"Bellion, Tara" <tara.bellion@urs.com>
04/02/2012 10:25 AM

To ArcticAR <arcticar@urscorp.com>
cc
bcc
Subject FW: Submittal - Draft Comment Analysis Report for Review

Tara Bellion - Environmental Planner
URS Corporation
3504 Industrial Avenue, Suite 126
Fairbanks, AK 99701

Tel: 907.374.0303 ext 15
Fax: 907.374-0309
tara.bellion@urs.com
www.urs.com

From: Rosenthal, Amy
Sent: Thursday, March 29, 2012 8:27 AM
To: Candace Nachman (Candace.Nachman@noaa.gov); jolie.harrison@noaa.gov; Michael.Payne@noaa.gov
Cc: Isaacs, Jon; Fuchs, Kim; Bellion, Tara; Kluwe, Joan
Subject: Submittal - Draft Comment Analysis Report for Review
Importance: High

Hi all –

Attached is the Draft Comment Analysis Report for your review (word and PDF versions). We have a placeholder for the government-to-government CAR, which will be an Appendix to this report, until we are able to code any comments from the upcoming Point Lay meeting next week. And for all of the "Editorial" comments we received (i.e. specific changes to the text), we will be giving you a separate table that tracks those by section of the document.

As always, comments back from you in track changes works best. The schedule shows us receiving comments back from you on April 4th by end of the day.

I will be out of the office the rest of this week, but back in on Monday. If you have questions, feel free to call my cell (503-804-4292) or contact Kim Fuchs or Jon Isaacs.

Thanks,
Amy

******* Please note my new email address: amy.rosenthal@urs.com *******

Amy C. Rosenthal
Environmental Planner

URS Corporation

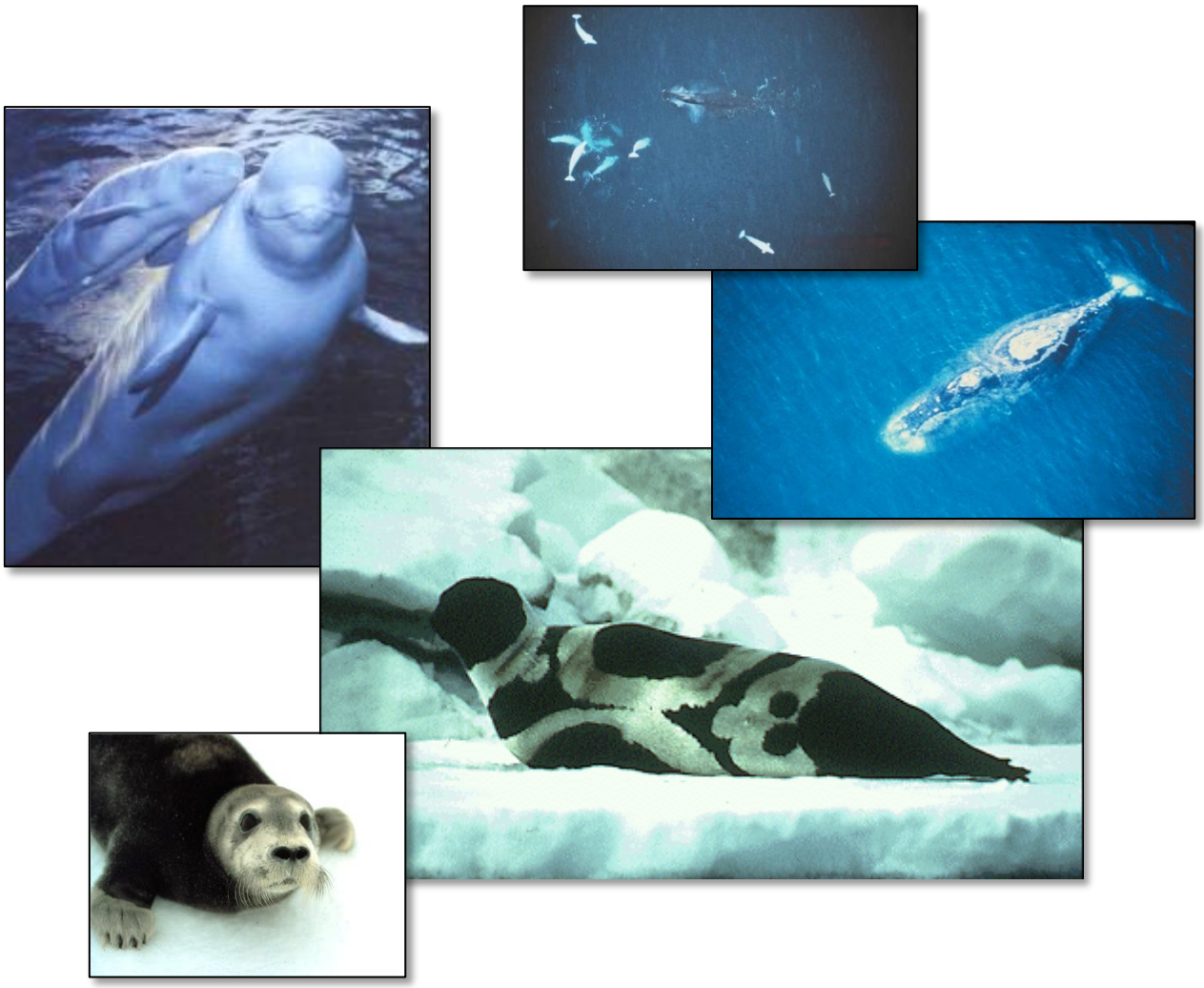
503-948-7223 (direct phone)
503-222-4292 (fax)

Draft Comment Analysis Report - Arctic EIS (032912).pdf

Draft Comment Analysis Report - Arctic EIS (032912).docx

Effects of Oil and Gas Activities in the Arctic Ocean

Draft Comment Analysis Report



March 29, 2012

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Protected Resources

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

BOEM	Bureau of Ocean Energy Management
CAR	Comment Analysis Report
CASy	Comment Analysis System database
EIS	Draft Environmental Impact Statement
ITAs	incidental take authorizations
MMPA	Marine Mammal Protection Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
SOC	Statement of Concern
USC	United States Code

1.0 INTRODUCTION

The National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) and the U.S. Department of the Interior's Bureau of Ocean Energy Management (BOEM) have prepared and released a Draft Environmental Impact Statement (EIS) that analyzes the effects of offshore geophysical seismic surveys and exploratory drilling in the federal and state waters of the U.S. Beaufort and Chukchi seas.

The proposed actions considered in the Draft EIS are:

- NMFS' issuance of incidental take authorizations (ITAs) under Section 101(a)(5) of the Marine Mammal Protection Act (MMPA), for the taking of marine mammals incidental to conducting seismic surveys, ancillary activities, and exploratory drilling; and
- BOEM's issuance of permits and authorizations under the Outer Continental Shelf Lands Act for seismic surveys and ancillary activities.

2.0 BACKGROUND

NMFS is serving as the lead agency for this EIS. BOEM (formerly called the U.S. Minerals Management Service) and the North Slope Borough are cooperating agencies on this EIS. The U.S. Environmental Protection Agency is serving as a consulting agency. NMFS is also coordinating with the Alaska Eskimo Whaling Commission pursuant to our co-management agreement under the MMPA.

The Notice of Intent to prepare an EIS was published in the Federal Register on February 8, 2010 (75 FR 6175). On December 30, 2011, Notice of Availability was published in the Federal Register (76 FR 82275) that NMFS had released for public comment the ''Draft Environmental Impact Statement (DEIS) for the Effects of Oil and Gas Activities in the Arctic Ocean." The original deadline to submit comments was February 13, 2012. Based on several written requests received by NMFS, the public comment period for this DEIS was extended by 15 days. Notice of extension of the comment period and notice of public meetings was published January 18, 2012 in the Federal register (77 FR 2513). The comment period concluded on February 28, 2012 making the entire comment period 60 days in total.

NMFS intends to use this EIS to: 1) evaluate the potential effects of different levels of offshore seismic surveys and exploratory drilling activities occurring in the Beaufort and Chukchi seas; 2) take a comprehensive look at potential cumulative impacts in the EIS project area; and 3) evaluate the effectiveness of various mitigation measures. NMFS will use the findings of the EIS when reviewing individual applications for ITAs associated with seismic surveys and exploratory drilling in the Beaufort and Chukchi seas.

3.0 THE ROLE OF PUBLIC COMMENT

During the public comment period, public meetings were held to inform and to solicit comments from the public on the DEIS. The meetings consisted of an open house, a brief presentation, and then a public comment opportunity. Transcripts of each public meeting are available on the project website (http://www.nmfs.noaa.gov/pr/permits/eis/arctic.htm). Meetings were cancelled in the communities of Nuiqsut, Kaktovik, and Point Lay due to extreme weather conditions. The six public meetings that were held are described in Table 1.

Table 1. Public Meetings, Locations and Dates

Meeting	Date	Location
Wainwright	January 30, 2012	Wainwright Community Center, Wainwright, AK
Barrow	January 31, 2012	Inupiat Heritage Center, Barrow, AK
Kivalina	February 6, 2012	McQueen School, Kivalina
Kotzebue	February 7, 2012	Northwest Arctic Borough Assembly Chambers, Kotzebue, AK
Point Hope	February 8, 2012	Point Hope Community Center, Point Hope, AK
Anchorage	February 13, 2012 12:00-2:00 p.m.	Loussac Library – Wilda Marston Theatre Anchorage, Anchorage, AK

These meetings were attended by a variety of stakeholders, including Federal agencies, Tribal governments, state agencies, local governments, businesses, special interest groups/non-governmental organizations, and individuals.

In a separate, but parallel process for government to government consultation, Tribal governments in each community, with the exception of Anchorage, were notified of the availability of the DEIS and invited to give comments. The first contact was via letter that was faxed, dated December 22, 2011; follow-up calls and emails were made with the potentially affected Tribal governments, and in the communities listed above, each government was visited during the comment period. Because NMFS was not able to make it to the communities of Nuiqsut, Kaktovik, and Point Lay on the originally scheduled dates, a follow-up letter was sent on February 29, 2012 requesting a teleconference meeting for government to government consultation. Nuiqsut and Point Lay rescheduled with teleconferences. [NMFS: language here for something about Nuiqsut "no show" on March 26, 2012?]. The comments received during government to government consultation between NMFS, BOEM, and the Tribal governments are included in a separate Comment Analysis Report (CAR) (Appendix B of this document). Comments submitted in writing by Tribal governments are also included in Appendix B.

NMFS and the cooperating agencies will review all comments, determine how the comments should be addressed, and make appropriate revisions in preparing the Final EIS. The Final EIS will contain the comments submitted and a summary of responses to those comments.

The Final EIS will include public notice of document availability, the distribution of the document, and a 30-day comment/waiting period on the final document. Public statements of agency decisions are expected in September 2012. NMFS and BOEM are expected to each issue a separate Record of Decision (ROD) which will then conclude the EIS process in early 2013. The selected alternative will be identified in each ROD, as well as the agency's rationale for their conclusions regarding the environmental effects and appropriate mitigation measures for the proposed project.

4.0 ANALYSIS OF PUBLIC SUBMISSIONS

The body of this report provides a brief summary of the comment analysis process, and the comments that were received during the public comment period. Two appendices follow this narrative, including the Submission and Comment Index, and the Government to Government CAR.

Comments were received on the DEIS in several ways:

- Oral discussion or testimony from the public meeting transcripts;
- Written comments received by mail or by fax; and
- Written comments submitted electronically by email or through the project website.

NMFS received a total of 67 unique submissions on the DEIS. There were 49,436 form letters received and reviewed. One submission as a form letter from the Natural Resources Defense Council contained 36,445 signatures and another submission as a form letter from the Sierra Club contained 12,991 signatures. Group affiliations of those that submitted comments include: federal agencies, Tribal governments, state agencies, local governments, businesses, special interest groups/non-governmental organizations, and individuals. The complete text of public comments received will be included in the Administrative Record for the EIS.

This CAR provides an analytical summary of these submissions. It presents the methodology used by NMFS in reviewing, sorting, and synthesizing substantive comments within each submission into common themes. As described in the following sections of this report, a careful and deliberate approach has been undertaken to ensure that all substantive public comments were captured.

The coding phase was used to divide each submission into a series of substantive comments (herein referred to as 'comments'). All submissions on the DEIS were read, reviewed and logged into the Comment Analysis System database (CASy) where they were assigned an automatic tracking number (Submission ID). These comments were recorded into the CASy and given a unique Comment ID number (with reference to the Submission ID) for tracking and synthesis. The goal of this process was to ensure that each sentence and paragraph in a submission containing a substantive comment pertinent to the DEIS was entered into the CASy. Substantive content constituted assertions, suggested actions, data, background information or clarifications relating to the content of the DEIS.

Comments were assigned subject issue categories to describe the content of the comment (see Table 2). The issues were grouped by general topics, including effects, available information, regulatory compliance, and Inupiat culture. The relative distribution of comments by issue is shown in Figure 1.

A total of 25 issue categories were developed for coding during the first step of the analysis process as shown in Table 2. These categories evolved from common themes found throughout the submissions received by NMFS. Some categories correspond directly to sections of the DEIS, while others focus on more procedural topics. Several submissions included attachments of scientific studies or reports, or requested specific edits to the DEIS text.

