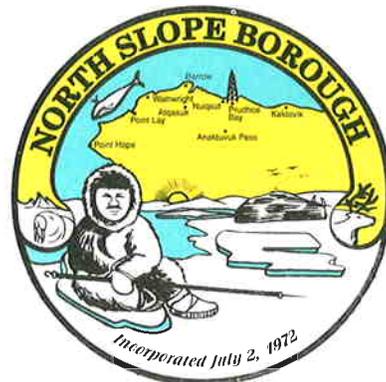


# North Slope Borough

## OFFICE OF THE MAYOR

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*Edward S. Itta, Mayor*

July 30, 2007

P. Michael Payne, Chief  
Permits, Conservation and Education Division  
Office of Protected Resources  
National Marine Fisheries Service  
1315 East-West Highway  
Silver Spring, MD 20910-3225

Dear Mr. Payne:

The North Slope Borough (NSB) appreciates the opportunity to submit comments on the Mineral Management Service (MMS) and the National Marine Fisheries Service (NMFS) Seismic Surveys in the Beaufort and Chukchi Seas, Alaska: Draft Programmatic Environmental Impact Statement (DPEIS). Given the high degree of uncertainty regarding impacts of seismic surveys and the speed with which offshore oil and gas development is occurring, NSB urges MMS and NMFS to adopt the no action alternative, as the alternative most protective of both people and natural resources.

Short of this, NSB believes that Alternative 9, limiting industry to only one survey in each of the two planning areas, may be the most protective and therefore appropriate alternative. It should therefore have been carried forward for additional consideration in the DPEIS. *See pp. 8-10 below.* If MMS and NMFS permit multiple operations under any of the other alternatives, they should include extensive monitoring and mitigation measures. They should also ensure, regardless of the alternative selected, that any required monitoring and mitigation is effectively implemented. *See p. 19 below.*

In the following comments, we first provide a discussion of the legal background of the action, then general comments, and finally, specific comments on the DPEIS.

Sincerely,

Edward S. Itta  
Mayor

## LEGAL BACKGROUND

### A. THE NATIONAL ENVIRONMENTAL POLICY ACT

Section 101 of the National Environmental Policy Act (hereafter “NEPA”), 42 U.S.C. 4331, provides:

The Congress, recognizing the profound impact of man’s activity on the interrelations of all components of the natural environment, particularly the profound growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances and recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man declares that it is the continuing policy of the Federal Government \* \* \* to use all practicable means and measures \* \* \* in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.

NEPA thus “declares a broad national commitment to protecting and promoting environmental quality.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989). Its goal is “to use all practicable means and measures \* \* \* to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.” 42 U.S.C. 4331(a).

NEPA’s action-forcing procedures require agencies to consider environmental effects. “To ensure that this commitment [to protect and promote environmental quality] is infused into the ongoing programs and actions of the Federal Government, the act also establishes some important ‘action-forcing’ procedures” (citations omitted). *Robertson v. Methow Valley Citizens Council, supra*, 490 U.S. at 348. NEPA requires that federal agencies prepare environmental impact statements to be “include[d] in every recommendation or report on proposals for \* \* \* major Federal actions significantly affecting the quality of the human environment.” 42 U.S.C. 4332(2)(C); *see also Robertson v. Methow Valley Citizens Council, supra*, 490 U.S. at 348. “Major Federal action” encompasses “new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies \* \* \*.” 40 C.F.R. 1508.18(a) (regulations of the Council on Environmental Quality (hereafter “CEQ”)).<sup>1</sup>

NEPA also requires the agency to consider human health impacts. Congress, in enacting NEPA, stated that the Act was intended, among other purposes (42 U.S.C. 4321):

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<sup>1</sup>In order to implement NEPA’s provisions, Congress created the Council on Environmental Quality. 42 U.S.C. 4342. CEQ has promulgated various regulations under NEPA. *See* 40 C.F.R. 1500, *et seq.* “CEQ’s interpretation of NEPA is entitled to substantial deference.” *Andrus v. Sierra Club*, 442 U.S. 347, 358 (1979). CEQ’s regulations are “binding on all federal agencies.” *Sugarloaf Citizens Ass’n v. Federal Energy Regulatory Commission*, 959 F.2d 508, 512, n. 3 (4th Cir. 1992).

To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; [and] to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man \* \* \*.

CEQ regulations require the agency to consider the effects of its actions on the “human environment.” See 40 C.F.R. 1500.2. “Human environment” is meant to be “interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment.” 40 C.F.R. 1508.14. CEQ regulations direct the consideration of effects of the proposed action and reasonable alternatives, including effects that are “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. CEQ regulations also direct the agency to consider “the degree to which the proposed action affects public health or safety” when evaluating the intensity of impacts. 40 C.F.R. 1508.27.

NEPA requires the agency to consider the impacts of the proposed action and reasonable alternatives to it. An environmental impact statement (EIS) under NEPA must include “a detailed statement by the responsible official on \* \* \* (iii) alternatives to the proposed action.” 42 U.S.C. 4332(2)(C). This statement must “rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss their reasons for having been eliminated.” 40 C.F.R. 1502.14(a). The alternatives analysis “is the heart of the environmental impact statement.” 40 C.F.R. 1502.14. The EIS requirement serves NEPA’s action-forcing purpose in two respects. First, it “ensures that the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts \* \* \*.” *Robertson v. Methow Valley Citizens Council*, *supra*, 490 U.S. at 349. Second, it “guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decision making process and the implementation of that decision.” *Ibid*. Thus, “by focusing the agency’s attention on the environmental consequences of a proposed project, NEPA ensures that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast” (citations omitted). *Ibid*.

While NEPA and its regulations “set forth significant substantive goals,” they do not require substantive environmental results. *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519, 558 (1978). Instead, they impose procedural requirements that agencies must follow. *Ibid*. However, these procedures “are not highly flexible. Indeed, they establish a strict standard of compliance.” *Calvert Cliffs’ Coordinating Committee, Inc. v. United States Atomic Energy Commission*, 449 F.2d 1109, 1112 (D.C. Cir. 1971). Writing for the Court of Appeals for the First Circuit, then-Judge Breyer explained (*Massachusetts v. Watt*, 716 F.2d 946, 952 (1st Cir. 1983)):

NEPA is not designed to prevent all possible harm to the environment; it foresees that decisionmakers may choose to inflict such harm, for perfectly good reasons. Rather, NEPA is designed to influence the decisionmaking process; its aim is to make government officials notice environmental considerations and take them into account. Thus, when a decision to which NEPA obligations attach is made without the informed environmental consideration that NEPA requires, the harm that NEPA intends to prevent has been suffered.

CEQ regulations under NEPA recognize, however, that complete information is not always available. In the case of uncertainty or incomplete or unavailable information, the agency must identify the missing information, but it still must make a decision. 40 C.F.R. 1502.22. In such a case, the agency must state the “relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment”; summarize “existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment”; and evaluate the reasonably foreseeable adverse impacts “based upon theoretical approaches or research methods generally accepted in the scientific community.” 40 C.F.R. 1502.22(b).

#### B. THE MARINE MAMMAL PROTECTION ACT

The Marine Mammal Protection Act, 16 U.S.C. 1361, *et seq.* (MMPA), provides protection for marine mammals, including the bowhead whale and other species likely to be affected by the proposed action. MMPA declares that marine mammals “should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management and that the primary objective of their management should be to maintain the health and stability of the marine ecosystem.” 16 U.S.C. 1361(a). Congress prohibited the taking, including the taking by harassment, of any marine mammal, except when subject to certain restrictions and conditions. 16 U.S.C. 1371(a). The Court of Appeals for the Ninth Circuit has held that “Congress’ overriding purpose in enacting the MMPA was the protection of marine mammals.” *Balelo v. Baldrige*, 724 F.2d 753, 756 (9th Cir. 1984). One important reason for this protection was the preservation of marine mammals for subsistence use, a purpose that MMPA recognizes and protects. MMPA exempts “any Indian, Aleut, or Eskimo who resides in Alaska and who dwells on the coast of the North Pacific or Arctic Ocean” from the prohibition on taking marine mammals, provided that any takings under this exemption are done “for subsistence purposes.” 16 U.S.C. 1371(b)(1). MMPA also specifically gives the Secretary authority to “enter into cooperative agreements with Alaska Native organization to conserve marine mammals and provide co-management of subsistence use by Alaska Natives.” 16 U.S.C. 1388(a). The Act further requires the Secretary to find that any taking or harassment for which a letter of authorization or incidental harassment authorization is issued “will not have an unmitigable adverse impact on the availability of such species or stock for taking for subsistence uses.” 16 U.S.C. 1371(a)(5)(A)(i) and (D)(i)(II).

Under MMPA, the Secretary of Commerce, through NMFS, may grant an Incidental Harassment Authorization (IHA), “subject to such conditions as the Secretary may impose,” for the

harassment of marine mammals occurring as the incidental result of some other lawful activity. 16 U.S.C. 1371(a)(5)(D). However, to grant an IHA, NMFS must find that the harassment (16 U.S.C. 1371(a)(5)(D)(i)):

- (I) will have a negligible impact on such species or stock, and
- (II) will not have an unmitigable adverse impact on the availability of such species or stock for taking for subsistence uses \* \* \*.

The IHA must prescribe (16 U.S.C. 1371(a)(5)(D)(ii)):

- (I) permissible methods of taking by harassment pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat \* \* \* and on the availability of such species or stock for taking for subsistence uses \* \* \*,
- (II) the measures that the Secretary determines are necessary to ensure no unmitigable adverse impact on the availability of the species or stock for taking for subsistence uses \* \* \*, and
- (III) requirements pertaining to the monitoring and reporting of such taking by harassment\* \* \*.

These requirements are also established in NMFS's own regulations. *See* 50 C.F.R. 216.102, 216.107. These regulations define negligible impact as "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates or recruitment or survival." 50 C.F.R. 216.103. Unmitigable adverse impact is defined as (*ibid.*):

an impact resulting from the specified activity: (1) That is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by: (i) Causing the marine mammals to abandon or avoid hunting areas \* \* \* ; and (2) That cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

The NMFS regulations under MMPA further provide (50 C.F.R. 216.102):

The taking of small numbers of marine mammals under section 101(a)(5)(A) through (D) [16 U.S.C. 1371(a)(5)(A) through (D)] of the Marine Mammal Protection Act may be allowed only if the National Marine Fisheries Service: (a) Finds, based on the best scientific evidence available, that the total taking by the specified activity during the specified time period will have a negligible impact on species or stock of marine mammal(s) and will not have an unmitigable adverse impact on the availability of those species or stocks of marine mammals intended for subsistence uses.

The NMFS regulations also state (50 C.F.R. 216.107(b)):

Issuance of an incidental harassment authorization will be based on a determination that the number of marine mammals taken by harassment will be small, will have a negligible impact on the species or stock of marine mammal(s), and will not have an unmitigable adverse impact on the availability of species or stocks for taking for subsistence uses.

