sharing, and processing of other subsistence resources should continue but would be hampered to the degree that these resources were contaminated." is articulating the commenter's point: if resources were in fact contaminated in communities far from the spill, then the sharing of the resources that were affected could not occur.

#### **NSB 006-192**

The MMS recognizes the limitations of the small sample size of exploration wells in the Beaufort and Chukchi Sea and their associated spill record. Indeed, MMS works vigorously through regulations and inspections to prevent oil spills, which keeps the sample size small. The MMS will continue to collect information on any OCS exploration spills that may occur to update its database of information develop that is reliable and validated. The following paragraph discusses the information available for the larger OCS and includes over 13,000 wells.

#### **NSB 006-193**

A reference to information on breakout events has been added to Sections III.A.4.a and III.A.4.f.

#### **NSB 006-194**

The trajectory simulations use the vectors from the models discussed in Appendix A.1, Section C.1.f, Current and Ice Information from a General Circulation Model. In the trajectory simulation portion of the OSRA model, many hypothetical oil-spill trajectories are produced by numerically integrating a temporally and spatially varying ocean current or ice field and superposing on that an empirical wind-induced drift of the hypothetical oil spills (Samuels, Huang, and Amstutz, 1982). Collectively, the trajectories represent a statistical ensemble of simulated oil-spill displacements produced by a field of winds derived from observations and numerically derived ocean currents or ice fields. The winds and currents are assumed to be statistically similar to those that will occur in the Arctic during future offshore activities. In other words, the oil-spill-risk analysts assume that the frequency of strong wind events in the wind field is the

same as what will occur during future offshore activities. By inference, the frequencies of contact by the simulated oil spills are the same as what could occur from actual oil spills during future offshore activities. Trajectory models that use historical weather data help establish the range of possible scenarios and are thus very useful in environmental impact assessment.

Historically, there have been heavier and lighter ice years in the time period used for the analysis. If present and future observations of sea ice indicate changes in the overall ice concentration, this will be incorporated into the analysis. If summer sea ice were to vanish in the Beaufort Sea, then hypothetical oil spills would be forced to move by ocean currents and wind. The sea ice model thermodynamics would produce the first-year ice, as it does in the existing runs for parts of the Chukchi Sea. The MMS would modify the seasonal (monthly) definitions, based on wind and ice conditions. The MMS has an ongoing research project on coupled sea ice/ocean modeling in the Beaufort Sea with Dr. Jia Wang (University of Alaska, Fairbanks). Reference to these research projects (Wang and Ikeda, 2000a,b,c.; Wang and Ikeda, In press.; Wang and Jin, 2000, 2001, 2004, 2005a,b,c; Wang, Liu, and Jin, 2002; Wang et al., 2003, 2004, 2005a,b). These references have been added to the bibliography.

## **NSB 006-195**

We assumed a definition of northeast Chukchi land segments (LS) as LS 80-85 (just past Wainwright to Barrow). The OSRA model estimates that launch areas (LA's) 1-13 and pipeline segments (P) 1-11 have a <0.5-3, <0.5-4, <0.5-5, <0.5-7, <0.5-8, and <0.5-10% chance of a spill  $\geq 1,000$  bbl contacting individual LS's 80-85 after 3, 10, 30, 60, 180, and 360 days, respectively, during the entire year (Tables A.2-7-A.2-10). The OSRA model estimates that LA's 1-13 and P1-11 have a <0.5-5, <0.5-8, <0.5-11, <0.5-13, and <0.5-13% chance of a spill  $\geq 1,000$  bbl contacting individual LS's 80-85 after 3, 10, 30, 60, 180, and 360 days, respectively, during summer (Tables A.2-31-A.2-36). The OSRA model estimates LA's 1-13 and P 1-11 have a <0.5-1, <0.5-1, <0.5-2, <0.5-3, <0.5-6%, and <0.5-7% chance of a spill  $\geq 1,000$  bbl contacting individual LS's 80-85 after 3, 10, 30, 60, 180, and 360 days respectively during winter (Tables A.2-55-A.2-60).

The chances of a spill  $\geq 1,000$  bbl contacting vary given the location of the launch areas. Generally launch areas and pipelines directly adjacent to land segments 80-85 have higher chance of contact. Generally the chance of contact is greater in the summer season than in the winter season. In stochastic sense oil spills tend to move more north east and south west than directly east or directly south.