The public comment submissions generated 1,883 substantive comments, which were then grouped into ***Statements of Concern*** (SOCs). SOCs are summary statements intended to capture the different themes identified in the substantive comments. SOCs are frequently supported by additional text to further explain the concern, or alternatively to capture the specific comment variations within that grouping. SOCs are not intended to replace actual comments. Rather, they summarize for the reader the range of comments on a specific topic.

Every substantive comment was assigned to an SOC; a total of 540 SOCs were developed. Each SOC is represented by an issue category code followed by a number. NMFS will use the SOCs to respond to substantive comments on the DEIS, as appropriate. Each issue category may have more than one SOC.

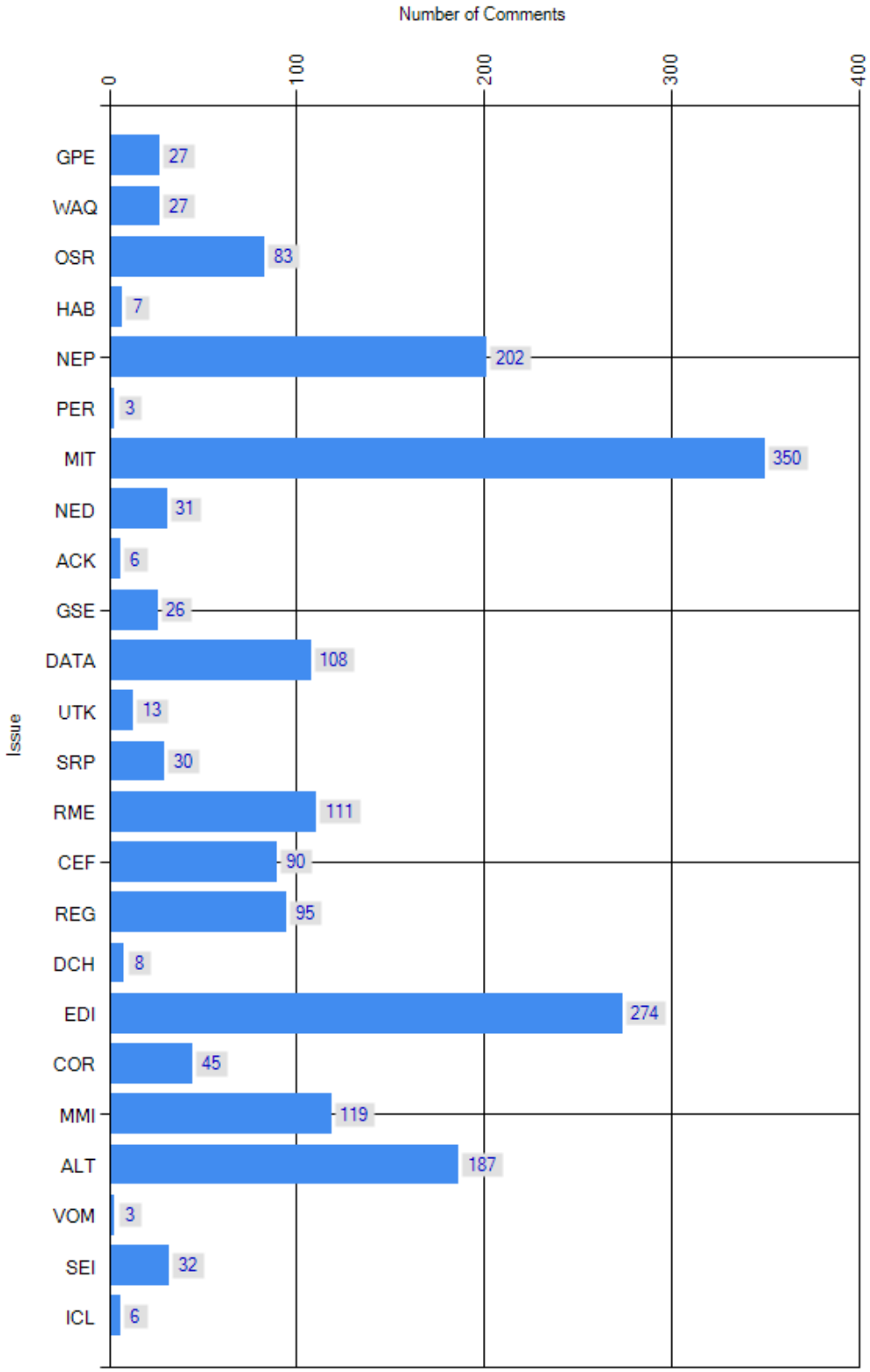
For example, there are 12 SOCs under the issue category "Cumulative Effects" (CEF 1, CEF 2, CEF 3, etc.). Each comment was assigned to one SOC. The complete list of SOCs can be found in Section 5.0.

Table 2. Issue Categories for DEIS Comments

GROUP	Issue Category	Code	Summary
Effects	Cumulative Effects	CEF	Comments related to cumulative impacts in general, or for a specific resource
	Physical Environment (General)	GPE	Comments related to impacts on resources within the physical environment *(Physical Oceanography, Climate, Acoustics, Environmental Contaminants & Ecosystem Functions)*
	Social Environment (General)	GSE	Comments related to impacts on resources within the social environment *(Public Health, Cultural, Land Ownership/Use/Mgt., Transportation, Recreation & Tourism, Visual Resources, EJ)*
	Habitat	HAB	Comments associated with habitat requirements, or potential habitat impacts from seismic activities and exploratory drilling. Comment focus is habitat, not animals.
	Marine Mammal and other Wildlife Impacts	MMI	General comments related to potential impacts to marine mammals or wildlife, unrelated to subsistence resource concepts.
	National Energy Demand and Supply	NED	Comments related to meeting national energy demands, supply of energy.
	Oil Spill Risks	OSR	Concerns about potential for oil spill, ability to clean up spills in various conditions, potential impacts to resources or environment from spills.
	Socioeconomic Impacts	SEI	Comments on economic impacts to local communities, regional economy, and national economy, can include changes in the social or economic environments (MONEY, JOBS).
	Subsistence Resource Protection	SRP	Comments on need to protect subsistence resources and potential impacts to these resources. Can include ocean resources as our garden, contamination (SUBSISTENCE ANIMALS, HABITAT).
	Vessel Operations and Movements	VOM	Comments regarding vessel operations and movements.
	Water and Air Quality	WAQ	Comments regarding water and air quality, including potential to impact or degrade these resources.
Info Available	Data	DATA	Comments referencing scientific studies that should be considered.
	Research, Monitoring, Evaluation Needs	RME	Comments on baseline research, monitoring, and evaluation needs

GROUP	Issue Category	Code	Summary
Process: NEPA, Permits, the DEIS	Alternatives	ALT	Comments related to alternatives or alternative development.
	Coordination and Compatibility	COR	Coordinating with Federal, state, local agencies or organizations; permitting requirements.
	Discharge	DCH	Comments regarding discharge levels, including requests for zero discharge requirements, and deep waste injection wells. Does not include contamination of subsistence resources.
	Mitigation Measures	MIT	Comments related to suggestions for or implementation of mitigation measures.
	NEPA	NEP	Comments on impact criteria (Chapter 4) that require clarification of NEPA process and methodologies for impact determination
	Peer Review	PER	Suggestions for peer review of permits, activities, proposals.
	Regulatory Compliance	REG	Comments associated with compliance with existing regulations, laws and statutes.
General	Editorial	EDI	Comments associated with specific text edits to the document.
	Comment Acknowledged	ACK	Entire submission determined not to be substantive and warranted only a "comment acknowledged" response.
Inupiat Culture	Inupiat Culture and Way of Life	ICL	Comments related to potential cultural impacts or desire to maintain traditional practices (PEOPLE).
	Use of Traditional Knowledge	UTK	Comments regarding how traditional knowledge (TK) is used in the document or decision making process, need to incorporate TK, or processes for documenting TK.

Figure 1: Comments by Issue



5.0 STATEMENTS OF CONCERN

This section presents the SOCs developed to help summarize comments received on the DEIS. To assist in finding which SOCs were contained in each submission, a Submission and Comment Index (Appendix A) was created. The index is a list of all submissions received, presented alphabetically by the last name of the commenter, as well as the Submission ID associated with the submission, and which SOCs responds to their specific comments. To identify the specific issues that are contained in an individual submission, first search for the submission of interest in Appendix A, then note which SOC codes are listed under the submissions, locate the SOC within Section 5.0 and then read the text next to that SOC. Each substantive comment contained in a submission was assigned to one SOC.

Comment Acknowledged (ACK)

ACK Entire submission determined not to be substantive and warranted only a "comment acknowledged" response.

ACK 1 Comment Acknowledged.

Alternatives (ALT)

ALT Comments related to alternatives or alternative development.

ALT 1 NMFS should not permit any more oil and gas exploration within the U.S. Beaufort and Chukchi Seas unless and until there is a plan in place that shows those activities can be conducted without harming the health of the ecosystem or opportunities for the subsistence way of life.

ALT 2 NMFS should adopt the No Action Alternative (Alternative 1) as the preferred alternative, which represents a precautionary, ecosystem-based approach. There is a considerable amount of public support for this alternative. It is the only reliable way to prevent a potential catastrophic oil spill from occurring in the Arctic Ocean, and provides the greatest protections from negative impacts to marine mammals from noise and vessel strikes. Alternative 1 is the only alternative that makes sense given the state of missing scientific baseline, as well as long-term, data on impacts to marine mammals and subsistence activities resulting from oil and gas exploration.

ALT 3 NMFS should edit the No Action Alternative to describe the present agency decision-making procedures. The No Action Alternative should be rewritten to include NMFS' issuance of Incidental Harassment Authorizations (IHA) and preparing project-specific EAs for exploration activities as they do currently. If NMFS wishes to consider an alternative in which they stop issuing authorizations, it should be considered as an additional alternative, not the No Action alternative.

ALT 4 Limiting the extent of activity to two exploration programs annually in the Beaufort and Chukchi seas is unreasonable and will shut out leaseholders. The restrictions and mitigation measures outlined in the five alternatives of the DEIS would likely make future development improbably and uneconomic. Because the DEIS does not present any alternative that would cover the anticipated level of industry activity, it would cap industry activity in a way that (a) positions the DEIS as a decisional document in violation of NEPA standards, and (b) would constitute an economic taking. NMFS should revise the levels of activity within the action alternatives to address these concerns.

ALT 5 The "range" of action alternatives only considers two levels of activity. The narrow range of alternatives presented in the DEIS and the lack of specificity regarding the source levels, timing, duration, and location of the activities being considered do not provide a sufficient basis for determining whether other options might exist for oil and gas development with significantly less environmental impact, including reduced effects on marine mammals. NMFS and BOEM should expand the range of alternatives to ensure that oil and gas exploration activities have no more than a negligible impact on marine mammal species and stocks, and will not have adverse impacts on the Alaska Native communities that depend on the availability of marine mammals for subsistence, as required under the Marine Mammal Protection Act.

ALT 6 The range of alternatives presented in the DEIS do not assist decision-makers in determining what measures can be taken to reduce impacts and what choices may be preferential from an environmental standpoint. There is no indication in the analysis as to which alternative would be cause for greater concern, from either an activity level or location standpoint.

NMFS needs to revise the alternatives and their assessment of effects to reflect these concerns.

ALT 7 An EIS must evaluate a reasonable range of alternatives in order to fully comply with NEPA. The DEIS does not provide a reasonable range of alternatives. The No Action Alternative is inaccurately stated (does not reflect current conditions), and Alternative 5 is infeasible because those technologies are not available. Multiple alternatives with indistinguishable outcomes do not represent a "range" and do not assist in determining preferential options. NMFS needs to revise the EIS to present a reasonable range of alternatives for analysis.

ALT 8 NMFS should consider additional alternatives (or components of alternatives) including:

- A phased, adaptive approach for increasing oil and gas activities,
- Avoidance of redundant seismic surveys,
- Development of a soundscape approach and consideration of caps on noise or activity levels for managing sound sources during the open water period, and
- A clear basis for judging whether the impacts of industry activities are negligible as required by the Marine Mammal Protection Act.

ALT 9 The levels of oil and gas exploration activity identified in Alternatives 2 and 3 are not accurate. In particular, the DEIS significantly over estimates the amount of seismic exploration that is reasonably foreseeable in the next five years, while underestimating the amount of exploration drilling that could occur. The alternatives are legally flawed because none of the alternatives address scenarios that are currently being contemplated and which are most likely to occur. For example:

- Level 1 activity assumes as many as three site clearance and shallow hazard survey programs in the Chukchi Sea, while Level 2 activity assumes as many as 5 such programs. By comparison, the Incidental Take Reduction (ITR) petition recently submitted by Alaska Oil and Gas Association to USFWS for polar bear and walrus projects as many as seven (and as few as zero) shallow hazard surveys and as many as two (and as few as one) other G&G surveys annually in the Chukchi Sea over the next five years.
- The assumption for the number of source vessels and concurrent activity is unlikely.
- By 2014, ConocoPhillips intends to conduct exploration drilling in the Chukchi Sea. It is also probable that Statoil will be conducting exploration drilling on their prospects in the Chukchi Sea beginning in 2014. Accordingly, in 2014, and perhaps later years depending upon results, there may be as many as three exploration drilling programs occurring in the Chukchi Sea.