The regulations require that NMFS adequately estimate the number of marine mammals that will be taken, because it must determine that the number will be small. *Ibid.*

### C. THE ENDANGERED SPECIES ACT

The Endangered Species Act, 16 U.S.C. 1531, *et seq.* (ESA), is intended to protect endangered species and the habitats on which they depend, including the bowhead whale, an endangered species likely to be affected by the proposed action. In enacting ESA, Congress declared that the purposes of ESA “are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species \* \* \*.” 16 U.S.C. 1531(b). It further declared that “all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of this chapter.” 16 U.S.C. 1531(c)(1). ESA prohibits the taking of any endangered species “within the United States or the territorial sea of the United States” or “upon the high seas.” 16 U.S.C. 1538(a)(1)(B) and (C). Taking includes harassment. 16 U.S.C. 1532(19) (“The term ‘take’ means to harass \* \* \*”). The Act accords to endangered species the highest level of protection. The Supreme Court has explicitly held that “Congress intended endangered species to be afforded the highest of priorities.” *TVA v. Hill*, 437 U.S. 153, 174 (1978).

### D. THE BEST SCIENCE STANDARD OF MMPA AND ESA

ESA specifically provides that each agency, in fulfilling its obligations not to allow any activity authorized by it to jeopardize the continued existence of an endangered or threatened species, or to affect adversely the habitat of such a species, must use the “best scientific and commercial data available.” 16 U.S.C. 1536(a)(2). MMPA also provides for the use of the best available science in authorizing exemptions to the prohibition on takings (16 U.S.C. 1371(a)(3)(A)):

The Secretary, on the basis of the best scientific evidence available \* \* \*, is authorized and directed, from time to time, having due regard to the distribution, abundance, breeding habits, and times and lines of migratory movements of such marine mammals, to determine when, to what extent, if at all, and by what means, it is compatible with this chapter to waive the requirements of this section [prohibiting taking] so as to allow taking \* \* \* of any marine mammal \* \* \*.

NMFS regulations under MMPA echo this requirement to use the best available science, providing that the taking of “small numbers of marine mammals” may be allowed if negligible impact on the species and no unmitigable adverse impact of the availability of the species for

subsistence use are found “based on the best scientific evidence available.” 50 C.F.R. 216.102.

When the best available science standard requires a decision to be made, even in the absence of complete information, Congress intended this standard “to give the benefit of the doubt to the species.” *Conner v. Burford*, 848 F.2d 1441, 1454 (9th Cir. 1988). The Court of Appeals for the Ninth Circuit has found that the benefit to the species is meant to be applied whenever there is uncertainty. In *Brower v. Evans*, 257 F.3d 1058, 1063-1064 (9th Cir. 2001), the court of appeals reviewed NMFS’s findings that the purse seine fishing industry had a suggested, but inconclusive, impact on two species of dolphin. Based on this information, NMFS decided that there was insufficient evidence to find a significant adverse impact. *Id.* at 1064. However, the court determined that “scientific findings in [the] marine mammal conservation area are often necessarily made from incomplete or imperfect information,” but ESA nonetheless “requires agencies to make determinations on the basis of the best scientific data available.” *Id.* at 1070. The court of appeals found that the best available science standard requires a decision to be made, even in the case of incomplete information but that “with [the] best available data standard[,] Congress required [the] agency to consider the scientific information presently available and intended to give ‘the benefit of the doubt to the species.’” *Ibid.* (citing *Conner v. Burford, supra*, 848 F.2d at 854). The finding of no significant impact, based on insufficient evidence, was held to be contrary to law and an abuse of discretion. 257 F.3d at 1070.

Other courts have also relied on *Conner v. Burford* to find that “Congress has expressed a preference for the species in a context of uncertainty.” *Rock Creek Alliance v. United States Fish and Wildlife Service*, 390 F. Supp. 2d 993, 1009 (D. Mont. 2005). Accord, *Center for Biological Diversity v. Bureau of Land Management*, 422 F. Supp. 2d 1115, 1127 (N.D. Cal. 2006) (“To the extent that there is any uncertainty as to what constitutes the best available scientific information, Congress intended ‘to give the benefit of the doubt to the species’”); *Earth Island Institute v. Evans*, 2004 WL 1774221, \*11 (N.D. Cal. 2004) (the best available science standard “is intended to give the benefit of the doubt to the species” (internal quotations omitted)); *Center for Biological Diversity v. Lohn*, 296 F. Supp. 2d 1223, 1239 (W.D. Wash. 2003) (“The best available science standard gives the benefit of the doubt to the species” (internal quotations omitted)).

Based on this legal background, we submit the following general comments.

## GENERAL COMMENTS

### COMMENT: The Document is Poorly Formatted.

Section headings and breaks are not clearly delineated using varying spacing, indents, or other methods to indicate to a reviewer that a change in topic has occurred. The problem exists as well with the Table of Contents. Conclusions are difficult to locate or recognize. A document that is difficult to access is difficult to understand and review.

### COMMENT: The Proposed Level of Activity is Unprecedented

As the NSB stated in its comments on the MMS Draft Programmatic Environmental Assessment: Arctic Ocean Outer Continental Shelf Seismic Surveys - 2006 (Draft PEA), “[e]ven recognizing that the actual level of activity proposed for the coming open water season is somewhat less than the four seismic operations in each of the Beaufort and Chukchi Seas addressed in the PEA, the number of programs now being planned is unprecedented in recent times.” NSB Comments on Draft PEA, May 9, 2006, pp. 1-2. This remains true, even though it currently appears that only one industry program will operate in the Beaufort and Chukchi Seas this year. The DPEIS would allow up to six programs in each of the Beaufort and Chukchi Seas, for a total of up to twelve seismic programs a year, for an unspecified number of years into the future. As NSB has previously stated, the proposed industrial activity is “too much, too soon, and too fast.” *Id.*, p. 1.

### COMMENT: NMFS and MMS Should Not Exclude Alternative 9 from Further Evaluation

Aside from the no-action alternative, Alternative 9, which allows only one seismic survey or ancillary activity in each planning area annually (DPEIS, p. II-10), may be the most protective alternative. The DPEIS fails to provide sufficient reason for the exclusion of Alternative 9 from further consideration.

First, the DPEIS argues that the 2006 PEA, analyzing the effects of four surveys in each planning area and necessarily, by its characterization as “programmatic” unable to distinguish between the effects of one survey and the effects of four surveys, found no significant impact, and thus found that “the one annual survey under this alternative can be assumed to have no significant impacts.” DPEIS, p. II-10. This statement is untrue. The 2006 PEA’s conclusion of no significant impacts for four surveys in each planning area rested on the implementation of the PEA’s extensive monitoring and mitigation measures. *See, e.g.*, MMS Finding of No Significant Impact: Programmatic Environmental Assessment Arctic Outer Continental Shelf Seismic Surveys - 2006, p. 2 (“By incorporating mitigation measures [including 120-dB and 160-dB monitoring and mitigation zones as described on pp. 4-5 of the FONSI] into the Selected Alternative and designating them as permit stipulations and/or conditions of approval, MMS has determined that no significant adverse affects [sic] (40 CFR 1508.27) on the quality of the human environment would occur from the Selected Alternative”); and NMFS Finding of No Significant Impact for the Issuance of Multiple Incidental Harassment Authorizations to Take Marine Mammals Incidental to Conducting Seismic Surveys in the Chukchi and Beaufort Seas

off Alaska, p. 2 (“By incorporating these additional mitigation measures [including 120-dB and 160-dB monitoring and mitigation zones as described on pp. 5-7 of the FONSI] into the Selected Alternative and designating them as IHA conditions, NMFS has determined that no significant adverse affects [sic] on the quality of the human environment would occur from implementing the Selected Alternative”). Alternative 9 does not include these additional 120-dB and 160-dB monitoring and mitigation measures, or other measures that allowed for the agencies’ FONSI. *See* DPEIS, p. II-10 (describing only a 180-dB/190-dB specified exclusion zone and other, unidentified “additional protective measures for marine animals”). Thus, it is not true that the FONSI associated with the 2006 PEA’s four surveys in each planning area would necessarily mean a FONSI satisfies MMS’ and NMFS’ NEPA obligations for one survey in each planning area.

Moreover, even if Alternative 9 could properly be assumed to have no significant impacts, this is not a reason to exclude it from further evaluation. By excluding it from further evaluation, the DPEIS necessarily excludes it from comparison with other alternatives, and thus from the possibility of being chosen as the Selected Alternative. An alternative with “no significant impacts” may well be the most desirable alternative. There is no reason its lack of impacts should render it ineligible for selection.

The DPEIS’ other stated reasons for excluding Alternative 9 from further consideration are similarly unconvincing. The DPEIS next argues that the limited collection of survey information “does not support informed decision-making” and thus would not meet the purpose and need of the Proposed Action. DPEIS, p. II-10. This is not necessarily true. Industry could work together to develop one survey plan, as appears to be happening this year. Both Conoco and GXT have withdrawn their applications for permits, and only Shell is seeking to proceed with open water seismic surveys.

The DPEIS argues that allowing only one permit “would not necessarily reduce impacts” (DPEIS, p. II-10), but this is entirely dependent upon the terms of the permit.<sup>2</sup> Although MMS regulations (30 C.F.R. 250 and 251) do not restrict operators to one seismic survey by one vessel per permit, permits requesting authorization for more need not be granted. If MMS found that only one survey could be allowed without causing undue harm to aquatic life or undue pollution, it could deny permits seeking authorization for more surveys. *See* 30 C.F.R. 251.2 (regulations ensure G&G activities carried out in an “environmentally sound” manner) and 30 C.F.R. 251.6 (operator conducting G&G exploration may not cause harm or damage to life, including aquatic life, or the environment). Similarly, if NMFS found that only one survey was consistent with a negligible impact determination under MMPA (16 U.S.C. 1371(a)(5)(D)(i)), it could not issue an IHA to any operator seeking to conduct more than one survey.

The DPEIS further argues that limiting activity to one seismic source vessel would not

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<sup>2</sup>It is also contradictory to the DPEIS’ assertion that one survey would necessarily have no significant impacts. DPEIS, p. II-10.

necessarily reduce impacts, because “the potential impacts are more directly related to where, when, how long, and how close together seismic surveys are conducted than to the absolute number of seismic source vessels.” DPEIS, p. II-11. However, the number of sources clearly affects these issues. One vessel cannot conduct two simultaneous surveys, thus ruling out the possibility of two surveys being conducted close together (except to the extent that the one source operating in the Beaufort Sea surveys in close proximity to the one source operating in the Chukchi Sea). “[W]here, when, [and] how long” will be issues regardless of the number of sources operating, but having only one source operating in each planning area makes these issues more tractable rather than less.

Moreover, MMS rules and regulations requiring the Regional Director to provide reasons why an application is denied and how to obtain approval do not provide persuasive reasons not to limit seismic activity. DPEIS, p. II-11. There is no right on the part of an operator to OCS oil and gas development. Rather, such development can only be allowed in an environmentally sound and responsible manner, respectful of the subsistence uses of the area.

In sum, the DPEIS does not provide sufficient reason for excluding Alternative 9 from further consideration. By such exclusion, the DPEIS has merely foreclosed the ability to analyze whether Alternative 9 is protective and suitable.