If a particular group of land segments are of interest, a stakeholder can request during scoping that a group of land segments be considered in the OSRA. Another way of looking at the conditional probabilities of contact to shoreline in that area includes grouped land segments such as the NPR-A (LS's 76-77, 80-83, and 86-89). The OSRA model estimates that LA's 1-13 and P 1-11 have a <0.5-3, <0.5-7, <0.5-11, <0.5-11, <0.5-21, and <0.5-23% chance of a spill  $\geq 1,000$  bbl contacting the NPR-A (LS's 76-77, 80-83, and 86-89) after 3, 10, 30, 60, 180, and 360 days, respectively, during the entire year (Tables A.2-40-A.2-46). The OSRA model estimates that LA's 1-13 and P 1-11 have a <0.5-7, <0.5-17, <0.5-23, <0.5-28, <0.5-30, and <0.5-32% chance of a spill  $\geq 1,000$  bbl contacting individual LS's 80-85 after 3, 10, 30, 60, 180, and 360 days, respectively, during summer (Tables A.2-31-A.2-36). The OSRA model estimates LA's 1-13 and P 1-11 have a <0.5-1, <0.5-2, <0.5-3, <0.5-5, <0.5-14, and <0.5-16% chance of a spill  $\geq 1,000$  bbl contacting the NPR-A (LS's 76-77, 80-83, and 86-89) after 3, 10, 30, 60, 180, and 360 days, respectively, during winter (Tables A.2-61-A.2-66).

The OSRA model estimates that a large spill from LA's 1 and 2 in the Beaufort Sea (USDOI, MMS 2003a:Table 2-30) have a <0.5-17% annual chance of contacting LS's 22-25 (Skull Cliff to Barrow) within 360 days.

It is generally thought that some of the driftwood in the Beaufort and Chukchi seas comes from the Mackenzie River as well as the Yukon and Kuskokwim rivers (Eggersson, 1994; Dyke et al., 1997). The Yukon and Kuskokwim river driftwood becomes entrained in the Pacific water, which becomes the Alaska Coastal current in the Chukchi Sea. The launch areas in the Sale 193 area range from approximately 11-40 nautical miles offshore. Differences in the contact of driftwood versus oil spills are based on many

different variables, including the location of where the drifting particle starts. Logs may start closer to shore prior to beaching than the Sale 193 launch areas. Further work on driftwood from the Yukon and Kuskokwim rivers would be useful information.

### **NSB 006-196**

Results of the Lambertsen et al. (2005) study are incorporated into the EIS and can be found, in part, in Section IV.C.1.f(1)(g)3c).

### **NSB 006-197**

The MMS acknowledges that oil-spill cleanup in broken-ice conditions presents a challenge; however, there are tactics and equipment capable of recovering or removing oil from that dynamic environment. Oil-spill responders in the Beaufort Sea and Cook Inlet have developed strategies and equipment inventories that can be successfully applied in the broken-ice environment. In situ burning is also a valuable response method that has the potential to remove in excess of 90% of oil from the burn area. Research also continues both nationally and internationally to improve methods of spill response in cold water and arctic environments.

### **NSB 006-198**

For purposes of analysis, the 2007-2012 5-Year OCS Leasing Program assumes two large spills for the Arctic Subregion, which includes both the Beaufort and Chukchi seas. For purposes of analysis, the Sale 193 EIS assumes one large spill and includes only the Chukchi Sea. The difference between the two documents is that one considers both the Chukchi and Beaufort Sea Planning Areas together and the other considers only the Chukchi Sea Planning Area. The estimated mean number of spills for the proposed action is 0.51, which is approximately half a spill. For purposes of analysis, MMS assumes one large spill.

Table IV-4 is mislabeled in the 2007-2012 5-Year Program EIS. The last row of the table under scenario elements should read  $\geq 1$  and  $< 50$  bbl. For the same size category in the Sale 193 ( $\geq 1$  and  $< 1,000$  bbl), we estimate approximately 46 spills (Appendix A, Table A.1-30). This is in contrast to 110 listed in Table IV-4 of the 2007-2012 5-Year Program EIS. Again, the difference is one document considers one planning area, and the other considers two.

### **NSB 006-199**

The mitigation measures are stated in terms of requirements that apply at various decibel levels. Required field verification will determine the zone of influence by providing the distance from the seismic-source vessel at which a specific decibel level is reached.