The alternatives scenarios should be adjusted by NMFS to account for realistic levels of seismic and exploratory drilling activities, and the subsequent impact analyses should be substantially revised. The DEIS does not explain why alternatives that would more accurately represent likely levels of activity were omitted from inclusion in the DEIS as required under 40 C.F.R. Sections 1500.1 and Section 1502.14.

ALT 10 NMFS should include, as part of the assumptions associated with the alternatives, an analysis examining how many different lessees there are, where their respective leases are in each planning area (Beaufort vs. Chukchi seas), when their leases expire, and when they anticipate exploring (by activity) their leases for hydrocarbons. This will help frame the levels of activity that are considered in the EIS.

ALT 11 There is a 2016 lease sale in Chukchi Sea and a 2015 lease sale in Beaufort Sea within the Proposed 5 Year Plan. Alternatives should include some seismic, shallow hazard and possibly drilling to account for these lease sales.

ALT 12 In every impact category but one, the draft impact findings for Alternative 4 are identical to the draft impact findings for Alternative 3 (Level 2 activity with standard mitigation measures). Given that the impacts with and without additional mitigation are the same, Alternative 4 neither advances thoughtful decision-making nor provides a rational justification under the MMPA for NMFS to impose any additional conditions beyond standard mitigation measures. Alternative 4 provides no useful analysis because the context is entirely abstract (i.e., independent from a specific proposal). The need and effectiveness of any given mitigation measure, standard or otherwise, can only be assessed in the context of a specific activity proposed for a given location and time, under then-existing circumstances. Finally, the identified time/area closures, and the use of a 120 dB and 160 dB buffer zones, have no sound scientific or other factual basis. Alternative 4 should be changed to allow for specific mitigations and time constraints designed to match proposed projects as they occur.

ALT 13 Camden Bay, Barrow Canyon, Hanna Shoal, and Kasegaluk Lagoon are not currently listed as critical habitat and do not maintain special protective status. NMFS should remove Alternative 4 from further consideration until such time that these areas are officially designated by law to warrant special protective measures. In addition, these temporal/spatial limitations should be removed from Section 2.4.10(b).

ALT 14 Alternative 5 should be deleted. The alternative is identical to Alternative 3 with the exception that it includes "alternative technologies" as possible mitigation measures. However, virtually none of the technologies discussed are currently commercially available nor will they being during the time frame of this EIS, which makes the analysis useless for NEPA purposes. Because the majority of these technologies have not yet been built and/or tested, it is difficult to fully analyze the level of impacts from these devices. Therefore, additional NEPA analyses (i.e., tiering) will likely be required if applications are received requesting to use these technologies during seismic surveys.

ALT 15 The alternative technologies identified in Alternative 5 should not be viewed as a replacement for airgun-based seismic surveys in all cases.

ALT 16 Positive environmental consequences of some industry activities and technologies are not adequately considered, especially alternative technologies and consideration of what the benefits of better imaging of the subsurface provides in terms of potentially reducing the number of wells to maximize safe production.

ALT 17 The DEIS fails to include any actionable alternatives to require, incentivize, or test the use of new technologies in the Arctic. Such alternatives include:

- Mandating the use of marine vibroseis or other technologies in pilot areas, with an obligation to accrue data on environmental impacts;
- Creating an adaptive process by which marine vibroseis or other technologies can be required as they become available;
- Deferring the permitting of surveys in particular areas or for particular applications where effective mitigative technologies, such as marine vibroseis, could reasonably be expected to become available within the life of the EIS;

- Providing incentives for use of these technologies as was done for passive acoustic monitoring systems in NTL 2007-G02; and
- Exacting funds from applicants to support accelerated mitigation research in this area.

NMFS must include these alternatives in the FEIS analysis.

ALT 18 The reasons to not evaluate specific program numbers in the 2007 DPEIS would apply to the current DEIS. This is a fundamental shift in reasoning of how alternatives are evaluated. NMFS should:

- Address why a previously rejected alternative (limiting number of surveys) has become the basis for all alternatives currently under consideration; and
- Explain the reasoning behind the change in analysis method.

If NMFS cannot adequately address this discrepancy, they should consider withdrawing the current DEIS and initiating a new analysis that does not focus on limiting program numbers as a means of reducing impacts.

ALT 19 The DEIS improperly dismisses the alternative "Caps on Levels of Activities and/or Noise." As NMFS has recognized, oil and gas-related disturbances in the marine environment can result in biologically significant impacts depending upon the timing, location, and number of the activities. Yet the DEIS declines even to consider an alternative limiting the amount of activity that can be conducted in the Arctic, or part of the Arctic, over a given period. The "soundscape" of the Arctic should be relatively easy to describe and manage compared to the soundscapes of other regions, and should be included in the EIS.

The agencies base their rejection of this alternative not on the grounds that it exceeds their legal authority, but that it does not meet the purpose and need of the EIS. Instead of developing an activity cap alternative for the EIS, the agencies propose, in effect, to consider overall limits on activities when evaluating individual applications under Outer Continental Shelf Lands Act (OCSLA) and the MMPA. It would, however, be much more difficult for NMFS or BOEM to undertake that kind of analysis in an individual IHA application or OCSLA exploration plan because the agencies often lack sufficient information before the open water season to take an overarching view of the activities occurring that year. Determining limits at the outset would also presumably reduce uncertainty for industry. In short, excluding any consideration of activity caps from the alternatives analysis in this EIS frustrates the purpose of programmatic review, contrary to NEPA. NMFS claims that there is inadequate data to quantify impacts to support a cumulative noise cap should serve to limit authorizations rather than preventing a limit on activity.

ALT 20 The DEIS improperly dismisses the alternative "Permanent Closures of Areas." BOEM's relegation of this alternative to the leasing process is not consistent with its obligation, at the exploration and permit approval stage, to reject applications that would cause serious harm or undue harm. It is reasonable here for BOEM to define areas whose exploration would exceed these legal thresholds regardless of time of year, just as it defines areas for seasonal avoidance pursuant to other OCSLA and MMPA standards. Regardless, the lease sale stage is not a proper vehicle for considering permanent exclusions for strictly off-lease activities, such as off-lease seismic surveys. At the very least, the DEIS should consider establishing permanent exclusion areas, or deferring activity within certain areas, outside the boundaries of existing lease areas.

ALT 21 The DEIS improperly dismisses the alternative "Duplicative Surveys." NMFS' Open Water Panel has twice called for the elimination of unnecessary, duplicative surveys, whether through data sharing or some other means. Yet the DEIS pleads that BOEM cannot adopt this measure, on the grounds that the agency cannot "require companies to share proprietary data, combine seismic programs, change lease terms, or prevent companies from acquiring data in the same geographic area." This analysis overlooks BOEM's statutory duty under OCSLA to approve only those permits whose exploration activities are not unduly harmful to marine life. While OCSLA does not define the standard, it is difficult to imagine an activity more expressive of undue harm than a duplicative survey, which obtains data that the government and industry already possess and therefore is not necessary to the expeditious and orderly development, subject to environmental safeguards of the outer continental shelf. It is thus within BOEM's authority to decline to approve individual permit applications in whole or part that it finds are unnecessarily duplicative of existing or proposed surveys or data.

ALT 22 NMFS should include a community-based alternative that establishes direct reliance on the Conflict Avoidance Agreement (CAA), and the collaborative process that has been used to implement it. The alternative would include a fully developed suite of mitigation measures similar to what is included in each annual CAA. This alternative would also include:

- A communications scheme to manage industry and hunter vessel traffic during whale hunting;
- Time-area closures that provide a westward-moving buffer ahead of the bowhead migration in areas important for fall hunting by our villages;
- Vessel movement restrictions and speed limitations for industry vessels moving in the vicinity of migrating whales;
- Limitations on levels of specific activities;
- Limitations on discharges in near-shore areas where food is taken and eaten directly from the water;
- Other measures to facilitate stakeholder involvement; and
- An annual adaptive decision making process where the oil industry and Native groups come together to discuss new information and potential amendments to the mitigation measures and/or levels of activity.

NMFS should also include a more thorough discussion of the 20-year history of the CAA to provide better context for assessing the potential benefits of this community-based alternative.

ALT 23 NMFS should include an alternative in the Final EIS that blends the following components of the existing DEIS alternatives, which are designed to benefit subsistence hunting:

- Alternative 2 activity levels;
- Mandatory time/area closures of Alternative 4;
- Alternative technologies from Alternative 5;
- Zero discharge in the Beaufort Sea;
- Limitation on vessel transit into the Chukchi Sea;
- Protections for the subsistence hunt in Wainwright, Point Hope, and Point Lay;
- Sound source verification;
- Expanded exclusion zones for seismic activities; and
- Limitations on limited visibility operation of seismic equipment.

ALT 24 NMFS should include an alternative in the Final EIS that is based on the amount of anthropogenic sounds that marine mammals might be exposed to, rather than using numbers of activities as a proxy for sound. This alternative, based on accumulation of sound exposure level, could evaluate:

- Different types and numbers of industrial activities;
- Different frequencies produced by each activity;
- Location of activities;
- Timing of activities;
- Overlap in time and space with marine mammals; and
- Knowledge about how marine mammals respond to anthropogenic activities.

Threshold levels could be based on simulation modeling using the above information. This approach would use a valid scientific approach, one that is at least as robust, and probably more, than the current approach of simply assessing numbers of activities.

ALT 25 NMFS has defined a seismic "program" as limited to no more than two source vessels working in tandem. This would expand the duration required to complete a program, which could increase the potential for environmental impacts, without decreasing the amount of sound in the water at any one time. NMFS should not limit the number of source vessels used in a program in this manner as it could limit exploration efficiencies inherent in existing industry practice.

ALT 26 NMFS should not limit the number of on ice surveys that can be acquired in any year, in either the Beaufort or Chukchi seas, as it could limit exploration efficiencies inherent in existing industry practice.

ALT 27 The DEIS alternatives also limit the number of drilling operations each year regardless of the type of drilling. Given that there are many different approaches to drilling, each with its own unique acoustic footprint and clear difference in its potential to generate other environmental effects, a pre-established limit on the number of drilling operations each year is not based on a scientific assessment and therefore is unreasonable. NMFS should not limit the number of drilling operations.

ALT 28 By grouping 2D/3D seismic surveys and Controlled Source Electro-Magnetic (CSEM) surveys together, the DEIS suggests that these two survey types are interchangeable, produce similar types of data and/or have similar environmental impact characteristics. This is incorrect and the DEIS should be corrected to separate them and, if the alternatives propose limits, then each survey type should be dealt with separately.

ALT 29 NMFS should consider a phased, adaptive approach to increasing the number of surveys in the region because the cumulative effects of seismic surveys are not clear. Such an approach would provide an opportunity to monitor and manage effects before they become significant and also would help prevent situations where the industry has over-committed its resources to activities that may cause unacceptable harm.

ALT 30 In the Final EIS, NMFS should identify its preferred alternative, including the rationale for its selection.

ALT 31 NMFS must consider alternatives that do not contain the Additional Mitigation Measures currently associated with every action alternative in the DEIS. These measures are not

warranted, are not scientifically supported, and are onerous prohibiting exploration activities over extensive areas for significant portions of the open water season.

ALT 32 Alternatives 2 and 3 identify different assumed levels of annual oil and gas activity. Varying ranges of oil and gas activity are not alternatives to proposal for incidental take authorizations. NMFS should revise the alternatives to more accurately reflect the Purpose and Need of the EIS.

ALT 33 The levels of activity identified in Alternatives 2 and 3 go far above and beyond anything that has been seen in the Arctic to date. The DEIS as written preemptively approves specific levels of industrial activity. This action is beyond NMFS' jurisdiction, and the alternatives should be revised to reflect these concerns.

ALT 34 There is nothing in OCSLA that bars BOEM from incentivizing the use of common surveyors or data sharing, as already occurs in the Gulf of Mexico, to reduce total survey effort. NMFS should include this as part of an alternative in the EIS.

ALT 35 The analysis in the DEIS avoids proposing a beneficial conservation alternative and consistently dilutes the advantages of mitigation measures that could be used as part of such an alternative. NEPA requires that agencies explore alternatives that "will avoid or minimize adverse effects of these actions upon the quality of the human environment." Such an alternative could require all standard and additional mitigation measures, while adding limits such as late-season drilling prohibitions to protect migrating bowhead whales and reduce the harm from an oil spill. NMFS should consider analyzing such an alternative in the Final EIS.

Cumulative Effects (CEF)

CEF Comments related to cumulative impacts in general and for a specific resource

CEF 1 NMFS should review cumulative effects section; many "minor" and "negligible" impacts can combine to be more than "minor" or "negligible".

CEF 2 Adverse cumulative effects need to be considered in more depth for:

- Fisheries and prey species for marine mammals;
- Marine mammals and habitat;
- Wildlife in general;
- North Slope communities;
- Migratory pathways of marine mammals;
- Subsistence resources and traditional livelihoods.

CEF 3 A narrow focus on oil and gas activities is therefore likely to underestimate the overall level of impact on the bowhead whale, whereas an Ecosystem Based Management (EBM) approach would better regulate the totality of potential impacts to wildlife habitat and ecosystem services in the Arctic.