COMMENT: The Cumulative Activity Scenario Should Consider Effects from Surveys in Neighboring Russian and Canadian Waters

The cumulative activity scenario includes no discussion of possible seismic surveys or other industrial activity in the Canadian Beaufort Sea or the Russian waters of the Chukchi Sea. *See* DPEIS, p. III-12. Such activities have occurred in recent years, are likely to occur again, and may have significant impacts on the species considered in the analysis, particularly the bowhead whale. They should therefore be included in the baseline activity against which the proposed activity is measured. In particular, NMFS and MMS must do more to consult with the Canadian Department of Fisheries and Oceans to determine the scope of seismic operations conducted in the Canadian Beaufort Sea by GXT in 2006 and proposed for 2007, and the likely impacts to migrating bowhead whales and “downstream” Alaskan subsistence harvests.

COMMENT: NMFS and MMS Must Act Cautiously in the Face of Uncertainty

In 2006, the North Slope Borough identified the great amount of uncertainty surrounding the proposed seismic activities in its comments on the Programmatic Environmental Assessment (PEA) on seismic surveys. The concerns we identified in our comments on the PEA are still applicable to the DPEIS. We incorporate those comments by reference and ask that NMFS/MMS address them in their final PEIS.

The uncertainty continues to exist and especially applies to the current state of knowledge about marine mammals in the Chukchi Sea. The studies that industry conducted in 2006, in association

with their seismic surveys, were intended to help fill some of the data gaps. Unfortunately, we are still in a situation where we have few current data. The analyses of the 2006 data have not been completed.

Therefore we find ourselves in a similar situation when considering the Draft Programmatic Environmental Impact Statement for seismic surveys in the Beaufort and Chukchi seas. There continue to be few recent data available on marine mammal distribution, abundance and habitat use in the Chukchi Sea. The data that are available are out of date. These data were collected during the early 1990s. Since these data were collected, there have been substantial changes in the Chukchi Sea due to global warming and human activities. The lack of recent data on marine mammals in the Chukchi Sea makes it virtually impossible to evaluate the impacts, assess whether the impacts are significant, or mitigate impacts from seismic activity.

Understanding cumulative effects is also very difficult. Federal, state and local agencies and oil and gas companies have had a difficult time evaluating impacts from a single industrial operation. Evaluating and mitigating impacts from multiple operations has not been adequate. Because it is extremely difficult for NMFS and MMS to determine what the cumulative impacts from multiple oil and gas activities will be, NMFS and MMS should use the precautionary principle, limit seismic activities, and require extensive monitoring and mitigation. Further, NMFS and MMS must conduct compliance monitoring. In 2006, some of the seismic activities did not comply with mitigation measures, but there was admittedly no compliance monitoring. This must change in the future. The federal government must ensure that companies adhere to the permit stipulations and mitigation measures otherwise the NEPA process is pointless.

In its comments on the Notice of Intent to prepare this DPEIS, NSB noted the lack of data and the many sources of uncertainty regarding the bowhead whale, other marine mammals, and seismic impacts. *See* NSB Comments on Notice of Intent, December 18, 2006, p. 9. NSB urged NMFS and MMS, in light of this uncertainty, to take a precautionary approach to their analysis. *Ibid.* Such an approach is required by MMPA and ESA's best science standards, which, as set forth above (pp. 8-10), require that the benefit of the doubt be given to protected species. Uncertainties should therefore be resolved in favor of protected species.

The DPEIS admits uncertainty, at least as far as the bowhead whale is concerned, and states that such "[u]ncertainty should be acknowledged explicitly, because it may point to areas that may need further monitoring and consideration of adaptive management." DPEIS, p. III-101. Specifically, it acknowledges uncertainty as to the extent and specifics of the seismic surveys themselves, uncertainty as to the adverse effects of noise on whales, and uncertainty about bowhead whale use of the Chukchi Sea and many parts of the Beaufort Sea. *Ibid.* It further notes uncertainty about the status of this particular population of bowhead whales.<sup>3</sup> *Ibid.* The

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<sup>3</sup>The DPEIS also notes that this population of bowheads is critical to the continued existence and viability of the species as a whole. DPEIS, p. III-101. This is another reason for MMS and NMFS to act cautiously.

DPEIS also acknowledges the lack of information about the hearing capabilities of large whales, including bowhead whales. DPEIS, p. III-106. As pointed out by Cheryl Rosa, DVM, PhD, of the North Slope Borough Department of Wildlife in her testimony at the Barrow, Alaska Public Hearing on the DPEIS, this lack of information is extensive, and especially critical, given what is known about the importance of hearing to marine mammals and, in particular, to whales. Public testimony of Cheryl Rosa, April 26, 2007. This uncertainty leads the DPEIS to conclude that its analysis of impacts from seismic surveys to the bowhead whale population must be protective of that population. *Ibid.*

Given this uncertainty and their acknowledgment that they should act protectively, MMS and NMFS should adopt an alternative and mitigation measures that provide the greatest possible protection for the bowhead whale. Alternative 9 could limit bowhead whale exposure to seismic surveys. Among the alternatives that would allow multiple operations, Alternative 3, with its required 120-dB monitoring and mitigation requirements, or Alternative 8, with its prohibition on surveying in the Chukchi Sea when sensitive and vulnerable mothers and calves are migrating through it, may provide the most protection.

Nonetheless, this acknowledgment of uncertainty regarding the bowhead does not go far enough. There is also, as NSB has previously pointed out to MMS, uncertainty regarding many other species, including seals, whales other than the bowhead whale, and polar bears, all of which are protected by the MMPA. NSB Comments on Notice of Intent, December 18, 2006, p. 12. The DPEIS itself acknowledges many areas where there is uncertainty or a lack of data for nearly all biological resources likely to be impacted by the proposed action. *See, e.g.*, DPEIS, p. III-53 (noting the lack of knowledge about the importance of various migratory stop-overs to endangered birds), p. III-54 (noting the unknown size of the breeding population of Kittlitz's murrelet, a candidate species under ESA), p. III-68 (stating that "specific knowledge of marine bird distribution and density within the survey area is limited"), p. III-72 (stating that "there is no reliable information about population-abundance trends, and [] reliable estimates of current or historical abundance are not available, for the entire Northeast Pacific fin whale stock"), p. III-73 (noting lack of data as to humpback whale use of the Chukchi Sea), p. III-104 (noting uncertainty about the hearing capabilities of baleen whales, which are likely to persist because of the difficulty of studying these capabilities, and uncertainty about the effects of sound on them), p. III-131 (acknowledging lack of data to determine whether fin or humpback whales use the Chukchi Sea Planning Area), p. III-135 (stating that little is known about the biology and ecology of ice seals, including bearded, ribbon, ringed, and spotted seals, and that the population statuses of ice seals and Pacific walrus are unknown), p. III-142 (noting lack of information about important aspects of beluga whale biology, including its late-summer distribution, fall-migration patterns, and winter distribution and feeding activities), p. III-143 (noting that there is no reliable population estimate for Alaska minke whales and insufficient data to determine stock status designations for Alaska harbor porpoises), p. III-150 (noting the lack of a reliable estimate for the Chukchi/Bering Sea stock of polar bears, and an uncertain population status), p. III-155 (noting uncertainty about effects of seismic surveys on food resources for pinnipeds), p. III-157 (acknowledging the lack of research on effects of seismic activity on toothed whales and the

uncertain impact on toothed whale food), p. III-159 (noting the lack of study of effects of seismic activity on polar bears).<sup>4</sup>

The DPEIS states that, given the various uncertainties, and the lack of knowledge of the impacts of seismic surveys on marine mammals, “the impact analysis \* \* \* on nonendangered and nonthreatened marine mammals takes a protective approach and bases conclusions on potential effects on the most sensitive members of the population.” DPEIS, p. III-153. However, the DPEIS fails to acknowledge that this approach is also necessary for the other categories of biological resources for which it assesses impacts, including fish resources and marine birds. There are many uncertainties in both resource categories, as set forth above, and these uncertainties can only be accounted for with an explicitly protective approach.

The DPEIS must do more, however, than simply acknowledge that a protective approach is required; it must actively apply that protection in its analysis of impacts. This means that the DPEIS cannot simply assume that Alternatives 3 to 8 will provide adequate protection, but must actively analyze the likelihood of impacts given the various combination of protective measures. *See, e.g.*, DPEIS, p. II-12 (commenting that Alternatives 3 to 8 are all “environmentally sound” because they provide protective measures, but failing to analyze adequately the different impacts to which each will give rise).

COMMENT: The Bowhead Whale Significance Threshold is Inappropriate

One of the most substantial shortcomings in the threshold is that neither NMFS, MMS nor industry are able to determine whether seismic surveys affect the survival or reproduction of one or many bowhead whales. Further, it is not clear how NMFS or MMS will have industry monitor these types of impacts. A threshold that can be assessed and which is measurable is needed. Because NMFS and MMS cannot determine how seismic affects survival or reproduction of bowheads or other marine mammals, they should instead develop thresholds that are capable of measurement, such as by counting the number of animals that can be disturbed or displaced from their migratory path.

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<sup>4</sup>The DPEIS also acknowledges considerable uncertainty about fishery resources. *See, e.g.*, DPEIS, p. III-32 (noting lack of sampling for coastal and marine fish species, particularly in the Chukchi Sea, the lack of specific information for many species of fish, making it “necessary to discuss the biology and ecology at the family level,” severe data deficiencies as to all aspects of fish biology in the Chukchi Sea, and severely outdated data, where there are data available at all), p. III-40 (stating that fish resources of northeastern Chukchi Sea have not been surveyed for at least fifteen years), p. III-43 (noting lack of information even as to the species of squid in the project area, thus making it impossible to describe their biology or ecology, as well as poor descriptions of the biology and ecology of snow crabs in the area), p. III-46 (noting the “paucity of studies [of fish resources] in both the Chukchi and Beaufort Seas”), p. III-51 (noting lack of information on distribution and abundance of rare fish, and limited and non-existent information at the species-level). Though in most cases not protected by the MMPA or ESA’s best science principles, caution should also be exercised with regard to these resources.

COMMENT: The Subsistence Harvest, Sociocultural Systems, and Environmental Justice  
Significance Thresholds are Inappropriate

The thresholds for subsistence harvest patterns, sociocultural systems, and environmental justice are also inappropriate, and insultingly so, as NSB has previously commented. NSB Comments on Lease Sale 193 DEIS, December 29, 2006, p. 4. As NSB explained, in commenting on identical thresholds in the Lease Sale 193 DEIS (*ibid.*):

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 DPEIS, p. III-23.] 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. \* \* \* 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.

The DPEIS acknowledges that seismic activity may have a major adverse effect on the bowhead whale subsistence hunt. DPEIS, p. III-172. Regarding other species, including beluga whales, seals, walrus, waterfowl, fish resources, and polar bears, the DPEIS finds that any effects are likely to be localized and temporary and thus that, although individual hunts may be disturbed, overall hunting success will not be affected. DPEIS, pp. III-172 to 173. This conclusion overlooks two major points. First, time, effort, and other resources available to be devoted to any particular subsistence hunt are limited. Disturbance to a local hunt cannot necessarily be made up elsewhere, as the DPEIS seems to suggest. Second, even “temporary” disturbances may have tremendous effects if they are repeated, something that seems likely to occur if as many as six surveys are permitted in each of the Chukchi and Beaufort Seas. In concluding that effects will be local and temporary, the DPEIS fails to account for possible synergistic or sequential effects from multiple surveys.