CEF 4 NMFS should include more in its cumulative effects analysis the impacts caused by:

- Climate change;
- Oil Spills;
- Ocean noise;
- Planes;
- Transportation in general;
- Discharge;
- Assessments/research/monitoring;
- Dispersants; and
- Invasive species.

CEF 5 The cumulative effects analysis overall in the DEIS is inadequate. Specific comments include:

- The DEIS fails to develop a coherent analytical framework by which impacts are assessed and how decisions are made;
- The cumulative impact section does not provide details about what specific methodology was used;
- The cumulative effects analysis does not adequately assess the impacts from noise, air/water quality, subsistence, and marine mammals;
- The list of activities is incomplete;
- The assessment of impacts to employment/socioeconomics/income are not considered in assessment of cumulative impacts for any alternative other than the no action alternative;
- The industry has not shown that their activities will have no cumulative, adverse and unhealthy effects upon the animals, the air, the waters nor the peoples of the coastal communities in the Arctic;

- The analysis on seals and other pinnipeds is inadequate and is not clear on whether potential listings was considered; and
- Recent major mortality events involving both walrus and ice seals must be considered when determining impacts. A negligible impact determination cannot be made without more information about these disease events.

CEF 6 The cumulative effects analyzed are overestimated. Specific comments include:

- There is no evidence from over 60 years of industry activities that injurious cumulative sound levels occur;
- Given that the seismic vessel is moving in and out of a localized area and the fact that animals are believed to avoid vessel traffic and seismic sounds, cumulative sound exposure is again likely being overestimated in the DEIS;
- Cumulative impacts from oil and gas activities are generally prescriptive, written to limit exploration activities during the short open water season.

CEF 7 There is a lack of studies on the adverse and cumulative effects on communities, ecosystems, air/water quality, subsistence resources, economy, and culture. NMFS should not authorize Incidental Harassment Authorizations without adequate scientific data.

CEF 8 Adverse cumulative effects need to be considered in more depth for marine mammals and habitat, specifically regarding:

- Oil and gas activities in the Canadian Beaufort and the Russian Chukchi Sea;
- Entanglement with fishing gear;
- Increased vessel traffic;
- Discharge;
- Water/Air pollution;
- Sources of underwater noise;
- Climate change;
- Ocean acidification;
- Production structures and pipelines.

CEF 9 The DEIS does not adequately analyze the cumulative and synergistic effects of exploration noise impacts to marine mammals. Specific comments include:

- The DEIS only addresses single impacts to individual animals. In reality a whale does not experience a single noise in a stationary area as the DEIS concludes but is faced with a dynamic acoustic environment which all must be factored into estimating exposure not only to individuals but also to populations;
- A full characterization of risk to marine mammals from the impacts of noise will be a function of the sources of noise in the marine and also the cumulative effects of multiple sources of noise and the interaction of other risk factors;
- The DEIS does not incorporate chronic stress into its cumulative impact analysis, such as by using other species as proxies for lower life expectancies;
- The DEIS fails to consider the impacts of noise on foraging and energetics;
- Because the acoustic footprint of seismic operations is so large, it is quite conceivable that bowhead whales could be exposed to seismic operations in the Canadian Beaufort, the Alaskan Beaufort, and the Chukchi Sea; and

- An Arctic sound budget should include any noise that could contribute to a potential take, not simply seismic surveying, oil and gas drilling, and ice management activities.

CEF 10 The DEIS does not adequately analyze the combined effects of multiple surveying and drilling operations taking place in the Arctic Ocean year after year.

CEF 11 Over the last several years, the scientific community has identified a number of pathways by which anthropogenic noise can affect vital rates and populations of animals. These efforts include the 2005 National Research Council study, which produced a model for the Population Consequences of Acoustic Disturbance; an ongoing Office of Naval Research program whose first phase has advanced the NRC model; and the 2009 Okeanos workshop on cumulative impacts. The draft EIS employs none of these methods, and hardly refers to any biological pathway of impact.

CEF 12 NMFS should include the following in the cumulative effects analysis:

- Current and future activities including deep water port construction by the military, the opening of the Northwest Passage, and production at BP's Liberty prospect;
- Past activities including past activities in the Arctic for which NMFS has issued IHAs; commercial shipping and potential deep water port construction; production of offshore oil and gas resources or production related activities; and commercial fishing;
- A baseline for analysis of current activities and past IHAs;
- Recent studies: a passive acoustic monitoring study conducted by Scripps, and NOAA's working group on cumulative noise mapping; and
- Ecosystem mapping of the entire project.

Coordination and Compatibility (COR)

COR Comments on compliance with other statues, laws or regulations that should be considered; coordinating with federal, state, local agencies or organizations; permitting requirements.

COR 1 Continued government to government consultation needs to include:

- Increased focus on how NMFS and other Federal Agencies are required to protect natural resources and minimize the impact of hydrocarbon development to adversely affect subsistence hunting.
- More consultations are needed with the tribes to incorporate their traditional knowledge into the DEIS decision making process.
- Direct contact between NMFS and Kotzebue IRA, Iñupiat Community of the Arctic Slope (ICAS) and Native Village of Barrow should be initiated by NMFS.
- Tribal organizations should be included in meeting with stakeholders and cooperating agencies.
- Consultation should be initiated early and from NOAA/NMFS, not through their contractor. Meetings should be in person.

COR 2 Data and results that are gathered should be shared throughout the impacted communities. Often, adequate data is not shared and therefore perceived inaccurate. Before and after an IHA is authorized, communities should receive feedback from industry, NMFS, and marine observers.

COR 3 There needs to be permanent system of enforcement and reporting for marine mammal impacts to ensure that oil companies are complying with the terms of the IHA and Threatened and Endangered species authorizations. This system needs to be developed and implemented in collaboration with the North Slope Borough and the ICAS and should be based on the Conflict Avoidance Agreements.

COR 4 The United States and Canada needs to adopt an integrated and cooperative approach to impact assessment of hydrocarbon development in the Arctic. NMFS should coordinate with the Toktoyaktuk and the Canadian government because of the transboundry impacts of exploratory activities and the United States' non-binding co-management agreements with indigenous peoples in Canada (Alaska Beluga Whale Committee and Nunavut Wildlife Management Board).

COR 5 The State of Alaska should be consulted and asked to join the DEIS team as a Cooperating Agency because the DEIS addresses the potential environmental impacts of oil and gas exploration in State water and because operators on state lands must comply with the MMPA.

COR 6 Local city councils within the affected area need to be informed of public involvement meetings, since they are the elected representatives for the community.

COR 7 NMFS should be explicit in how the CAA process is integrated into the process of reviewing site specific industry proposals and should require offshore operators to enter into a CAA with AEWC for the following reasons:

- Affected communities depend on the CAA process to provide a voice in management of offshore activities.

- Through the CAA process, whaling captains use their traditional knowledge to determine whether and how oil and gas activities can be conducted consistent with our subsistence activities.
- Promotes a community-based, collaborative model for making decisions, which is much more likely to result in consensus and reduce conflict.
- Promotes the objectives of OCSLA, which provides for the "expeditious and orderly development [of the OCS], subject to environmental safeguards ..."
- Serves the objectives of the MMPA, which states that the primary objective of management of marine mammals "should be to maintain the health and stability of the marine ecosystem."

COR 8 NMFS should develop a mechanism to ensure that there is a coordinated effort by federal and state agencies, industry, affected communities, and non-governmental organizations and stakeholders to improve the integration of scientific data and develop a comprehensive, long-term monitoring program for the Arctic ecosystem.

COR 9 Effort should be put towards enhancing interagency coordination for managing noise. Improved communication among federal agencies involved in noise impact assessment would enhance compliance with the US National Technology Transfer and Advancement Act (NTTAA). The NTTAA promotes the use of consensus-based standards rather than agency-specific standards whenever possible and/or appropriate.

COR 10 It is recommended that NMFS coordinate with BOEM on the following activities:

- To conduct supplemental activity-specific environmental analyses under NEPA that provides detailed information on proposed seismic surveys and drilling activities and the associated environmental effects.
- Ensure that the necessary information is available to estimate the number of takes as accurately as possible given current methods and data.
- Make activity-specific analyses available for public review and comment rather than issuing memoranda to the file or categorical exclusions that do not allow for public review/comment.
- Encourage BOEM to make those analyses available for public review and comment before the Service makes its final determination regarding applications for incidental take authorizations.

COR 11 It is recommended that BOEM should have more than a cooperating agency role since the proposed action includes BOEM issuance of G&G permits.

COR 12 NMFS should integrate its planning and permitting decisions with coastal and marine spatial planning efforts for the Arctic region.

COR 13 NMFS needs to coordinate with the oil and gas industry to identify the time period that the assessment will cover, determine how the information will be utilized, and request a range of activity levels that companies / operators might undertake in the next five years.

COR 14 It is requested that the DEIS clarify how in the DEIS the appropriate mechanism for considering exclusion areas from leasing can be during the BOEM request for public comments on its Five Year OCS Leasing Plan when the recent BOEM Draft EIS five-year plan refused to consider additional deferral areas. In that document, BOEM eliminated

additional details from further analysis by stating that it would consider the issue further as part of lease sale decisions.

COR 15 It is recommend that NMFS work to harmonize the DEIS with the President's goals under Executive Order 13580.

COR 16 Consultation with USGS would help NMFS make a more informed prediction regarding the likelihood and extent of successful exploration and development in the project area and thus affect the maximum level of activity it analyzed.

COR 17 NMFS must consider the comments that BOEM received on the five-year plan draft EIS as well as the plan itself before extensively relying on the analysis, specifically for its oil spill analysis.

COR 18 NMFS should consult with the AEWC about how to integrate the timing of the adaptive management process with the decisions to be made by both NMFS and BOEM regarding annual activities. This would avoid the current situation where agencies often ask for input from local communities on appropriate mitigation measures before the offshore operators and AEWC have conducted annual negotiations.

COR 19 NMFS should adopt an ecosystem based management approach consistent with the policy objectives of the MMPA and the policy objectives of the Executive Branch and President Obama's Administration.

COR 20 The EIS should have better clarification that a Very Large Oil Spill (VLOS) are violations of the Clean Water Act and illegal under a MMPA permit.

COR 21 The 2011 DEIS does not appear to define what new information became available requiring a change in the scope, set of alternatives, and analysis, as stated in the 2009 NOI to withdraw the DPEIS. Although Section 1.7 of the 2011 DEIS lists several NEPA documents (most resulting in a finding of no significant impact) prepared subsequent to the withdrawal of the DPEIS, NMFS has not clearly defined what new information would drive such a significant change to the proposed action and require the radical alternatives analysis presented in the 2011 DEIS.

COR 22 The 2011 DEIS is inconsistent with past NEPA reviews on Arctic exploration activities.

Data (DAT)

DATA Comments referencing scientific studies that should be considered.

DATA 1 NMFS should consider these additional references regarding effects to beluga whales:

[Effects of noise] Christine Erbe and David M. Farmer, Zones of impact around icebreakers affecting beluga whales in the Beaufort Sea. J. Acoust. Soc. Am. 108 (3), Pt. 1 p.1332

[avoidance] Findley, K.J., Miller, G.W., Davis, R.A., and Greene, C.R., Jr., Reactions of beluga whales, Delphinapterus leucas, and narwhals, Monodon monoceros, to ice-breaking ships in the Canadian high Arctic, Can. J. Fish. Aquat. Sci. 224: 97-117 (1990); see also Cosens, S.E., and Dueck, L.P., Ice breaker noise in Lancaster Sound, NWT, Canada: implications for marine mammal behavior, Mar. Mamm. Sci. 9: 285-300 (1993).

[beluga displacement]See, e.g., Fraker, M.A., The 1976 white whale monitoring program, MacKenzie estuary, report for Imperial Oil, Ltd., Calgary (1977); Fraker, M.A., The 1977 white whale monitoring program, MacKenzie estuary, report for Imperial Oil, Ltd., Calgary (1977); Fraker, M.A., The 1978 white whale monitoring program, MacKenzie estuary, report for Imperial Oil, Ltd., Calgary (1978); Stewart, B.S., Evans, W.E., and Awbrey, F.T., Effects of man-made water-borne noise on the behaviour of beluga whales, Delphinapterus leucas, in Bristol Bay, Alaska, Hubbs Sea World (1982) (report 82-145 to NOAA); Stewart, B.S., Awbrey, F.T., and Evans, W.E., Belukha whale (Delphinapterus leucas) responses to industrial noise in Nushagak Bay, Alaska: 1983 (1983); Edds, P.L., and MacFarlane, J.A.F., Occurrence and general behavior of balaenopterid cetaceans summering in the St. Lawrence estuary, Canada, Can. J. Zoo. 65: 1363-1376 (1987).

[beluga displacement] Miller, G.W., Moulton, V.D., Davis, R.A., Holst, M., Millman, P., MacGillivray, A., and Hannay, D., Monitoring seismic effects on marine mammals - southeastern Beaufort Sea, 2001-2002, in Armsworthy, S.L., et al. (eds.),Offshore oil and gas environmental effects monitoring/Approaches and technologies, at 511-542 (2005).

DATA 2 NMFS should consider these additional references regarding the general effects of noise, monitoring during seismic surveys and noise management as related to marine mammals:

[effects of noise] Jochens, A., D. Biggs, K. Benoit-Bird, D. Engelhaupt, J. Gordon, C. Hu, N. Jaquet, M. Johnson, R. Leben, B. Mate, P. Miller, J. Ortega-Ortiz, A. Thode, P. Tyack, and B. WÃ¼rsig. 2008. Sperm whale seismic study in the Gulf of Mexico: Synthesis report. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 2008-006. 341 pp. SWSS final report was centered on the apparent lack of large-scale effects of airguns (distribution of sperm whales on scales of 5-100km were no different when airguns were active than when they were silent), but a key observation was that one D-tagged whale exposed to sound levels of 164dB re:1ÂµPa ceased feeding and remained at the surface for the entire four hours that the survey vessel was nearby, then dove to feed as soon as the airguns were turned off.

[effects of noise] Miller, G.W., R.E. Elliott, W.R. Koski, V.D. Moulton, and W.J. Richardson. 1999. Whales. p. 5-1 – 5- 109 In W.J. Richardson, (ed.), Marine mammal and acoustical monitoring of Western Geophysical's openwater seismic program in the Alaskan Beaufort Sea, 1998. LGL Report TA2230-3. Prepared by LGL Ltd., King City, ONT, and

Greeneridge Sciences Inc., Santa Barbara, CA, for Western Geophysical, Houston, TX, and NMFS, Anchorage, AK, and Silver Spring, MD. 390 p.

[effects of noise] Richardson, W.J., Greene Jr, C.R., Malme, C.I. and Thomson, D.H. 1995. Marine Mammals and Noise. Academic Press, San Diego. 576pp.

[effects of noise] Holst, M., M.A. Smultea, W.R. Koski, and B. Haley. 2005. Marine mammal and sea turtle monitoring during Lamont-Doherty Earth Observatory's marine seismic program off the Northern Yucatan Peninsula in the Southern Gulf of Mexico, January February 2005. LGL Report TA2822-31. Prepared by LGL Ltd. environmental research associates, King City, ONT, for Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY, and NMFS, Silver Spring, MD. June. 96 p.

[marine mammals and noise] Balcomb III, KC, Claridge DE. 2001. A mass stranding of cetaceans caused by naval sonar in the Bahamas. Bahamas J. Sci. 8(2):2-12.

[noise from O&G activities] Richardson, W.J., Greene Jr, C.R., Malme, C.I. and Thomson, D.H. 1995. Marine Mammals and Noise. Academic Press, San Diego. 576pp.

A study on ship noise and marine mammal stress was recently issued. Rolland, R.M., Parks, S.E., Hunt, K.E.,Castellote, M., Corkeron, P.J., Nowacek, D.P., Wasser, S.K., and Kraus, S.D., Evidence that ship noise increases stress in right whales, Proceedings of the Royal Society B: Biological Sciences doi:10.1098/rspb.2011.2429 (2012).

Lucke, K., Siebert, U., Lepper, P.A., and Blanchet, M.-A., Temporary shift in masked hearing thresholds in a harbor porpoise (Phocoena phocoena) after exposure to seismic airgun stimuli, Journal of the Acoustical Society of America 125: 4060-4070 (2009).

Gedamke, J., Gales, N., and Frydman, S., Assessing risk of baleen whale hearing loss from seismic surveys: The effect of uncertainty and individual variation, Journal of the Acoustical Society of America 129:496-506 (2011).

[re. relationship between TTS and PTS] Kastak, D., Mulsow, J., Ghoul, A., Reichmuth, C., Noise-induced permanent threshold shift in a harbor seal [abstract], Journal of the Acoustical Society of America 123: 2986 (2008) (sudden, non-linear induction of permanent threshold shift in harbor seal during TTS experiment); Kujawa, S.G., and Liberman, M.C., Adding insult to injury: Cochlear nerve degeneration after 'temporary' noise-induced hearing loss, Journal of Neuroscience 29: 14077-14085 (2009) (mechanism linking temporary to permanent threshold shift).

[exclusion zones around foraging habitat] See Miller, G.W., Moulton, V.D., Davis, R.A., Holst, M., Millman, P., MacGillivray, A., and Hannay, D. Monitoring seismic effects on marine mammals in the southeastern Beaufort Sea, 2001-2002, in Armsworthy, S.L., et al.(eds.), Offshore oil and gas environmental effects monitoring/Approaches and technologies, at 511-542 (2005).

[passive acoustic monitoring limitations] See also Gillespie, D., Gordon, J., Mchugh, R., Mclaren, D., Mellinger, D.K., Redmond, P., Thode, A., Trinder, P., and Deng, X.Y., PAMGUARD: semiautomated, open source software for real-time acoustic detection and localization of ceteaceans, Proceedings of the Institute of Acoustics 30(5) (2008).

BOEM, Site-specific environmental assessment of geological and geophysical survey application no. L11-007for TGS-NOPEC Geophysical Company, at 22 (2011) (imposing separation distance in Gulf of Mexico, noting that purpose is to "allow for a corridor for marine mammal movement").

[harbor porpoise avoidance] Bain, D.E., and Williams, R., Long-range effects of airgun noise on marine mammals: responses as a function of received sound level and distance (2006) (IWC Sci. Comm. Doc. IWC/SC/58/E35); Kastelein, R.A., Verboom, W.C., Jennings, N., and de Haan, D., Behavioral avoidance threshold level of a harbor porpoise (Phocoena phocoena) for a continuous 50 kHz pure tone, Journal of the Acoustical Society of America 123: 1858-1861 (2008); Kastelein, R.A., Verboom, W.C., Muijsers, M., Jennings, N.V., and van der Heul, S., The influence of acoustic emissions for underwater data transmission on the behavior of harbour porpoises (Phocoena phocoena) in a floating pen, Mar. Enviro. Res. 59: 287-307 (2005); Olesiuk, P.F., Nichol, L.M., Sowden, M.J., and Ford, J.K.B., Effect of the sound generated by an acoustic harassment device on the relative abundance and distribution of harbor porpoises (Phocoena phocoena) in Retreat Passage, British Columbia, Mar. Mamm. Sci. 18: 843-862 (2002).

A special issue of the International Journal of Comparative Psychology (20:2-3) is devoted to the problem of noise-related stress response in marine mammals. For an overview published as part of that volume, see, e.g., A.J. Wright, N. Aguilar Soto, A.L. Baldwin, M. Bateson, C.M. Beale, C. Clark, T. Deak, E.F. Edwards, A. Fernandez, A.Godinho, L. Hatch, A. Kakuschke, D. Lusseau, D. Martineau, L.M. Romero, L. Weilgart, B. Wintle, G. Notarbartolo di Sciara, and V. Martin, Do marine mammals experience stress related to anthropogenic noise? (2007).

[methods to address data gaps] Bejder, L., Samuels, A., Whitehead, H., Finn, H., and Allen, S., Impact assessment research: use and misuse of habituation, sensitization and tolerance in describing wildlife responses to anthropogenic stimuli, Marine Ecology Progress Series 395:177-185 (2009).

[strandings] Brownell, R.L., Jr., Nowacek, D.P., and Ralls, K., Hunting cetaceans with sound: a worldwide review, Journal of Cetacean Research and Management 10: 81-88 (2008); Hildebrand, J.A., Impacts of anthropogenic sound, in Reynolds, J.E. III, Perrin, W.F., Reeves, R.R., Montgomery, S., and Ragen, T.J., eds., Marine Mammal Research: Conservation beyond Crisis (2006).

[effects of noise] Harris, R.E., T. Elliot, and R.A. Davis. 2007. Results of mitigation and monitoring program, Beaufort Span 2-D marine seismic program, open-water season 2006. LGL Rep. TA4319-1. Rep. from LGL Ltd., King City, Ont., for GX Technology Corp., Houston, TX. 48 p.

Hutchinson and Ferrero (2011) noted that there were on-going studies that could help provide a basis for a sound budget.

[refs regarding real-time passive acoustic monitoring to reduce ship strike] Abramson, L., Polefka, S., Hastings, S., and Bor, K., Reducing the Threat of Ship Strikes on Large Cetaceans in the Santa Barbara Channel Region and Channel Islands National Marine Sanctuary: Recommendations and Case Studies (2009) (Marine Sanctuaries Conservation Series ONMS-11-01); Silber, G.K., S. Bettridge, and D. Cottingham, Report of a workshop to identify and assess technologies to reduce ship strikes of large whales. Providence, Rhode Island, July 8-10, 2008 (2009) (NOAA Technical Memorandum. NMFS-OPR-42).

[time/place restrictions] See, e.g., Letter from Dr. Jane Lubchenco, Undersecretary of Commerce for Oceans and Atmosphere, to Nancy Sutley, Chair, Council on Environmental Quality at 2 (Jan. 19, 2010); Agardy, T., et al., A Global Scientific Workshop on Spatio-Temporal Management of Noise (October 2007).

[seismic and ambient noise] Roth, E.H., Hildebrand, J.A., Wiggins, S.M., and Ross, D., Underwater ambient noise on the Chukchi Sea continental slope, Journal of the Acoustical Society of America 131:104-110 (2012).

Expert Panel Review of Monitoring and Mitigation and Protocols in Applications for Incidental Take Authorizations Related to Oil and Gas Exploration, including Seismic Surveys in the Chukchi and Beaufort Seas. Anchorage, Alaska 22-26 March 2010.

[refs regarding monitoring and safety zone best practices] Weir, C.R., and Dolman, S.J., Comparative review of the regional marine mammal mitigation guidelines implemented during industrial seismic surveys, and guidance towards a worldwide standard, Journal of International Wildlife Law and Policy 10: 1-27 (2007); Parsons, E.C.M., Dolman, S.J., Jasny, M., Rose, N.A., Simmonds, M.P., and Wright, A.J., A critique of the UK's JNCC seismic survey guidelines for minimising acoustic disturbance to marine mammals: Best practice? Marine Pollution Bulletin 58: 643-651 (2009).

[marine mammals and noise - aircraft] Ljungblad, D.K., Moore, S.E. and Van Schoik, D.R. 1983. Aerial surveys of endangered whales in the Beaufort, eastern Chukchi and northern Bering Seas, 1982. NOSC Technical Document 605 to the US Minerals Management Service, Anchorage, AK. NTIS AD-A134 772/3. 382pp

[marine mammals and noise - aircraft] Southwest Research Associates. 1988. Results of the 1986-1987 gray whale migration and landing craft, air cushion interaction study program. USN Contract No. PO N62474-86-M-0942. Final Report to Nav. Fac. Eng. Comm., San Bruno, CA. Southwest Research Associates, Cardiff by the Sea, CA. 31pp.

DATA 3 NMFS should consider these additional references regarding fish and the general effects of noise on fish:

[effects of noise] Arill Engays, Svein Lakkeborg, Egil Ona, and Aud Vold Soldal. Effects of seismic shooting on local abundance and catch rates of cod (Gadus morhua) and haddock (Melanogrammus aeglefinus) Can. J. Fish. Aquat. Sci. 53: 2238 "2249 (1996).

[animal adaptations to extreme environments- may not be relevant to EIS] Michael Tobler, Ingo Schlupp, Katja U. Heubel, Radiger Riesch, Francisco J. Garca de Leon, Olav Giere and Martin Plath. Life on the edge: hydrogen sulfide and the fish communities of a Mexican cave and surrounding waters 2006 Extremophiles Journal, Volume 10, Number 6, Pages 577-585

[response to noise] Knudsen, F.R., P.S. Enger, and O. Sand. 1994. Avoidance responses to low frequency sound in downstream migrating Atlantic salmon smolt, Salmo salar. Journal of Fish Biology 45:227-233.

See also Fish Fauna in nearshore water of a barrier island in the western Beaufort Sea, Alaska. SW Johnson, JF Thedinga, AD Neff, and CA Hoffman. US Dept of Commerce, NOAA. Technical Memorandum NMFS-AFSC-210. July 2010.

[airgun impacts and fish] McCauley, R.D., Fewtrell, J., Duncan, A.J., Jenner, C., Jenner, M.-N., Penrose, J.D., Prince, R.I.T., Adhitya, A., Murdoch, J., and McCabe, K., Marine seismic surveys: Analysis and propagation of air-gun signals; and effects of air-gun exposure on humpback whales, sea turtles, fishes and squid (2000) (industry-sponsored study undertaken by researchers at the Curtin University of Technology, Australia). Lakkeborg, S., Ona, E., Vold, A., Pena, H., Salthaug, A., Totland, B., Ãvredal, J.T., Dalen, J. and Handegard, N.O., Effects of seismic surveys on fish distribution and catch rates of gillnets and longlines in Vesterlen in summer 2009 (2010) (Institute of Marine Research Report for Norwegian Petroleum Directorate). Slotte, A., Hansen, K., Dalen, J., and Ona, E., Acoustic mapping of pelagic fish distribution and abundance in relation to a seismic shooting area off the Norwegian west coast, Fisheries Research 67:143-150 (2004). Skalski, J.R., Pearson, W.H., and Malme, C.I., Effects of sounds from a geophysical survey device on catch-perunit-effort in a hook-and-line fishery for rockfish (Sebastes ssp.), Canadian Journal of Fisheries and Aquatic Sciences 49: 1357-1365 (1992). McCauley et al., Marine seismic surveys: analysis and propagation of air-gun signals, and effects of air-gun exposure; McCauley, R., Fewtrell, J., and Popper, A.N., High intensity anthropogenic sound damages fish ears, Journal of the Acoustical Society of America 113: 638-642 (2003); see also Scholik, A.R., and Yan, H.Y., Effects of boat engine noise on the auditory sensitivity of the fathead minnow, Pimephales promelas, Environmental Biology of Fishes 63: 203-209 (2002). Purser, J., and Radford, A.N., Acoustic noise induces attention shifts and reduces foraging performance in threespined sticklebacks (Gasterosteus aculeatus), PLoS One, 28 Feb. 2011, DOI: 10.1371/journal.pone.0017478 (2011). Dalen, J., and Knutsen, G.M., Scaring effects on fish and harmful effects on eggs, larvae and fry by offshore seismic explorations, in Merklinger, H.M., Progress in Underwater Acoustics 93-102 (1987); Banner, A., and Hyatt, M., Effects of noise on eggs and larvae of two estuarine fishes, Transactions of the American Fisheries Society 1:134-36 (1973); L.P. Kostyuchenko, Effect of elastic waves generated in marine seismic prospecting on fish eggs on the Black Sea, Hydrobiology Journal 9:45-48 (1973).