The sociocultural systems analysis acknowledges that disruption of the subsistence hunt may have sociocultural effects. DPEIS, p. III-187 (“The more predominant issue associated with potential impacts on sociocultural systems is the potential disruption of seismic survey noise on subsistence-harvest patterns particularly on the bowhead whale, which is a pivotal species to the Inupiat culture. Such disruptions 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”). However, its suggested responses to these disruptions are insufficient. The DPEIS

suggests these impacts may be mitigated through the implementation of Alternative 8, which would impose restrictions on seismic operators, but otherwise leaves the mitigation of these impacts to the conflict avoidance agreement negotiation process. *See* DPEIS, pp. III-187 to 188. However, the DPEIS acknowledges that the negotiation process would be sorely tested by and possibly unequal to the challenges of coordinating activities on the scale envisioned by the proposed action. DPEIS, p. III-175.

The environmental justice impacts analysis largely restates the subsistence harvest impacts analysis. DPEIS III-194. Though it acknowledges that “Inupiat Natives could be disproportionately affected by any alternative that allows seismic because of their reliance on subsistence foods,” it does nothing more than reiterate that there will not be significant impacts to subsistence resources because of unspecified mitigation measures yet to be chosen as part of the selected alternative. *Ibid.* Like other analysis documents before it, the DPEIS fails to acknowledge 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.” NSB Comments on Lease Sale 193 DEIS, December 29, 2006, p. 7.

COMMENT: The Threatened and Endangered Birds Significance Threshold is Inappropriate

Even though Spectacled and Steller’s eiders are both listed as threatened under ESA (DPEIS, pp. III-53 and III-54), the significance threshold allows for impacts from which it would take an entire generation to recover. DPEIS, p. III-23. This is inappropriate for species that are already in decline, and that would have trouble recovering from any impact. In addition, the threshold is not appropriate because it cannot be monitored. The US Fish and Wildlife Service is not currently able to determine whether the North American breeding population (the listed population) is declining, increasing or stable. Therefore, it will be impossible for NMFS, MMS or industry to determine the impacts on Steller’s Eiders. Further, little is known about Spectacled Eider habitat use in the Chukchi Sea, even though critical habitat has been designated. NMFS and MMS will not be able to determine what the effects from seismic activities are on Spectacled Eiders within or outside the critical habitat areas. Measurable thresholds are needed for Spectacled and Steller’s Eiders. A prohibition on seismic and associated activity in the critical molting habitat of Ledyard Bay after July 1, as the DPEIS suggests is being considered (DPEIS, p. IV-6), would help provide necessary protection,<sup>5</sup> but it does not remedy the inappropriateness of the significance threshold.

COMMENT: The Biological Resources Significance Threshold is Inappropriate

The biological resources significance threshold, covering seals, walrus, beluga whales, gray whales, polar bears, marine and coastal birds, lower trophic-level organisms, fish/fishery

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<sup>5</sup>This prohibition was included in the 2006 MMS G&G permits and the NMFS IHAs, apparently without causing any controversy or difficulty. It should be included in 2007 and future authorizations.

resources, and essential fish habitat, is also inappropriate. As set forth above (pp. 15-19), the DPEIS acknowledges many sources of uncertainty in its analysis of impacts to these resources. Given this uncertainty and the lack of data, impacts cannot be readily assessed, and impacts of three generations or ten years (DPEIS, p. III-23) are simply too great. Further, as NSB has previously stated, the effects of climate change will add to uncertainties, as well as exacerbate adverse impacts to populations that may already be ill-equipped to deal with changing climates. NSB Comments on Draft PEA, May 9, 2006, p. 12. Impacts are thus likely to be significant even if they persist for much less than three generations or ten years.

Moreover, the Fish and Wildlife Service has proposed that the polar bear be listed as threatened under ESA, primarily because it is threatened by the loss of sea ice resulting from climate change. 72 Fed. Reg. 1064 (January 9, 2007). An impact lasting ten or more years is too much of an impact for a species proposed for ESA listing, especially because this PEIS has no specified end date, and may be used for the analysis of seismic activities well into the future and after the listing process for polar bears is complete.

COMMENT: Lack of Information is Not Equivalent to Lack of Impact

NMFS and MMS should acknowledge that lack of documented impacts to a resource is not the same as lack of impacts. For example, regarding bowhead whales, the DPEIS states (p. III-129):

Available information does not indicate there were detectable, long-term population-level adverse effects on the BCB Seas bowhead from the high level of seismic surveys and exploration drilling during the late 1970's and 1980's in the Beaufort and Chukchi seas. However, it is important to note that sublethal impacts on health (such as reduced hearing or increased stress) could not be detected in this population. Effects on reproduction or survival would not be detectable, unless the level of effects was great enough to be detected given the error around population estimation. The rates of population increase do not indicate any sublethal effects (if they occurred) resulted in a detectable effect on this population's recovery.

Similarly, regarding fish resources, the DPEIS states (p. III-46):

Because of the paucity of studies in both the Chukchi and Beaufort Seas, a review of the available science and management literature shows that at present, there are no empirical data to document potential impacts from seismic surveys reaching a local population-level effect; also, the experiments conducted to date have not contained adequate controls in place to allow us to predict the nature of a change or that any change would occur. Thus, the information that does exist has not demonstrated that seismic surveys alone would result in significant impacts to marine fish or related issues (e.g., impacts to migration and spawning, rare species, subsistence fishing).

Such statements provide no support for the DPEIS's ultimate conclusion that Alternatives 3 to 8

are all environmentally sound. DPEIS, p. II-12. Lack of studies simply means lack of data; it does not mean that “available data” show no population-level impact or no adverse effects. The best science standard does require that NMFS and MMS still make a decision, even in the face of lack of evidence. *See Conner v. Burford*, 848 F.2d 1441, 1454 (9th Cir. 1988). In such circumstances, NMFS and MMS may choose to proceed with the proposed activity, but they should be clear that they are basing their decision not on a lack of evidence of impact, but on a lack of evidence of any sort, making it impossible to say that there will be no impacts.

COMMENT: Research Monitoring is Needed

As NSB stated previously (NSB Comments on Draft PEA, May 9, 2006, p. 4):

A considerable amount of research monitoring should be required of the oil and gas industry or undertaken by MMS. This is necessary because of the lack of information on the most basic biological information of most species that occur in the Chukchi and Beaufort Seas. In addition to data gaps, there are environmental changes that are occurring. For example, global warming is causing a change. In order to separate out impacts of global warming from seismic operations, a great deal of baseline data is needed. These baseline data do not exist and yet seismic activity [did] occur in 2006 [and likely will occur in 2007 and into the future]. Every effort must be made to collect the baseline data that will be needed to assess impacts.

Additional information is needed so that appropriate impact assessments can be conducted and appropriate mitigative measures can be employed. If data gaps are not filled, MMS should use a precautionary approach in implementing mitigation.

These data gaps still exist, and MMS and NMFS should make every effort to ensure that additional data are gathered to strengthen and support their impact assessments. Research monitoring is just as necessary in 2007 as it was in 2006, if not more so, as seismic activity is now almost certain to continue into the future.

COMMENT: Monitoring and Mitigation Measures Should be Imposed to Protect Vulnerable Segments of the Bowhead Whale Population

The DPEIS acknowledges considerable uncertainty regarding particularly vulnerable segments of the bowhead whale population, including female whales and their calves and feeding aggregations. The DPEIS “acknowledge[s] that the unequivocal determination of how baleen (or other cetacean) calves, especially newborn calves, or females attending calves[,] are affected by sound exposure is difficult.” DPEIS, pp. III-99 to 100. It estimates these impacts based on information from a number of sources, all of which allow analogies to the impact of seismic surveys on bowhead females and calves, but none of which provide an exact description of actually observed effects on bowheads. DPEIS, p. III-100. The DPEIS states clearly, and repeatedly, that effects on this part of the population just cannot be predicted with certainty. *See*,

*e.g.*, DPEIS, pp. III-127 and III-129. However, the DPEIS acknowledges that there is enough evidence of possible adverse impacts to suggest the need for a precautionary approach incorporating adequate monitoring and mitigation to protect females with calves. DPEIS, p. III-100. NSB urges MMS and NMFS to require sufficient monitoring and mitigation, either through the alternative selected or the additional measures imposed, to ensure protection.<sup>6</sup>

The DPEIS also discusses potential impacts to feeding whales. The DPEIS finds that feeding whales are less likely to respond to industrial noise than whales engaged in other activities, such as migration (DPEIS, pp. III-116 to 117), but that this lack of response does not necessarily mean lack of harm, because the need to feed may overcome the disturbance caused by the noise. DPEIS, p. III-125. The DPEIS finds that exclusion of whales from their feeding grounds could be biologically significant. *See* DPEIS, p. III-117 (citing a study of grey whales). As Cheryl Rosa noted in her testimony at the Barrow, Alaska Public Hearing on the DPEIS, “data [on important feeding times and places] exist[] and should be compiled to allow the creation of a document that maps feeding areas on a temporal scale and prohibits seismic in or near these regions during this time.” Public testimony of Cheryl Rosa, April 26, 2007.

COMMENT: Even the 120 dB Level of Monitoring and Mitigation May Not Provide Sufficient Protection for Bowhead Whales

The DPEIS proposes a number of alternatives with protection for bowhead whales set at the 120 dB level, the most conservative of the approaches considered. These include Alternative 3, 5, and 7. *See* DPEIS, pp. II-1 to 2. However, as NSB commented on the 2006 PEA, even this might not be sufficiently protective (NSB Comments on Draft PEA, May 9, 2006, p. 4):

To ensure that there are no significant impacts from seismic surveys in 2006 [and in the future], industry must make sure they do not disturb, deflect, or exclude whales from important habitats. Without the proper mitigation monitoring and adherence to mitigation measures, there is no way to avoid impacts. Alternative 3 [identical in the 2006 PEA to Alternative 3 in the DPEIS] likely provides the most appropriate zones, the 120 dB isopleths, to monitor for mitigation. We need to point out though, that the 120 dB isopleth zones are based on studies that showed bowheads were nearly completely excluded from the 120 dB zones. We know that bowheads began reacting to industrial sounds at much lower sound levels than 120 dB. Therefore, even Alternative 3 may not provide the appropriate mitigation to avoid significant impacts.

The IWC Scientific Committee reviewed seismic effects on large whales (IWC 2006). During that review there was considerable discussion about the high sensitivity of bowhead whales to low levels of industrial sounds. The IWC recommended that considerable effort to put into

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<sup>6</sup>Cheryl Rosa of NSB commented on the sensitivity of early calf development, and recent research showing that calves are more sensitive to a wider range of frequencies of sound. Public testimony of Cheryl Rosa, April 26, 2007. These concerns indicate further reasons to be cautious of effects on bowhead cow-calf pairs.

determining the biological significance of this high sensitivity. Further, they identified the need to understand the cumulative effects from multiple industrial operations. NMFS and MMS must acknowledge the IWC analysis and recommendations in the final PEIS.

COMMENT: Sighting Rates Do Not Suggest that Bowhead Whales Necessarily Reoccupy an Area within 24 Hours of the End of Seismic Activity

NSB has previously commented on MMS and NMFS's use of a study by Richardson, *et al.* (1999), to suggest that bowhead whales will reoccupy an area from which they have been displaced by seismic activity within 24 hours of the end of seismic activity. *See* DPEIS, p. III-114 for discussion of the study. As NSB has stated (NSB Comments on Draft PEA, May 9, 2006, p. 15):

This paragraph [beginning "Sighting rates within a radius of 20 km of seismic operations..."] refers to observations made by Richardson *et al.* (1999). The study suggested that bowheads reoccupy a previously active seismic area within 12 to 24 hours of cessation of seismic activity. This paragraph overstates the conclusions in Richardson *et al.* (1999). First, Richardson *et al.* stated that their analysis of reoccupation was preliminary but MMS does not treat it as such in the PEA [or the DPEIS]. Secondly, the number of observations within a 20 km zone around the previously active seismic was small (only 13 whales were observed between zero and 96 hours after seismic). This small sample size means that the statistical power (i.e. ability) to detect a difference is low. Lastly, the data could reasonably be interpreted in other ways: (1) the overall results (over the entire survey period, 0 to 96 hours after seismic, the density of whales in the 0 to 20 km zone was lower than the density in the 20 to 90 km zone,  $p < 0.001$ , page 5-62 in Richardson *et al.* 1999) indicated that whales did not reoccupy the active seismic zone even after 96 hours. Further, there were no data collected beyond 96 hours so the reoccupation might have taken much longer than 96 hours. Or (2) that whales immediately reoccupied the active zone because the multiple comparison tests (binomial tests) did not show a difference in density of whales between the zones in the category of 1 to 12 hours after seismic. These two wildly different interpretations further illustrate that the analysis was preliminary and the sample size too small to adequately test the question of reoccupation.

COMMENT: NMFS and MMS Should Include in All Authorizations a Provision Requiring the Cessation of All Seismic Activity if Synergistic Effects Prove Greater than Expected

The DPEIS notes that "MMS and NMFS can restrict operations if additive synergistic effects occur from simultaneous surveys that might hinder the [bowhead] whales' migration." DPEIS, p. III-124. However, this provision should be given more emphasis; it should be clear that MMS and NMFS can restrict all seismic activity if greater than expected adverse effects are observed. Authority to take such a step flows from the MMPA, which allows NMFS to issue IHA's only if

there are negligible impacts on affected populations and which requires NMFS to “modify, suspend, or revoke an authorization if [NMFS] finds that the provisions of clauses (i) [negligible impact on the species and no unmitigable adverse impact on subsistence] and (ii) [least practicable impact on the species and no unmitigable adverse impact on subsistence] are not being met.” 16 U.S.C. 1371(a)(5)(D)(iv). Similarly, by its own regulations MMS may temporarily stop exploration activities if they pose a threat of harm to life, including fish and other aquatic life, or the environment. 30 C.F.R. 251.9(a).

COMMENT: Required Monitoring and Mitigation Should Be Strictly Enforced

One seismic survey operator openly admitted at the April 2007 Open Water Meeting that it did not conduct the required 120-dB monitoring and mitigation because it felt that, since ConocoPhillips, Alaska, Inc. had managed to obtain a stay of the requirement, it too could do so. This is not an adequate reason to violate the terms of the G&G permit and the IHA issued, since the stay did not apply to other operators. However, the larger problem is that NMFS and MMS apparently had no system in place to ensure that operators were in compliance. In 2007 and the future, NMFS and MMS should have monitoring systems to ensure that all operators comply with the terms of their authorizations and, if they do not, or those authorizations should be immediately revoked.

COMMENT: The DPEIS Must Adequately Analyze the Alternatives for Adverse Impacts to Subsistence, rather than Relying on the MMPA IHA Process to Ensure No Unmitigable Adverse Impact

The DPEIS states that Alternatives 3 to 8 all require applications for MMPA authorizations, which must result in determinations that the proposed activity will not have an unmitigable adverse impact on the availability of a species for subsistence use before an IHA can be granted. DPEIS, p. II-12; *see also* 16 U.S.C. 1371(a)(5)(D)(i)(II). The DPEIS concludes “Given that Alternative 1 [no action] results in no seismic surveying and Alternatives 3 through 8 all require an MMPA authorization (and subsistence determination), then the remaining alternatives are all similar in regards [sic] to avoiding unmitigable adverse impacts on subsistence.” DPEIS, p. II-12. However, the DPEIS also states that NMFS will rely on this PEIS for future MMPA authorization determinations. DPEIS, p. I-1. If NMFS will rely on this PEIS in making MMPA determinations, it cannot state that the MMPA process will ensure no adverse impacts on subsistence. Rather, the appropriate analysis must be conducted in this document. The DPEIS should analyze the different degrees of impact from the different alternatives, rather than lump them together and assume that the MMPA process will resolve the problem.

COMMENT: Alternatives and Mitigation Measures Must be Chosen to Reduce Impacts on the Bowhead Whale Subsistence Harvest

As stated above (p. 26), the DPEIS acknowledges that seismic surveys could have a major adverse impact on subsistence harvest patterns. For example, the DPEIS recognizes that seismic

activity could force the offshore deflection of bowhead whales, a “displacement [that] could have a major impact on local access and harvest success of bowhead whales.” DPEIS, p. III-172. Because restrictions on operating permits and IHA’s will protect the spring harvest, the DPEIS finds that Kaktovik, Nuiqsut, and Barrow will be most vulnerable. DPEIS, p. III-175. Barrow will be particularly vulnerable, because fall-migrating whales passing through hunting areas around it will have seismic noises in the Beaufort Sea behind them and seismic noises in the Chukchi Sea before them, potentially causing even greater deflection. *Ibid.* As the DPEIS acknowledges the fall hunt in Barrow is particularly important. *Ibid.* The DPEIS further acknowledges that (*ibid.*):

Conflict avoidance agreements between the AEWG and oil operators conducting one or perhaps two seismic-survey operations per open water season have tended to mitigate disruptions to the fall hunt in these communities, but the magnitude of six concurrent seismic surveys would test the ability of survey operators and whalers to coordinate their efforts to prevent disruptions to the hunt.

MMS and NMFS must ensure that an alternative is chosen and mitigation measures imposed that will avoid this major impact, and not simply rely on the conflict avoidance agreements.

COMMENT: The DPEIS Fails Adequately to Address Human Health Impacts

In its comments on the Notice of Intent to Prepare this DPEIS, NSB stated that “the DPEIS must adequately address human health and sociocultural impacts.” NSB Comments on Notice of Intent, December 18, 2006, p. 12. NSB explained the importance of human health analysis and suggested that the DPEIS utilize the best available information, including information that could be provided from NSB public records, and the best available methodology, specifically Health Impact Assessment. *Ibid.* As stated above (pp. 25-28), the DPEIS significance threshold for sociocultural impacts and the accompanying impact analysis are inadequate. The DPEIS has completely failed to address NSB’s human health concerns. At a minimum, the PEIS must first incorporate as appropriate the human health impact analysis contained in the April 2007 OCS Oil and Gas Leasing Program 2007-2012 Final EIS (pp. III-203, IV-240, and IV-472), then determine specifically what potential impacts to human health are associated with the proposed seismic operations, and finally, identify mitigation that can reduce or eliminate those impacts.

COMMENT: Multiple Planning Processes Engender Community Anxiety

NSB has repeatedly commented upon the significant community anxiety created by multiple planning processes and the repeated failure of regulatory agencies to address this anxiety in any meaningful way. *See, e.g.*, NSB Comments on Lease Sale 193 DEIS, December 29, 2006, p. 7, NSB Comments on Notice of Intent, December 18, 2006, p. 13. As NSB has explained (NSB Comments on Lease Sale 193 DEIS, December 29, 2006, p. 7):

[W]e 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.

NMFS and MMS have acknowledged this concern and stated that they have “taken measures to more carefully plan the number and timing of meetings with regional tribal groups and local governments.” DPEIS, p. III-191. However, more needs to be done in this respect. Comments on this DPEIS were initially due, for example, at a time when the International Whaling Commission is meeting, and, more importantly, when spring whaling was occurring. This strains the ability of North Slope residents, biologists, and others to provide effective comments and to satisfy their other responsibilities. Alternative 8 goes some way toward remedying this problem by reducing the task of negotiating the Conflict Avoidance Agreements through the imposition at the G&G permit and IHA stage of spatial, temporal, and operational restrictions. *See* DPEIS III-194 (“By specifying restricted locations and time periods, [Alternative 8] would streamline the plan of cooperation (which could be in the form of a CAA) negotiation process and reduce stress on local community organizations that normally negotiate such agreements”). Whatever alternative NMFS and MMS ultimately select, NSB urges them to consider incorporating some or all of the restrictions proposed for Alternative 8.

## SPECIFIC COMMENTS

In addition to the comments below, please also refer to the acoustic comments submitted by the Alaska Eskimo Whaling Commission, which we support.

Pg. I-8, Issues and Concerns: NMFS and MMS failed to identify that disturbance to all marine mammals is a critical concern and issue. They identify that disturbance to bowheads is a concern but disturbance to other marine mammals, such as belugas, ice seals, walrus, polar bears, and gray whales, is also a concern. In addition, potential impacts to human health, and particularly effects resulting from a reduced consumption of subsistence foods, should be added to the list of Issues and Concerns.

### *General Comments on Acoustic Section:*

The authors need to better and more clearly qualify dB levels whenever stated (e.g., received level, pressure, rms, re. 1  $\mu$ Pa). Are source levels always zero-to-peak pressure? If so, then they would not be rms. Are received levels always zero-to-peak pressure? If so, then they would not be rms. Document should have or refer to either an appendix or another document that clearly explains underwater sound measurement nomenclature and units, especially different ways of stating sound pressure level, intensity and energy.

Also, for clarity, consistent units should be used for speed, distance, area (e.g., sometimes use miles/h, knots, km/h).

Page I-9: The DPEIS should analyze the effects of vertical seismic profiling separately from high resolution and deep seismic activity, as is done for environmental review of activities in the Gulf of Mexico.

Page II-2: several of the standards appearing in the MMS existing G & G exploration stipulations and guidelines, and incorporated into Alternatives 2-9, require clarification if the degree of protection they are meant to provide is to be assessed in any meaningful way. First, it is unclear whether, and if so, why, the last six bullets only apply to whales, and in most cases, only to concentrations of whales. It is unclear what number of animals would constitute a concentration, and why a single cow/calf pair, for instance, should not be afforded comparable protection. In addition, the second bullet states, in part, that “operations shall be conducted in a manner to ensure that they will not cause pollution, cause *undue harm* to aquatic life, create *hazardous or unsafe* conditions, or *unreasonably interfere* with other uses of the area”. The criteria that are used to evaluate whether an activity reaches any one of these italicized thresholds must be described. Dictionary definitions of “undue” range from “inappropriate” and “unsuitable”, to “excessive”. Presuming that it is that latter of the three that applies here, how much harm is excessive? With respect to the creation of hazardous or unsafe conditions, the NSB assumes that the agencies recognize that offshore subsistence hunting activities, especially whaling, are inherently extremely dangerous. Given that any deflection of whales due to seismic activity that requires hunters to travel greater distances to harvest and transport the animals significantly adds to the danger of such activities, the agencies must indicate whether any level of *added* danger is

permissible. In the same vein, the agencies must indicate what level of interference with offshore subsistence activities would be considered “reasonable”. Significant with respect to this issue is the conclusion stated in the third paragraph on page II-13 that “impacts to subsistence still might occur under all identified alternatives”.