Recent work performed by Dr. Brenda Norcross (UAF) for MMS/BOEM. There are extensive data deficiencies for most marine and coastal fish population abundance and trends over time. I know because I conducted such an exercise for the MMS in the mid 2000s and the report is archived as part of lease sale administrative record. Contact Kate Wedermeyer (BOEM) or myself for a copy if it cannot be located in the administrative record.

DATA 4 NMFS should consider these additional references on the effects of noise on lower trophic level organisms:

[effects of noise] Michel Andra, Marta Sola, Marc Lenoir, Merca¨ Durfort, Carme Quero, Alex Mas, Antoni Lombarte, Mike van der Schaar1, Manel Lpez-Bejar, Maria Morell, Serge Zaugg, and Ludwig Hougnigan. Lowfrequency sounds induce acoustic trauma in cephalopods. Frontiers in Ecology and the Environment. Nov. 2011V9 Iss.9

[impacts of seismic surveys and other activities on invertebrates] See, e.g., McCauley, R.D., Fewtrell, J., Duncan, A.J., Jenner, C., Jenner, M.-N., Penrose, J.D., Prince, R.I.T., Adhitya, A., Murdoch, J., and McCabe, K., Marine seismic surveys: Analysis and propagation of air-gun signals; and effects of air-gun exposure on humpback whales, sea turtles, fishes and squid (2000); Andra, M., Sola, M., Lenoir, M., Durfort, M., Quero, C., Mas, A., Lombarte, A., van der Schaar, M., Lapez-Bejar, M., Morell, M., Zaugg, S., and Hougnigan, L., Low-frequency sounds induce acoustic trauma in cephalopods, Frontiers in Ecology and the Environment doi:10.1890/100124 (2011); Guerra, A., and Gonzales, A.F., Severe injuries in the giant squid Architeuthis dux stranded after seismic explorations, in German Federal

Environment Agency, International Workshop on the Impacts of Seismic Survey Activities on Whales and Other Marine Biota at 32-38 (2006)

DATA 5 NMFS should consider these additional references on effects of noise on bowhead whales:

[effects of noise] Richardson WJ, Miller GW, Greene Jr. CR 1999. Displacement of Migrating Bowhead Whales by Sounds from Seismic Surveys in Shallow Waters of the Beaufort Sea. J. of Acoust. Soc. of America. 106:2281.

NMFS cites information from Richardson et al. (1995) which suggested that migrating bowhead whales may react at sound levels as low as 120 dB (RMS) re 1 uPa but fails to cite newer work by Christie et al. 2010 and Koski et al. 2009, cited elsewhere in the document, showing that migrating whales entered and moved through areas ensonified to 120-150 dB (RMS) deflecting only at levels of ~150 dB. Distances at which whales deflected were similar in both studies suggesting that factors other than just sound are important in determining avoidance of an area by migrating bowhead whales. This is a general problem with the EIS in that it consistently uses outdated information as part of the impact analysis, relying on previous analyses from other NMFS or MMS EIS documents conducted without the benefit of the new data.

Additionally, we ask NMFS to respond to the results of a recent study of the impacts of noise on Atlantic Right whales, which found "a decrease in baseline concentrations of fGCs in right whales in association with decreased overall noise levels (6 dB) and significant reductions in noise at all frequencies between 50 and 150 Hz as a consequence of reduced large vessel traffic in the Bay of Fundy following the events of 9/11/01. This study of another baleen whale that is closely related to the bowhead whale supports traditional knowledge regarding the skittishness and sensitivity of bowhead whales to noise and documents that these reactions to noise are accompanied by a physiological stress response that could have broader implications for repeated exposures to noise as contemplated in the DEIS. 68 Rolland, R.M., et al. Evidence that ship noise increases stress in right whales. Proc. R. Soc. B (2012) (doi:lO.1098/rspb.2011.2429). Exhibit G.

Bowhead Whale Aerial Survey Project (or BWASP) sightings show that whales are found feeding in many years on both sides of the Bay. See also Ferguson et al., A Tale of Two Seas: Lessons from Multi-decadal Aerial Surveys for Cetaceans in the Beaufort and Chukchi Seas (2011 PowerPoint) (slide 15). A larger version of the map from the PowerPoint is attached as Exh. 2 Industry surveys have also confirmed whales feeding west of Camden Bay in both 2007 and 2008.159 Shell, Revised Outer Continental Shelf Lease Exploration Plan, Camden Bay, Beaufort Sea, Alaska, Appendix F 3-79 (May 2011) (Beaufort EIA), available at http://boem.gov/Oil-and-Gas-Energy-Program/Plans/Regional-Plans/Alaska-Exploration-Plans/2012-Shell-Beaufort-EP/Index.aspx.

[bowhead displacement] Miller, G.W., Elliot, R.E., Koski, W.R., Moulton, V.D., and Richardson W.J., Whales, in Richardson, W.J. (ed.),Marine Mammal and Acoustical Monitoring of Western Geophysical's Open-Water Seismic Program in the Alaskan Beaufort Sea, 1998 (1999); Richardson, W.J., Miller, G.W., and Greene Jr., C.R., Displacement of migrating bowhead whales by sounds from seismic surveys in shallow waters of the Beaufort Sea, Journal of the Acoustical Society of America 106:2281 (1999).

Clark, C.W., and Gagnon, G.C., Considering the temporal and spatial scales of noise exposures from seismic surveys on baleen whales (2006) (IWC Sci. Comm. Doc. IWC/SC/58/E9); Clark, C.W., pers. comm. with M. Jasny, NRDC (Apr. 2010); see also

MacLeod, K., Simmonds, M.P., and Murray, E., Abundance of fin (Balaenoptera physalus) and sei whales (B. Borealis) amid oil exploration and development off northwest Scotland, Journal of Cetacean Research and Management 8: 247-254 (2006).

DATA 6 NMFS should review and incorporate these additional recent BOEM documents into the Final EIS:

BOEM recently issued a Final Supplemental Environmental Impact Statement for Gulf of Mexico OCS Oil and Gas Lease Sale: 2012; Central Planning Area Lease Sale 216/222; Mexico OCS Oil and Gas Lease Sale: 2012; Central Planning Area Lease Sale 216/222 (SEIS). This final SEIS for the GOM correctly concluded that, despite more than 50 years of oil and gas seismic and other activities, "there are no data to suggest that activities from the preexisting OCS Program are significantly impacting marine mammal populations."

DATA 7 The DEIS should be revised to discuss any and all NMFS or BOEM IQA requirements/guidance that apply to oil and gas activities in the Arctic Ocean. The final EIS should discuss Information Quality Act Requirements, and should state that these IQA requirements also apply to any third-party information that the agencies use or rely on to regulate oil and gas operations. The DEIS should be revised to discuss:

- NMFS Instruction on NMFS Data Documentation, which states at pages 11-12 that all NMFS data disseminations must meet IQA guidelines.
- NMFS Directive on Data and Information Management, which states at page 3: (General Policy and Requirements A. Data are among the most valuable public assets that NMFS controls, and are an essential enabler of the NMFS mission. The data will be visible, accessible, and understandable to authorized users to support mission objectives, in compliance with OMB guidelines for implementing the Information Quality Act.
- NMFS Instruction on Section 515 Pre-Dissemination Review and Documentation Form.
- NMFS Instruction on Guidelines for Agency Administrative Records, which states at pages 2-3 that: The AR [Administrative Record] first must document the process the agency used in reaching its final decision in order to show that the agency followed required procedures. For NOAA actions, procedural requirements include The Information Quality Act.

DATA 8 Information in the EIS should be updated and include information on PAMGUARD that has been developed by the International Association of Oil and Gas Producers Joint Industry Project. PAMGUARD is a software package that can interpret and display calls of vocalizing marine mammals, locate them by azimuth and range and identify some of them by species. These abilities are critical for detecting animals within safety zones and enabling shut-down.

DATA 9 NMFS should utilize some of the new predictive modeling techniques that are becoming available to better describe and analyze the links between impacts experienced at the individual level to the population level. One example is the tool for sound and marine mammals; Acoustic Integration Models (AIMs) that estimate how many animals might be exposed to specific levels of sound. Furthermore, Ellison et al. (2011) suggest a three-pronged approach that uses marine mammal behaviors to examine sound exposure and help with planning of offshore activities. Additionally, scenario-modeling tools such as EcoPath and EcoSim might help with modeling potential outcomes from different anthropogenic activities.

DATA 10 NMFS should consider these additional references regarding impacts of, or responses to, oil spills:

NMFS should update information in the EIS with work recently completed by this gap is documented in recent oil in ice field studies completed by SINTEF. Despite some advances in oil spill response technology, there is still a significant gap in the ability to either remove or burn oil in 30 to 70 percent ice cover. This gap is documented in recent oil in ice field studies completed by SINTEF and cited by NMFS.

DATA 11 NMFS should consider review and incorporation of the following document related to energy development:

Energy [r]evolution: A Sustainable Energy Outlook: 2010 USA Energy Scenario. http://www.energyblueprint.info/1239.0.html http://www.energyblueprint.info/fileadmin/media/documents/national/2010/0910_gpi_E_R__usa_report_10_lr.pdf?PHPSESSID=a403f5196a8bfe3a8eaf375d5c936a69 (PDF document, 9.7 MB).

DATA 12 NMFS should review their previous testimony and comments that the agency has provided on oil and gas exploration or similarly-related activities to ensure that they are not conflicting with what is presented in the DEIS.

- [NMFS should review previous comments on data gaps they have provided] NMFS, Comments on Minerals Management Service (MMS) Draft EIS for the Chukchi Sea Planning Area "Oil and Gas Lease Sale 193 and Seismic Surveying Activities in the Chukchi Sea at 2 (Jan. 30, 2007) (NMFS LS 193 Cmts); NMFS, Comments on MMS Draft EIS for the Beaufort Sea and Chukchi Sea Planning Areas" Oil and Gas Lease Sales 209, 212, 217, and 221 at 3-5 (March 27, 2009) (NMFS Multi-Sale Cmts).
- NMFS should review past comment submissions on data gaps, National Oceanic and Atmospheric Administration (NOAA), Comments on the U.S. Department of the Interior/MMS Draft Proposed Outer Continental Shelf (OCS) Oil and Gas Leasing Program for 2010-2015 at 9 (Sept. 9, 2009).
- Past NEPA documents have concluded that oil and gas exploration in the Chukchi Sea and Beaufort Sea OCS in conjunction with existing mitigation measures (which do not include any of the Additional Mitigation Measures) are sufficient to minimize potential impacts to insignificant levels.

DATA 13 NMFS should review past comment submissions on data gaps regarding:

The DPEIS appears not to address or acknowledge the findings of the U.S. Geological Survey (USGS) June 2011 report "Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska." USGS reinforced that information and data in the Arctic are emerging rapidly, but most studies focus on subjects with small spatial and temporal extent and are independently conducted with limited synthesis. USGS recommended that refined regional understanding of climate change is required to help clarify development scenarios.

This report found that basic data for many marine mammal species in the Arctic are still needed, including information on current abundance, seasonal distribution, movements, population dynamics, foraging areas, sea-ice habitat relationships, and age-specific vital rates. The need for such fundamental information is apparent even for bowhead whales, one of the better studied species in the Arctic. The report confirms that more research is also necessary

to accurately assess marine mammal reactions to different types of noise and that more work is needed to characterize the seasonal and spatial levels of ambient noise in both the Beaufort and Chukchi seas. Recognizing the scope and importance of the data gaps, the report states that missing information serves as a major constraint to a defensible science framework for critical Arctic decision making.

Regarding data gaps on Arctic species see, e.g., Joint Subcommittee on Ocean Science & Technology, Addressing the Effects of Human-Generated Sound on Marine Life: An Integrated Research Plan for U.S. Federal Agencies (Jan. 13, 2009), available at http://www.whitehouse.gov/sites/default/files/microsites/ostp/oceans-mmnoise-IATF.pdf, (stating that the current status of science as to noise effects often results in estimates of potential adverse impacts that contain a high degree of uncertainty?); (noting the need for baseline information, particularly for Arctic marine species);

National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling (National Commission), Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling, Report to the President (Jan. 2011), available at http://www.oilspillcommission.gov/sites/default/files/documents/DEEPWATER_Reporttothe President_FINAL.pdf (finding that "[s]cientific understanding of environmental conditions in sensitive environments in areas proposed for more drilling, such as the Arctic, is inadequate").

National Commission, Offshore Drilling in the Arctic: Background and Issues for the Future Consideration of Oil and Gas Activities, Staff Working Paper No. 13 at 19, available at http://www.oilspillcommission.gov/sites/default/files/documents/Offshore%20Drilling%20in %20the%20Arctic_Bac kground%20and%20Issues%20for%20the%20Future%20Consideration%20of%20Oil%20an d%20Gas%20Activitie s_0.pdf (listing acoustics research on impacts to marine mammals as a ?high priority?)

DATA 14 NMFS should include further information on the environmental impacts of EM [Electromagnetic] surveys. Refer to the recently completed environmental impact assessment of Electromagnetic (EM) Techniques used for oil and gas exploration and production, available at http://www.iagc.org/EM-EIA. The EIA concluded that EM sources as presently used have no potential for significant effects on animal groups such as fish, seabirds, sea turtles, and marine mammals.

DATA 15 NMFS and BOEM risk assessors should consider the National Academy of Sciences report "Understanding Risk: Informing Decisions in a Democratic Society" for guidance. There are other ecological risk assessment experiences and approaches with NOAA, EPA, OMB and other agencies that would inform development of an improved assessment methodology. (National Research Council). Understanding Risk: Informing Decisions in a Democratic Society. Washington, DC: The National Academies Press, 1996).

DATA 16 The following references should be reviewed by NMFS regarding takes and sound level exposures for marine mammals:

Richardson et al. (2011) provides a review of potential impacts on marine mammals that concludes injury (permanent hearing damage) from airguns is extremely unlikely and behavioral responses are both highly variable and short-term.

The growing scientific consensus is that seismic sources pose little risk of Level A takes (Southall, 2010; Richardson et al. 2011)12. Southall and Richardson recommended a Level A threshold, 230 dB re: 1 ÂµPa (peak) (flat) (or 198 dB re 1 ÂµPa2-s, sound exposure level) The NRC's expert panel assessment (NRC 2005) and further review as discussed by Richardson et al (2011) also support the Association's position.

The level of sound exposure that will induce behavioral responses may not directly equate to biologically significant disturbance; therefore additional consideration must be directed at response and significance (NRC 2005; Richardson et al. 2011; Ellison et al. 2011). To further complicate a determination of an acoustic Level B take, the animal's surroundings and/or the activity (feeding, migrating, etc.) being conducted at the time they receive the sound rather than solely intensity levels may be as important for behavioral responses (Richardson et al 2011).

DATA 17 Reports regarding estimated of reserves of oil and gas and impacts to socioeconomics that NMFS should consider including the EIS include:

NMFS should have consulted with the United States Geological Service (USGS), which recently issued a report on anticipated Arctic oil and gas resources (Bird et al. 2008) The USGS estimates that oil and gas reserves in the Arctic may be significant. This report was not referenced in the DEIS.

Two studies by Northern Economics and the Institute for Social and Economic Research at the University of Alaska provide estimation of this magnitude (NE & ISER 2009; NE & ISER 2011). As a result, socioeconomic benefits are essentially not considered in assessment of cumulative impacts for any alternative other than the no-action alternative. This material deficiency in the DEIS must be corrected.

Stephen R. Braund and Associates. 2009. Impacts and benefits of oil and gas development to Barrow, Nuiqsut, Wainwright, and Atqasuk Harvesters. Report to the North Slope Borough Department of Wildlife Management, PAGEO. Box 69, Barrow, AK.)

DATA 18 NMFS should consider citing newer work by work by Christie et al. 2010 and Koski et al. 2009 related to bowhead reactions to sound:

NMFS cites information from Richardson et al. (1995) that suggested that migrating bowhead whales may react at sound levels as low as 120 dB (rms) re 1 uPa but fails to cite newer work by Christie et al. 2010 and Koski et al. 2009, cited elsewhere in the document, showing that migrating whales entered and moved through areas ensonified to 120-150 dB (rms) deflecting only at levels of ~150-160dB.

For example, on Page 43 Section 4.5.1.4.2 the DEIS cites information from Richardson et al. (1995) that suggested that migrating bowhead whales may react to sound levels as low as 120 dB (rms) re 1 uPa, but fails to cite newer work by Christie et al. (2010) and Koski et al. (2009), cited elsewhere in the document, showing that migrating whales entered and moved through areas ensonified to 120-150 dB (rms). In these studies bowhead whales deflected only at levels of ~150 dB (rms).

As described earlier in this document, the flawed analysis on Page 43 Section 4.5.1.4.2 of the DEIS cites information from Richardson et al. (1995), but fails to cite newer work (Christie et al. 2010, Koski et al. 2009) that increases our perspective on the role of sound and its influences on marine mammals, specifically bowhead whales.

The first full paragraph of Page 100 indicates that it is not known whether impulsive sounds affect reproductive rate or distribution and habitat use over periods of days or years. All evidence indicates that bowhead whale reproductive rates have remained strong despite seismic programs being conducted in these waters for several decades (Gerber et al. 2007). Whales return to these habitat areas each year and continue to use the areas in similar ways. There has been no documented shift in distribution or use (Blackwell et al. 2010). The data that have been collected suggests that the impacts are short term and on the scale of hours rather than days or years (MMS 2007, MMS 2008a).

DATA 19 The DEIS consistently fails to use new information as part of the impact analysis instead relying on previous analyses from other NMFS or MMS EIS documents conducted without the benefit of the new data. This implies a pre-disposition toward acceptance of supposition formed from overly conservative views without the benefit of robust review and toward rejection of any data not consistent with these views.

DATA 20 NMFS should consider the incorporation of marine mammal concentration area maps provided as comments to the DEIS (by Oceana) as strong evidence for robust time and area closures should NMFS decide to move forward with approval of industrial activities in the Arctic. While the maps in the DEIS share some of the same sources as the enclosed maps, the concentration areas presented in the above referenced maps reflect additional new information, corrections, and discussions with primary researchers. These maps are based in part on the Arctic Marine Synthesis developed previously, but include some new areas and significant changes to others.

DATA 21 NMFS should consider and an updated literature search for the pack ice and ice gouges section of the EIS:

Pages 3-6 to 3-7, Section 3.1.2.4 Pack Ice and Ice Gouges: An updated literature search should be completed for this section. In particular additional data regarding ice gouging published by MMS and Weeks et al., should be noted. The DEIS emphasizes ice gouging in 20-30 meter water depth: "A study of ice gouging in the Alaskan Beaufort Sea showed that the maximum number of gouges occur in the 20 to 30m (66 to 99 ft) water-depth range (Machemehl and Jo 1989)." However, an OCS study commissioned by MMS (2006-059) noted that Leidersdorf, et al., (2001) examined ice gouges in shallower waters: 48 ice gouges exceeding the minimum measurement threshold of 0.1 m [that were] detected in the Northstar pipeline corridor. These were all in shallower waters (< 12 m) and the maximum incision depth was 0.4 m. "In all four years, however, measurable gouges were confined to water depths exceeding 5 m." These results are consistent with the earlier work, and these results are limited to shallow water. Thus, this study will rely on the earlier work by Weeks et al. which includes deeper gouges and deeper water depths. (Alternative Oil Spill Occurrence Estimators for the Beaufort/Chukchi Sea OCS (Statistical Approach) MMS Contract Number 1435 - 01 - 00 - PO - 17141 September 5, 2006 TGE Consulting: Ted G. Eschenbach and William V. Harper). The DEIS should also reference the work by Weeks, including: Weeks, W.F., P.W. Barnes, D.M. Rearic, and E. Reimnitz, 1984, "Some Probabilistic Aspects of Ice Gouging on the Alaskan Shelf of the Beaufort Sea," The Alaskan Beaufort Sea: Ecosystems and Environments, Academic Press. Weeks, W.F., P.W. Barnes, D.M. Rearic, and E. Reimnitz, June 1983, "Some Probabilistic Aspects of Ice Gouging on the Alaskan Shelf of the Beaufort Sea," US Army Cold Regions Research and Engineering Laboratory.

DATA 22 NMFS should consider revisions to the EIS based on data provided below regarding ice seals:

Page 4-387, Pinnipeds: Ringed seals and some bearded seals spend a fair amount of time foraging in the open ocean during maximum ice retreat (NSB unpublished data, http://www.north slope.org/departments/wildlife/Walrus%201ce%20Seals.php#RingedSeal, Crawford et al. 2011, ADF&G unpublished data). Bearded seals are not restricted to foraging only in shallow areas on a benthic diet. Consumption of pelagic prey items does occur (ADF&G unpublished data, Lentfer 1988).

Pages 4-388 Pinnipeds, and 4-392, Ringed Seal: Ringed seals are known to persist in the offshore pack ice during all times of the year (Crawford et al. 2011, NSB unpublished data, Lenter 1988). It has actually been suggested that there are two ecotypes, those that make a living in the pack ice and shore fast ice animals. This should be stated in one of these sections.

NOAA, 2011 Arctic Seal Disease Outbreak Fact Sheet (updated Nov. 22, 2011) (Arctic Seal Outbreak Fact Sheet), available at http://alaskafisheries.noaa.gov/protectedresources/seals/ice/diseased/ume022012.pdf. NMFS has officially declared an "unusual mortality event" for ringed seals.

DATA 23 NMFS should consider incorporation of the following references regarding vessel impacts on marine mammals:

Renilson, M., Reducing underwater noise pollution from large commercial vessels (2009) available at www.ifaw.org/oceannoise/reports; Southall, B.L., and Scholik-Schlomer, A. eds. Final Report of the National Oceanic and Atmospheric Administration (NOAA) International Symposium: Potential Application of Vessel Quieting Technology on Large Commercial Vessels, 1-2 May 2007, at Silver Springs, Maryland (2008) available at http://www.nmfs.noaa.gov/pr/pdfs/acoustics/vessel_symposium_report.pdf.

[refs regarding vessel speed limits] Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S., and Podesta, M., Collisions between ships and whales, Marine Mammal Science 17:35-75 (2001); Pace, R.M., and Silber, G.K., Simple analyses of ship and large whale collisions: Does speed kill? Biennial Conference on the Biology of Marine Mammals, December 2005, San Diego, CA. (2005) (abstract); Vanderlaan, A.S.M., and Taggart, C.T., Vessel collisions with whales: The probability of lethal injury based on vessel speed. Marine Mammal Science 23:144-156 (2007); Renilson, M., Reducing underwater noise pollution from large commercial vessels (2009) available at www.ifaw.org/oceannoise/reports; Southall, B.L., and Scholik-Schlomer, A. eds. Final Report of the National Oceanic and Atmospheric Administration (NOAA) International Symposium: Potential Application of Vessel-Quieting Technology on Large Commercial Vessels, 1-2 May 2007, at Silver Springs, Maryland (2008), available at http://www.nmfs.noaa.gov/pr/pdfs/acoustics/vessel_symposium_report.pdf; Thompson, M.A., Cabe, B., Pace III, R.M., Levenson, J., and Wiley, D., Vessel compliance and commitment with speed regulations in the US Cape Cod Bay and off Race Point Right Whale Seasonal Management Areas. Biennial Conference on the Biology of Marine Mammals, November-December 2011, Tampa, FL (2011) (abstract); National Marine Fisheries Service, NOAA. 2010 Large Whale Ship Strikes Relative to Vessel Speed. Prepared within NOAA Fisheries to support the Ship Strike Reduction Program (2010), available at http://www.nmfs.noaa.gov/pr/pdfs/shipstrike/ss_speed.pdf.

[aerial monitoring and/or fixed hydrophone arrays] Id.; Hatch, L., Clark, C., Merrick, R., Van Parijs, S., Ponirakis, D., Schwehr, K., Thompson, M., and Wiley, D., Characterizing the relative contributions of large vessels to total ocean noise fields: a case study using the Gerry E. Studds Stellwagen Bank National Marine Sanctuary, Environmental Management 42:735-752 (2008).

DATA 24 NMFS should review the references below regarding alternative technologies:

Among the [alternative] technologies discussed in the 2009 [Okeanos] workshop report are engineering modifications to airguns, which can cut emissions at frequencies not needed for exploration; controlled sources, such as marine vibroseis, which can dramatically lower the peak sound currently generated by airguns by spreading it over time; various non-acoustic sources, such as electromagnetic and passive seismic devices, which in certain contexts can eliminate the need for sound entirely; and fiber-optic receivers, which can reduce the need for intense sound at the source by improving acquisition at the receiver.121 An industry-sponsored report by Noise Control Engineering made similar findings about the availability of greener alternatives to seismic airguns, as well as alternatives to a variety of other noise sources used in oil and gas exploration.

Spence, J., Fischer, R., Bahtiarian, M., Boroditsky, L., Jones, N., and Dempsey, R., Review of existing and future potential treatments for reducing underwater sound from oil and gas industry activities (2007) (NCE Report 07-001) (prepared by Noise Control Engineering for Joint Industry Programme on E&P Sound and Marine Life). Despite the promise indicated in the 2007 and 2010 reports, neither NMFS nor BOEM has attempted to develop noise-reduction technology for seismic or any other noise source, aside from BOEM's failed investigation of mobile bubble curtains.