Page II-3: Proposed Mitigation: NMFS and MMS have not shown that the mitigation measures are effective. For example, it is not clear that “ramp up” is effective at eliminating physical injury to marine mammals. Data must be collected to determine whether mitigation measures actually provide mitigation from effects from seismic. The same concept applies to the size of exclusion or safety zones. Are they of sufficient size to prevent physical harm to marine mammals from seismic sounds?

Page II-4: Monitoring of the Seismic Survey Area: Preliminary analysis of 2006 data showed that oil and gas companies are not able to effectively monitor exclusion or safety zones around active seismic operations. For exclusion zones, companies are supposed to be able to monitor the entire zone so they can shut down seismic surveys in the event a marine mammal enters the zone. If an animal enters the zone, it might sustain physical harm if airguns are not shut down. Results from 2006 show conclusively that companies are not able to monitor exclusion zones even under decent weather and lighting conditions, let alone in rougher seas or with less light. This situation is even more substantial when monitoring zones in which marine mammals might show behavioral responses to seismic. Industry is not able to monitor these zones that might cause behavioral changes around the seismic vessels. Therefore data are not being collected to determine the impacts of seismic on marine mammals nor are data available to develop adequate mitigation measures. If NMFS and MMS are going to approve seismic operations in the Beaufort and Chukchi seas, then oil and gas companies must show that they can adequately monitor safety zones to protect marine mammal hearing and the larger behavioral zones to reduce impacts to behavior that could lead to population level impacts.

*General comments on various M&M Alternatives:* there must be a mitigation procedure (not just a monitoring procedure which is basically a post-hoc evaluation) that provides a conservative buffer to protect animals, particularly bowheads and other large whales, from exposures to sound pressure levels above 160 dB (rms re 1  $\mu$ Pa), with an added procedure for bowheads to monitor and document exposures to sound levels  $\geq$  120 dB. Presently the Alternative 5 only talks about monitoring, but this is not a protective action. It is a fudge factor that allows an action to proceed while not providing a mechanism that can be shown to significantly reduce the probability of sound source exposure levels that are known to cause a strong avoidance and therefore a potentially biologically significant response.

The NSB should push for Alternative 9 until scientific studies produce more specific data on the effects of industrial activities on marine mammals in the Arctic, and peer reviewers can agree on about how seismic noise affects bowheads physiologically and behaviorally. Then we can make reasonable management decisions. Included in the above are scientific studies to resolve the question of whether disturbed whales return to their original bathymetry line (or distance from

shore) once deflected from an industrial operation, and at what point they return to "normal behavior" and are not "skittish". Skittish behavior has big implications to hunting success (it's the same for any animal like caribou). Based on a review of the literature (as in III.F.f), it appears that bowhead reactions to industrial noise show a temporal and spatial effect or correlation. That is, a bowhead migrating in the Beaufort Sea in fall appears to react very differently than a summer bowhead that is feeding in the Canadian Beaufort and perhaps Alaskan waters also. It may be that bowheads "know" they are hunting on fall migration in the Alaskan Beaufort (spring migration in the Chukchi) and are more sensitive at those times and in those waters. Bowheads typically blow 7 times during a surfacing sequence, but when frightened they may only blow 1 or 2 times, swim faster and maintain a low profile. We've observed this in spring during the ice-based whale census. Bowheads are very difficult to hunt when behaving like this, and equally important, they are far more difficult to detect during surveys (e.g. Industry studies, BWASP, ice-based whale census, MMOs, etc) at such times.

With these data in hand, we can make informed management decisions about how to properly conduct oil and gas operations in the Beaufort (e.g., drilling, and seismic surveys).

Page II-4: Additional Proposed Mitigation Measures for MMS G&G Permits: Compliance with mitigation measures for G&G Permits or for protecting marine mammals must be monitored. It was clear in 2006 that NMFS and MMS did not conduct compliance monitoring of industry to ensure that mitigation measures were adhered to. Without this information, it is impossible to evaluate the effectiveness of mitigation measures.

Page II-6: Alternative 2 – (proposed action) – Why doesn't this include the basic mitigation and monitoring actions? As stated there is no easy basis for comparing this alternative to the others listed.

Page II-6: Alternative 5. Why make mitigation and monitoring dependent on aerial survey? Why don't they implement a near-real-time, mitigation-monitoring program as is now being done for Northern right whales off Massachusetts relative to liquefied natural gas terminal activities?

Page II-16: the statement is made that "avoidance did not persist beyond 12-24 hours after the end of seismic operations". As discussed earlier, the statement is misleading. It may be true with respect to the area within which operations were occurring. In other words, whales that had been "upstream" in their westward migration and had not been exposed to the noise, may be found in the area 12-24 hours after operations cease. It cannot be said with respect to individual whales that had been deflected that they reoccupied the area or returned downstream to their prior migratory path 12-24 hours following exposure.

Page II-17: the statement is made in the first full paragraph that "available information does not indicate there were detectable, long-term population-level adverse effects on the BCB Seas bowhead from the high level of seismic surveys and exploration drilling during the late 1970's

and 1980's in the Beaufort and Chukchi Seas". It would seem more accurate to say that it is unknown whether such effects occurred. It may well have been the case that the intense level of industrial activity did in fact slow the recovery of the species, and that today's population would be greater had the activity not occurred. The DPEIS concludes here (see also page III-129) that "if seismic operations overlap in time, the zone of seismic exclusion or influence across both planning areas could potentially be quite large", and that "avoidance of critical areas by bowheads, particularly females with calves, potentially could lead to population-level consequences". It would certainly seem the case that some level of effect occurred, given the intensity of operations (20 marine surveys in the Beaufort alone in 1982-83) and the comparative lack of mitigation imposed at the time.

The NSB is concerned with the speculative nature of the conclusions stated in the fourth paragraph on page II-17. First, it is not necessarily the case that a plan of cooperation setting spatial and temporal restrictions on seismic activities entered into with the aim of protecting subsistence harvests would also greatly reduce impacts to bowheads. It may, in fact, have the opposite effect. As noted in the 2006 PEA, such restrictions may amplify disturbance to the whales, since it may concentrate seismic operations in between hunting activity. Second, it cannot be said that CAAs are "likely" to be established for any surveys near any potentially impacted communities, though that would certainly be the goal. Difficulties have arisen in negotiations this year between whalers and Shell over proposed drilling and seismic operations. It has also been recognized in the DPEIS and elsewhere, that the ability of CAAs to effectively mitigate the potential effects of multiple concurrent seismic operations is strained. It must be explained why the DPEIS acknowledges that the "magnitude of *six* concurrent seismic surveys would test the ability of survey operators and whalers to coordinate their efforts to prevent disruption of the hunt" (see e.g. pages II-22 & III-180) when the 2006 EA for Beaufort Sea OCS Lease Sale 202 concluded that *four* concurrent surveys would raise the same concern. (Sale 202 EA page 37)

Page II-19: the inconsistency of conclusions here is a primary concern of the NSB with the DPEIS. In a discussion of safety zones in the last full paragraph, it is stated that "the ability of observers to effectively monitor the zone, and be able to call for a shut-down if marine mammals enter the zone is *critical* to the success of the protective measures described in Alternatives 3 through 8, *though it is often difficult* to observe all marine mammals, especially pinnipeds, within the zone." How then, can the conclusion be reached in the next paragraph that "the potential for any injuries to pinnipeds from the proposed activity is very limited..."? It is difficult to find comfort in a system of mitigation the success of which depends on doing something critical that is often difficult to actually do. Nowhere in the document, in fact, is the ability or inability of vessel-based marine mammal observers to actually observe marine mammals in a full 360 degrees around the vessel, and under the range of sea states, weather conditions, and darkness that occurs in the region quantified. A clear description of the percentage of time whales, seals, and walrus can be expected to occur within the various proposed safety zones without being visually detected must be included in the PEIS. We must know whether or not the use of vessel-based marine mammal observers is an effective mitigation

Page II-23: the NSB disagrees with the conclusion that because seismic activities are vessel-based, stresses to social systems in adjacent communities are expected to be minimal. NSB residents have experienced difficulty obtaining seats on regularly scheduled commercial flights in villages when seismic crew changes are taking place. This has been highly disruptive. In addition, if called for, village and NSB search and rescue organizations, as well as private citizens, would certainly respond in the event of any marine emergency involving a seismic vessel or crew member.

Page II-24: the first paragraph should be expanded significantly to discuss the full range of potential impacts to human health associated with continuing intensive offshore seismic activity, including, but not limited to, increases in social pathologies associated with disruption of the tradition subsistence lifestyle and physical effects associated with any decreased consumption of subsistence foods. Again, the authors are referred to the 2007-2012 OCS Leasing Program Final EIS for a general health impact analysis associated with the Alaskan arctic. It should be expanded upon with specific reference to the proposed seismic operations.

Page III-4: Note that shorefast ice calving events can occur any month of the year that the shorefast ice is in place.

Page III F3.f(6): Include in the text where and when the Richardson, Wells and Wursig (1985) study was conducted.

Page III-11, last paragraph: Masking: Just because the ambient noise level at a particular range from the seismic source is equal to the received level of that source, does not mean that the source is masked and undetectable. The time-bandwidth product of the seismic sound at range provides a gain that increases the effective detection area.

Page III-12: The second paragraph lists the main agents of the cumulative activities scenario. The list, and subsequent analysis, should be more expansive. The fourth agent is "oil and gas exploration in federal and state waters". Offshore development and production activities, as well as onshore activities, must be considered as well. Offshore repair and maintenance, of greater scope and frequency than predicted in the case of the Northstar facility, are not without impacts. Increased vessel traffic and the development of coastal staging areas specifically associated with expanding onshore activities must be addressed. The document must also acknowledge the broader linkage between onshore and offshore subsistence activities. They are for our coastal communities inseparable parts of a whole. Each subsistence activity, whether onshore or offshore, has its special and important role in the Inupiat culture. The loss of opportunity to participate in one activity, or the consumption of one product, can never fully be compensated for by the harvest or consumption of other products. Still, individual hunters and communities will adjust harvest patterns when called for by circumstances that limit hunting opportunities or

harvests in one area or during one season. These may include difficult ice, snow, flooding, or other weather conditions, or industrial activity that restricts access to traditional harvest areas or that deflects game from those areas. In years when caribou do not come close to a community, for example, greater effort may be applied to the harvest of marine resources. Similarly, if hunters have limited success harvesting marine resources, there may be greater focus on the harvest of caribou

Page III-14: It must be added to the second paragraph that industry vessels and barges make landfall at locations other than the industrial complex at Prudhoe Bay. Other service and support hubs have been developed or are used occasionally, and will likely be expanded at Camp Lonely and Barrow if industry interest in adjacent onshore and offshore areas continues. In addition, as occurred in 2006, vessels associated with seismic operations that cannot withstand rougher seas and weather conditions can be expected to occasionally seek refuge at or near the shore and local communities.

Page III-15: The discussion of Shell's proposed operations should be expanded to reflect that the company has proposed using up to thirteen vessels in support of its 2007 open water seismic and drilling operations. Also, the text should be updated to reflect that the 2007-2012 OCS Leasing Program has been adopted.

Page III-16: The document should more fully describe the State of Alaska's areawide leasing program.

Page III-17: Cumulative Activity Scenario, Industrial Development: NMFS and MMS fail to include the development of a coal mine adjacent to the Chukchi Sea in their cumulative activity scenario. The Arctic Slope Regional Corporation is developing a coal mine between Point Lay and Point Hope just inland of the Chukchi Sea coast. This activity has the potential to also impact the same bowhead and beluga whales that will be impacted by seismic activities in the Chukchi and Beaufort seas. The coal mine must be included in the cumulative effects assessment.

Page III-19: human health should be added to the list of resources subjected to impact analysis. Again, relevant material included in the Final EIS for the 2007-2012 OCS Leasing Program should be the starting point for such analysis.

Page III-21, Terrestrial Mammals: The assessment of impacts to terrestrial mammals is not sufficient. Seismic surveys in the Chukchi and Beaufort seas will require helicopters for re-supply and crew change. Thus, terrestrial mammals may be displaced from traditionally used areas possibly resulting in an impact to the terrestrial mammal populations and to subsistence hunting. Helicopter traffic associated with re-supply and crew change must be considered.

Page III-24, Criteria for the evaluation of the potential for significant effects on endangered whales: NMFS and MMS has chosen to use PBR to establish the level effects of seismic

activities on bowhead whales. This is not appropriate. When NMFS developed PBR, the approach was to be used only for evaluating impacts from commercial fishing on marine mammals and not other activities. Further, PBR relates to direct takes (i.e. death) of marine mammals and not behavioral effects. PBR did not consider behavioral effects in the development of the model for assessing impacts from commercial fishing. Therefore, NMFS must develop a different approach for assessing significant impacts to marine mammals from seismic activities other than with PBR.

Page III-77: Text says that “Bowheads also **may** migrate under ice...” It is not a question of “may”. Bowheads migrate under ice – full stop.

Page III-78: Why hasn't and why doesn't MMS and the O&G industry sponsor projects to collect much needed baseline data in the Chukchi Sea prior to industry operations and activities?

Page III-89: The conclusion that there is no indication “that there has been any significant negative or other change in the population status of the BCB Seas bowhead whale population since MMS consulted with NMFS in 2003 regarding the Lease Sale 195” is a scientifically unsupportable statement. There is no way that a significant change in the bowhead population's status since 2003 could be quantified (the time frame is simply too short), and thus, this conclusion should be struck from the narrative. The inability to detect a change should not be misrepresented as no change occurred. Although it is certainly logical, given the documented population growth rate from 1978 to 2001, to conclude that the population status has not changed since 2003, there are no data to support the population's status one way or another since 2003, and to imply that MMS and NMFS actions relative to Lease Sale 195 are somehow a factor in this situation is unacceptable and these implications should be removed from the narrative.

Page III-99: it is stated in the middle of the page that the greatest potential for effects to bowhead calves would occur if seismic operations resulted in the reduction in nursing by calves “shortly after they are born (in the spring)”. It should be noted that calving appears to occur through the summer and into the early fall as well. Whalers have seen newborn calves in September and early October. This raises the question whether a restriction of seismic operations until after July 1 in areas where “bowhead mothers and calves might be present” is as effective or adequate a mitigation measure as stated. Some attempt must be made to quantify the percentage of calves that are likely to be born or first develop a thick blubber layer after that date. On page III-127, a reference is added to the discussion of this issue that “available data indicate that most of the calving has occurred before that time”. That data must be described in more detail.

Page III-99: There are now compelling examples, both short-term and long-term, in which visual observations of animals were ineffective at detecting impacts that were occurring [e.g., Tyack et al. sperm whales in Gulf of Mexico; **Bejder, L., Samuels, A., Whitehead, H., Gales, N., Mann, J., Connor, R., Heithaus, M., Watson-Capps, J., Flaherty, C and Krützen, M. 2006.** Decline in relative abundance of bottlenose dolphins (*Tursiops* sp) exposed to long-term disturbance. Conservation Biology.]. Lack of observed separation of M&C pairs **is not evidence of no**

**impact.** All these observations were for short periods of time. As with several other types of critical activities for whales, there would be a very strong selective benefit to a mother and a calf NOT to separate when threatened by something, so why would one suggest that M&Cs would do anything but stay together? Furthermore, the impact from a novel and potentially threatening event would most likely be physiologically mediated and expressed, something that has not been monitored in whales under such circumstances. Such a physiological response can lead to decreased milk production or a lower quality (less fat content, disruption of hormone levels etc.) of milk.

Page III-101: Agency actions can reduce uncertainty by assuming worst case situation until adequate data and accumulated knowledge say otherwise. Thus, for example, although one does not know the details of six 2D/3D permits per planning area (assume per year's season), this should be assumed as the working condition, just as the maximum number of support vessels, overflights etc. should all be considered as the conditions under which the permittee would be allowed to operate. This is how NMFS has dealt with the US Navy's SEIS for LFA sonar, or permits related to LNG developments near a critical habitat for endangered Northern right whales.

Page III-102: If any seismic or support vessel will discharge any treated wastewater, the potential for such discharges to adversely impact migrating whales and subsistence harvests must be considered. Even if such substances may not be harmful to the animals, whalers have long known that whales are sensitive to the "smells" of foreign substances introduced into their marine environment and may avoid them. Stringent procedures are followed therefore at subsistence whaling camps to avoid introducing anything into the water.

Page III-104: Given that blue whales and fin whales produce sounds as low as 8 Hz, and most song notes are below 20Hz, it would seem that their hearing sensitivity was good down to that frequency and saying that "some baleen whales may hear infrasounds" is an understatement. Either baleen whales hear infrasonically or they have another sense yet to be discovered.

Page III-105: The section on hearing damage needs to consider effects of **chronic exposure**, not just acute exposure, in terms of hearing loss. Later the document discusses chronic exposure but not in terms of hearing loss.

Also, the document needs to incorporate results from long-term studies on humans demonstrating the significant impacts of noise on human health and development, and the synergistic effects of noise coupled with other factors. See papers by Gary Evans (e.g., Evans, G.W. 2003. A multimethodological analysis of cumulative risk and allostatic load among rural children. *Dev. Psych.* 39(5):924-933.)

Page III-106: Correction needed on masking. It is not that the "sound the animal needs to hear must be of greater intensity" [*than the background noise*] to be detected, as there is gain provided by a sound's time-bandwidth product (assuming the sound is not noise) that allows one to detect a sound with intensity that is below ambient noise in the same frequency band.

Page III-106: “Long-term adverse impacts of OCS seismic survey noise on the hearing abilities of individual marine mammals are unknown. Information about the hearing capabilities of large baleen whales is mostly lacking, and data gathered on odontocetes and pinnipeds is minimal.”

The Minerals Management Service (MMS) regulations (30 CFR 251) state that geological and geophysical activities cannot cause harm or damage to aquatic life, property or to marine, coastal or human environments. Mitigation measures have been implemented in the BCBS region, to varying extents and successes, by the oil and gas industry. However, currently, no protocols exist to assess the physiological effects of exposure (acute or chronic) of BCBS marine mammals to seismic disturbance. The BCBS stock of bowhead whale (*Balaena mysticetus*), while endangered, has been slowly recovering since the cessation of commercial whaling in 1910. The Native Alaskan residents of the North Slope Borough (NSB) hunt these whales for subsistence purposes in spring and fall. The bowhead whale is a tremendously important cultural and nutritional resource for the NSB Native population. Negative effects of seismic exploration that impact the health and well-being of the bowhead whale are likely to affect these subsistence users. The migratory route of the BCBS bowhead whale stock passes through the middle of this region of intensive seismic exploration twice a year (in spring and fall), as the whales participate in their yearly migration between the Bering and the Beaufort Sea. Calving, nursing, mating and feeding all occur within areas that experience seismic noise. The lack of basic descriptive data on the anatomy of the mysticete ear makes evaluation of the effects of anthropogenic noise a challenge to assess. This makes effective mitigation efforts difficult, if not impossible. We recommend the establishment of a baseline of anatomical and histological data that can be used as a foundation for future investigations on the effects of anthropogenic noise on the mysticete ear. This research may then serve as a resource for not only bowhead whales but for mysticetes in general, many of which are being affected by anthropogenic noise in other regions.

The BCBS region supports several populations of cetaceans besides the bowhead whale [gray (*Eschrichtius robustus*), and beluga whales (*Delphinapterus leucas*)] and pinnipeds (walrus (*Odobenus rosmarus*), bearded seals (*Erignathus barbatus*), ribbon seals (*Phoca fasciata*), spotted seals (*Phoca larga*) and ringed seals (*Phoca hispida*)). There is little information available on current population sizes and ecology of the majority of these marine mammals and most of the published data that exists is 15-20 years old. Considering the significant change in sea ice and weather patterns the BCBS region is experiencing (Johannessen et al., 2004), it is possible that many (if not all) of these populations are experiencing some degree of stress. The potential exists for these populations to be seriously impacted by anthropogenic disturbance and industrial activities. Development of plans to monitor for potential physiological impacts of seismic noise in marine mammals in the Arctic is a challenge, but must be attempted. As an initial step, collection of baseline data on arctic cetacean and pinniped ear anatomy and hearing physiology should be made a priority. This information is a necessary foundation for subsequent research on the potential physiological effects of sound on these species and requires documentation so that appropriate mitigation measures can be made.

*General Comment, Acoustic Environment Section:*

Throughout this section there is an over reliance on Richardson et al. (1995.) While this book has been an excellent basic reference for the topic, it is not necessarily the definitive source of scientific information or interpretation. Furthermore, a tremendous amount of new information on this topic has been generated in the last 12 years. As a result of this over reliance on Richardson et al. (1995) there are oversimplifications and some misrepresentations of the actual scientific evidence related to biological sounds and anthropogenic sources (see for example, III.B.1.b(1).) This problem also arises later in descriptions of airgun array acoustic characteristics, where, by referencing to Richardson et al. (1995), the text leads the reader to assume that airgun arrays in 2007 are the same as those in 1995. Is this true? Are the arrays proposed for use under this PEIS the same as those in 1995? Have these arrays been adequately calibrated so as to fully describe the spectral intensity characteristics in the horizontal and vertical domains?

Page III-107-109: Noise and Disturbance from Seismic Surveys. This is one section in which consideration and a description of changes in the characteristics of an original seismic pulse as it propagates over distance needs to be stated. After a certain distance, on the order of a few tens of kilometers, the seismic airgun array source is no longer an “impulse” as used by the MMS and industry. It is modified to become a tonal downsweep that has salient features similar to a biological signal. Therefore, I would strongly argue that the application of the 160 dB RL rule as the received level for level B harassment is not valid – and that the observations of bowheads avoiding seismic operations at range is compelling evidence of this conclusion. Although after traveling some kilometers from the airgun source array this sound retains an onset, it no longer sounds like or retains the fundamental properties an explosion or impulse. It is interesting to note that Northern right whales reacted to playback of frequency-modulated downsweeps by quickly coming to the surface, and this response was interpreted as a negative reaction to the FM downsweep (Nowacek, D. P., M. P. Johnson and P. L. Tyack. 2003. "North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting stimuli". Proceedings of the Royal Society of London, B:Biological Sciences. 227-231)

Another important consideration concerns the translation of the original short-duration, high peak level seismic impulse into a different sound form as it propagates through the underwater and seafloor substrate. The sound’s original duration of 100ms is stretched into a sound lasting many seconds. This level of impact needs to be assumed and mitigated for in appropriate instances.

Page III-110: Potential Effects of High-resolution Site Clearance Seismic Surveys...: These paragraphs are an over simplification. High-resolution surveys may use less energy than full seismic surveys, however, the impacts may still be substantial. For example, Shell used a small airgun, 280 in<sup>3</sup>, in 2006 for a high-resolution seismic survey in Camden Bay. The sounds from a test of this airgun showed that the sounds finally attenuated to a level of 120 db at about a distance of about 20km. The level of 120 db of industrial sounds has been shown to cause

avoidance of an area by bowheads. Thus, high-resolution surveys will contribute substantially to the amount of anthropogenic sounds in the Beaufort and Chukchi seas and may significantly impact marine mammals.

Further, NMFS and MMS state that high-resolution seismic will have little impact to bowheads. The studies they reference, however, do not use airguns of the same size as NMFS and MMS state will be used for high-resolution surveys (Pg. I-11 and -12). The referenced surveys used an airgun of 40 in<sup>3</sup>, whereas Pgs. I-11 and -12 state the airguns will be 90 to 150 in<sup>3</sup>. The studies should be given little weight in the analysis of impacts unless the design corresponds to how industry will conduct its high-resolution seismic surveys.

*General Comment on this section (section III):*

References to and inclusion of the Gulf of Mexico results from Tyack et al. need to be included. These results show that a) model predicted received levels at tagged foraging sperm whales did not match actual measured received levels on individual whales, and b) visual observation of the foraging individuals at the surface did not reveal responses in contrast to behavioral responses as revealed from tag data. That kind of scientific, empirical information specifically contradicts several of the simplistic assumptions in this document about potential impacts on whales and the perception that visual observations by marine mammal observers are adequate precautions. Furthermore, the exclusion of these tagged sperm whale data from this PEIS, while including Tolstoy et al., is worrisome and suggests that the document is incomplete.

Page III.B.3. (110-112): Sound propagation in the vertical versus horizontal direction needs to be clarified and made crystal clear. Although airgun arrays are designed to direct most of the sound energy downward into the seafloor, a great deal of energy propagates horizontally. The PEIS should specifically include calibration results for the different arrays in the horizontal dimension. Statements such as on III-11 “...multiple guns would emit energy at about 10-120 Hz, and pulses can contain significant energy up to at least 500-1,000 Hz...” only serve to underscore the lack of quantitative information on airgun array sound characteristics.

Page III-114: The discussion about the study examining the impacts from seismic surveys on bowhead whales is inadequate. Firstly, the DPEIS should have acknowledged at the very beginning of discussion that the study showed the bowheads were essentially excluded from an area within a radius of 20km around an active seismic vessel. Instead it is stated, “[b]ased on 1996-1998 data, there was little or no evidence that bowhead headings, general activities, or swimming speeds were affected by seismic exploration.” This statement as currently written in the DPEIS is incorrect. The results from the 1996-1998 study showed that the received sound levels during these seismic surveys at 20km from the source vessel were estimated to be about 120 db.

Further, the discussion about the lasting impacts from seismic surveys was inadequate. The DPEIS stated that the effects lasted only 24 hours. The analysis in Miller et al. (1999) was preliminary and further, the results could be interpreted that the effects to bowheads from

seismic surveys lasted at least 96 hours. Essentially, the data presented in Miller et al. (1999) are not sufficient to evaluate the lasting effects from seismic exploration. The NSB has made similar comments numerous times to MMS.

Page III-120 to –121: Effects from other vessel traffic associated with seismic surveys: NMFS and MMS failed to include important information in this section of the DPEIS. BP has been conducted detailed studies of the effects from industrial activities associated with the Northstar Production Island in the central Beaufort Sea (Richardson 2005, 2006, 2007). These studies have shown that bowheads are deflected away from the noisiest activities associated with Northstar. These sounds were mostly from vessel traffic. The studies have shown that bowheads are deflected northward, away from Northstar when re-supply vessels visit the island. The sounds levels that bowheads receive are likely near ambient, again showing that bowheads are highly sensitive to low levels of industrial sounds. This Northstar study should be included in the analysis presented in the final PEIS.

Page III-123: It is unclear why the scenario does not include any avoidance of support vessels. Supply boats and ice-management boats are extremely noisy and noise from these vessels must be considered.

Page III-126: there is a discussion of the potential effects of small oil spills associated with seismic surveys, but again, no discussion of the potentially disruptive effects of other permitted discharges.

Page III-131: here, as is the case throughout the document, great uncertainty is acknowledged with respect to the likelihood of potential impacts to bowhead whales. The response is a strong reliance upon certain key required mitigation and monitoring measures. Central among these measures is the use of vessel-based marine mammal monitors (MMOs). The Final PEIS must squarely address the issue of the apparent inability of those MMOs to effectively observe whales and other marine mammals within the safety zones established for their protection a significant percentage of the time. It is also essential that the document address the increasingly apparent breakdown of the entire system under which the mitigation and monitoring measures are created, implemented, and evaluated. Annual open water meetings had been the mechanism through which a previous season's activities were reported and peer reviewed, and with lessons learned, through which mitigation and monitoring measures for the coming season's proposed activities were established. For two years now, the meeting has not fully served its intended purpose. With multiple activities being conducted, reports were not made available in time to be meaningfully evaluated, and their full review has not been completed in a timeframe that allows for the application of lessons learned to proposed upcoming activities. It is unclear how the twelve single-season seismic surveys envisioned by the PEIS would be effectively reviewed under the current system.

Page III-132: the third full paragraph should be modified to indicate that pre-seismic survey monitoring "must", rather than "could" be required, where the "pre-" refers to monitoring

conducted in prior years, as bowhead use of particular areas varies within a season.

Page III-148: the statement is made at the end of the first paragraph that current human removals of polar bears are “already believed to be at or above maximum sustainable levels”. The statement must be clarified. It is not true with respect to the bear stocks taken by Alaskan subsistence users.

Page III-150: not included in the impact assessment beginning on this page is any discussion of the potential for a displacement of impacts from one species to others or from one time period to others associated with negotiated or imposed temporal/spatial restrictions on seismic activities designed to preserve subsistence harvest opportunities. The result may be that seismic operations are concentrated between subsistence hunting areas, leaving migrating whales little opportunity to rest. Forcing seismic activity from zones critical to whaling success at times when whaling is occurring may shift the activity into areas more critical to other species. Issues of conflicting mitigation measures have arisen in onshore areas when measures that would leave higher, drier ground important to caribou calving and insect relief undeveloped can have the effect of shifting development into lower-lying, wetter areas critical to nesting waterfowl.

Page III-155: it is unclear there is the potential for submerged and feeding walrus to prematurely terminate their dives upon hearing an approaching and operating seismic vessel, or to remain submerged and undetected by MMOs and be exposed to noise within the 190-dB safety zone. There also appears to be no discussion of the potential for disturbance of large numbers of walrus, including females with young calves, associated with the pre-survey movement of vessels into and within the Chukchi Sea during the June-July period when the sea ice in the region is retreating northward.

Page III-162: it is acknowledged that the ability of MMOs to perform their duties is critical to the effectiveness of the protective measures described in Alternatives 3-8. As discussed above, there are significant questions as to whether they can perform as called for, not only in terms of their ability to see animals within safety zones under certain commonly occurring conditions, but also simply whether two observers working at the same time can monitor a full 360 degrees around a vessel.

Page III-171: the fourth paragraph should note that bowheads are accessible to Kaktovik hunters and Nuiqsut hunters based at Cross Island as well.

Page III-178: the document’s characterization of the relationship between, and relative effectiveness of, MMS OCS lease Stipulations 4 and 5, and regulations governing the issuance of an LOA or IHA under the MMPA is confusing. With the proposed mitigation similar to Stipulation 5, it is unclear how that measure’s prevention of unreasonable conflicts with subsistence standard would relate to the no unmitigable adverse impacts standard of the MMPA. The proposal highlights the need to reconcile these standards, be clear about the criteria that would be evaluated in their implementation, and understand the timing of the procedures dictated

by each during a permitting process. Currently, many stakeholders consider the MMPA standard to be stronger, while MMS has maintained that the standard of Stipulation 5 offers greater protection of subsistence. With both NMFS and MMS cooperating in the preparation of this document, it would seem appropriate and timely that it include a detailed and specific description of the two standards, and the relative strength, breadth, and application of each. It must also be recognized that Stipulation 5 as it exists today is imperfect and imprecise. It is the product of several negotiations and compromises between MMS, the NSB, AEW, and others over many years. The result is a measure reflecting a clear basic intent to avoid interference with subsistence, but with inadequate and in several cases, inconsistent details as to the protections it offers and the consultation and appeals processes it defines. It began as a measure to address potential impacts to fall subsistence bowhead whaling in the Beaufort Sea. Given that its reach has been expanded to other subsistence activities, the agencies afforded the opportunity to request or participate in the meeting called for if consultation does not produce agreement should likewise have been expanded to include the Fish and Wildlife Service and the State of Alaska.

Page III-179: the fourth full paragraph highlights appears to be mixing the standards of the MMPA and Stipulation 5. To the extent Conflict Avoidance Agreements have been relied upon by NMFS to satisfy the no unmitigable adverse impact standard of the MMPA incidental take regulations, that is the standard against which such agreements ought to be judged by the agency, and not the avoidance of unreasonable conflicts standard of Stipulation 5 as the paragraph seems to indicate. Also, the agencies ought not to assume that other resource user groups will, at least in the near-term, match the capability of the AEW to represent the interests of their respective hunters in negotiating conflict avoidance agreements with industry. The AEW is 30 years old. Its commissioners, whaling captains, and small staff work in partnership with NSB staff and many consultants in order to bring appropriate expertise to its review of industry and agency proposals and science. Millions of dollars have been spent in support of the conduct and review of research that has informed the AEW in its negotiations with seismic operators and other permittees.

Page III-180: the statement in the first full paragraph is accurate in describing what observers do when they observe marine mammals within designated safety zones. The question is how often animals are within the zones, but unseen by observers. Data presented at the May 2007 follow-up to the April Open Water meeting seemed to indicate that the "sightability" of marine mammals drops off significantly with increasing distance and roughness of sea state. The Final PEIS must describe clearly the percentage of time, in both the Chukchi and Beaufort Seas, that sightability limitations can be expected to allow marine mammals to be exposed to survey noise within designated safety radii.

Page III-187: in this regard, we note the statement appearing here and repeatedly in the document that "an inability to perform mitigation measures will result in the suspension of a G&G permit until such time that the protective measures can be successfully performed and demonstrated. It is the belief of the NSB that the capability to effectively perform required vessel-based monitoring is now suspect under commonly occurring conditions, and that no surveys should be

P. Michael Payne  
July 30, 2007  
Page 37 of 37

permitted until it can be demonstrated that the effectiveness of such monitoring can be enhanced or that alternate means will be employed to ensure that marine mammals are not exposed to seismic noise within designated safety/exclusion zones.

Page III-190: it should be clarified that offshore areas within 3 miles of shore extending southeast from Point Barrow to the eastern reaches of Dease Inlet are owned by the federal government.

Page IV-7: all of the documents conclusions must be reevaluated in light of information presented at the 2007 Open Water and follow-up meetings, as well as the various reports supplied, and to be supplied, by industry regarding the mitigation and monitoring associated with past seismic and other offshore industrial activities.