[alternative technologies] Tenghamn, R., An electrical marine vibrator with a flextensional shell, Exploration Geophysics 37:286-291 (2006); LGL and Marine Acoustics, Environmental assessment of marine vibroseis (2011) (Joint Industry Programme contract 22 07-12).

DATA 25 NMFS should review the references below regarding masking:

Clark, C.W., Ellison, W.T., Southall, B.L., Hatch, L., van Parijs, S., Frankel, A., and Ponirakis, D., Acoustic masking in marine ecosystems as a function of anthropogenic sound sources (2009) (IWC Sci. Comm. Doc.SC/61/E10); Clark, C.W., Ellison, W.T., Southall, B.L., Hatch, L., Van Parijs, S.M., Frankel, A., and Ponirakis, D., Acoustic masking in marine ecosystems: intuitions, analysis, and implication, Marine Ecology Progress Series 395: 201-222 (2009); Williams, R., Ashe, E., Clark, C.W., Hammond, P.S., Lusseau, D., and Ponirakis, D., Inextricably linked: boats, noise, Chinook salmon and killer whale recovery in the northeast Pacific, presentation given at the Society for Marine Mammalogy Biennial Conference, Tampa, Florida, Nov. 29, 2011 (2011).

DATA 26 NMFS should review the references below regarding acoustic thresholds:

[criticism of threshold's basis in RMS]Madsen, P.T., Marine mammals and noise: Problems with root-mean-squared sound pressure level for transients, Journal of the Acoustical Society of America 117:3952-57 (2005).

Tyack, P.L., Zimmer, W.M.X., Moretti, D., Southall, B.L., Claridge, D.E., Durban, J.W., Clark, C.W., D'Amico, A., DiMarzio, N., Jarvis, S., McCarthy, E., Morrissey, R., Ward, J.,

and Boyd, I.L., Beaked whales respond to simulated and actual Navy sonar, PLoS ONE 6(3):e17009.doi:10.13371/journal.pone.0017009 (2011) (beaked whales); Miller, P.J., Kvadsheim, P., Lam., F.-P.A., Tyack, P.L., Kuningas, S., Wensveen, P.J., Antunes, R.N., Alves, A.C., Kleivane, L., Ainslie, M.A., and Thomas, L., Developing dose-response relationships for the onset of avoidance of sonar by free-ranging killer whales (Orcinus orca), presentation given at the Society for Marine Mammalogy Biennial Conference, Tampa, Florida, Dec. 2, 2011 (killer whales); Miller, P., Antunes, R., Alves, A.C., Wensveen, P., Kvadsheim, P., Kleivane, L., Nordlund, N., Lam, F.-P., van IJsselmuide, S., Visser, F., and Tyack, P., The 3S experiments: studying the behavioural effects of navy sonar on killer whales (Orcinus orca), sperm whales (Physeter macrocephalus), and long-finned pilot whales (Globicephala melas) in Norwegian waters, Scottish Oceans Institute Tech. Rep. SOI-2011-001, available at soi.st-andrews.ac.uk (killer whales). See also, e.g., Fernandez, A., Edwards, J.F., Rodríguez, F., Espinosa de los Monteros, A., Herraez, P., Castro, P., Jaber, J.R., Martín, V., and Arbelo, M., Gas and Fat Embolic Syndrome Involving a Mass Stranding of Beaked Whales (Family Ziphiidae) Exposed to Anthropogenic Sonar Signals, Veterinary Pathology 42:446 (2005); Jepson, P.D., Arbelo, M., Deaville, R., Patterson, I.A.P., Castro, P., Baker, J.R., Degollada, E., Ross, H.M., Herráez , P., Pocknell, A.M., Rodríguez, F., Howie, F.E., Espinosa, A., Reid, R.J., Jaber, J.R., Martín, V., Cunningham, A.A., and FernÃ¡ndez, A., Gas-Bubble Lesions in Stranded Cetaceans, 425 Nature 575-576 (2003); Evans, P.G.H., and Miller, L.A., eds., Proceedings of the Workshop on Active Sonar and Cetaceans (2004) (European Cetacean Society publication); Southall, B.L., Braun, R., Gulland, F.M.D., Heard, A.D., Baird, R.W., Wilkin, S.M., and Rowles, T.K., Hawaiian Melon-Headed Whale (Peponacephala electra) Mass Stranding Event of July 3-4, 2004 (2006) (NOAA Tech. Memo. NMFS-OPR-31).

DATA 27 NMFS should review the references below regarding real-time passive acoustic monitoring to reduce ship strike:

Abramson, L., Polefka, S., Hastings, S., and Bor, K., Reducing the Threat of Ship Strikes on Large Cetaceans in the Santa Barbara Channel Region and Channel Islands National Marine Sanctuary: Recommendations and Case Studies (2009) (Marine Sanctuaries Conservation Series ONMS-11-01); Silber, G.K., S. Bettridge, and D. Cottingham, Report of a workshop to identify and assess technologies to reduce ship strikes of large whales. Providence, Rhode Island, July 8-10, 2008 (2009) (NOAA Technical Memorandum. NMFS-OPR-42).

Lusseau, D., Bain, D.E., Williams, R., and Smith, J.C., Vessel traffic disrupts the foraging behavior of southern resident killer whales Orcinus orca, Endangered Species Research 6: 211-221 (2009); Williams, R., Lusseau, D. and Hammond, P.S., Estimating relative energetic costs of human disturbance to killer whales (Orcinus orca), Biological Conservation 133: 301-311 (2006); Miller, P.J.O., Johnson, M.P., Madsen, P.T., Biassoni, N., Quero, [energetics] M., and Tyack, P.L., Using at-sea experiments to study the effects of airguns on the foraging behavior of sperm whales in the Gulf of Mexico, Deep-Sea Research I 56: 1168-1181 (2009). See also Mayo, C.S., Page, M., Osterberg, D., and Pershing, A., On the path to starvation: the effects of anthropogenic noise on right whale foraging success, North Atlantic Right Whale Consortium: Abstracts of the Annual Meeting (2008) (finding that decrements in North Atlantic right whale sensory range due to shipping noise have a larger impact on food intake than patch-density distribution and are likely to compromise fitness).

[mid-frequency, ship strike] Nowacek, D.P., Johnson, M.P., and Tyack, P.L., North Atlantic right whales (Eubalaena glacialis) ignore ships but respond to alerting stimuli, Proceedings of the Royal Society of London, Part B: Biological Sciences 271:227 (2004).

DATA 28 NMFS should review the references below regarding terrestrial mammals and stress response:

Chang, E.F., and Merzenich, M.M., Environmental Noise Retards Auditory Cortical Development, 300 Science 498 (2003) (rats); Willich, S.N., Wegscheider, K., Stallmann, M., and Keil, T., Noise Burden and the Risk of Myocardial Infarction, European Heart Journal (2005) (Nov. 24, 2005) (humans); Harrington, F.H., and Veitch, A.M., Calving Success of Woodland Caribou Exposed to Low-Level Jet Fighter Overflights, Arctic 45:213 (1992) (caribou).

DATA 29 NMFS should review the references below regarding the inappropriate reliance on adaptive management inappropriate:

Taylor, B.L., Martinez, M., Gerrodette, T., Barlow, J., and Hrovat, Y.N., Lessons from monitoring trends in abundance of marine mammals, Marine Mammal Science 23:157-175 (2007).

DATA 30 NMFS should review the references below regarding climate change and polar bears:

Durner, G. M., et al., Predicting 21st-century polar bear habitat distribution from global climate models. Ecological Monographs, 79(1):25-58 (2009).

R. F. Rockwell, L. J. Gormezano, The early bear gets the goose: climate change, polar bears and lesser snow geese in western Hudson Bay, Polar Biology, 32:539-547 (2009).

DATA 31 NMFS should review the references below regarding climate change and the impacts of black carbon:

Anne E. Gore & Pamela A. Miller, Broken Promises: The Reality of Oil Development in America's Arctic at 41 (Sep. 2009) (Broken Promises).

EPA, Report to Congress on Black Carbon External Peer Review Draft at 12-1 (March 2011) (Black Carbon Report), available at http://yosemite.epa.gov/sab/sabproduct.nsf/0/05011472499C2FB28525774A0074DADE/$File/BC%20RTC%20Ext ernal%20Peer%20Review%20Draft-opt.pdf. See D. Hirdman et al., Source Identification of Short-Lived Air Pollutants in the Arctic Using Statistical Analysis of Measurement Data and Particle Dispersion Model Output, 10 Atmos. Chem. Phys. 669 (2010).

DATA 32 NMFS should review the references below regarding air pollution:

Environmental Protection Agency (EPA) Region 10, Supplemental Statement of Basis for Proposed OCS Prevention of Significant Deterioration Permits Noble Discoverer Drillship, Shell Offshore Inc., Beaufort Sea Exploration Drilling Program, Permit No. R10OCS/PSD-AK-2010-01, Shell Gulf of Mexico Inc., Chukchi Sea Exploration Drilling Program, Permit No. R10OCS/PSD-AK-09-01 at 65 (July 6, 2011) (Discoverer Suppl. Statement of Basis 2011), available at http://www.epa.gov/region10/pdf/permits/shell/discoverer_supplemental_statement_of_basis_chukchi_and_beaufort_air_permits_070111.pdf. 393 EPA Region 10, Technical Support Document, Review of Shell's Supplemental Ambient Air Quality Impact Analysis for the Discoverer OCS Permit Applications in the Beaufort and Chukchi Seas at 8 (Jun. 24, 2011)(Discoverer Technical Support Document), available at http://www.epa.gov/region10/pdf/permits/shell/discoverer_ambient_air_quality_impact_anal

ysis_06242011.pdf. 394 EPA, An Introduction to Indoor Air Quality: Nitrogen Dioxide, available at http://www.epa.gov/iaq/no2.html#Health Effects Associated with Nitrogen Dioxide 396 EPA, Particulate Matter: Health, available at http://www.epa.gov/oar/particlepollution/health.html

DATA 33 NMFS should review the references below regarding introduction of non-native species:

S. Gollasch, The importance of ship hull fouling as a vector of species introductions into the North Sea, Biofouling 18(2):105-121 (2002); National Research Council, Stemming the Tide: Controlling Introductions of Nonindigenous Species by Ships Ballast Water (1996) (recognizing that the spread of invasive species through ballast water is a serious problem).

DATA 34 In the Final EIS, NMFS should consider new information regarding the EPA Region 10's Beaufort (AKG-28-2100) and Chukchi (AKG-28-8100) General Permits. Although not final, EPA is in the process of soliciting public comment on the fact sheets and draft permits and this information may be useful depending on the timing of the issuance of the final EIS. Links to the fact sheets, draft permits, and other related documents can be found at: http://yosemite.epa.gov/r I 0/water.nsl/nodes+public+notices/arctic-gp-pn-2012.

DATA 35 NMFS should review the reference below regarding characterization of subsistence areas/activities for Kotzebue:

Whiting, A., D. Griffith, S. Jewett, L. Clough, W. Ambrose, and J. Johnson. 2011. Combining Inupiaq and Scientific Knowledge: Ecology in Northern Kotzebue Sound, Alaska. Alaska Sea Grant, University of Alaska Fairbanks, SG-ED-72, Fairbanks. 71 pp, for a more accurate representation, especially for Kotzebue Sound uses.

Crawford, J. A., K. J. Frost, L. T. Quakenbush, and A. Whiting. 201.2. Different habitat use strategies by subadult and adult ringed seals (Phoca hispida) in the Bering and Chukchi seas. Polar Biology 35(2):241-255.

DATA 36 NMFS should review the references below regarding Ecosystem-Based Management:

Environmental Law Institute. Integrated Ecosystem-Based Management of the U.S. Arctic Marine Environment- Assessing the Feasibility of Program and Development and Implementation (2008)

Siron, Robert et al. Ecosystem-Based Management in the Arctic Ocean: A Multi-Level Spatial Approach, Arctic Vol. 61, Suppl 1 (2008) (pp 86-102)2

Norwegian Polar Institute. Best Practices in Ecosystem-based Oceans Management in the Arctic, Report Series No. 129 (2009)

The Aspen Institute Energy and Environment Program. The Shared Future: A Report of the Aspen Institute Commission on Arctic Climate Change (2011)

DATA 37 NMFS should consider the following information regarding the use of a multi-pulse standard for behavior harassment, since it does not take into account the spreading of seismic pulses over time beyond a certain distance from the array. NMFS‘s own Open Water Panel for the Arctic has twice characterized the seismic airgun array as a mixed impulsive/continuous noise source and has stated that NMFS should evaluate its impacts on that basis. That analysis is supported by the masking effects model referenced above, in which several NMFS

scientists have participated; by a Scripps study, showing that seismic exploration in the Arctic has raised ambient noise levels on the Chukchi Sea continental slope); and, we expect, by the modeling efforts of NOAA‘s Sound Mapping working group, whose work will be completed this April or May.

DATA 38 NMFS is asked to review the use of the reference Richardson 1995, on page 4-86, as support for its statements. NMFS should revise the document to account for Southall et al's 2007 paper on Effects of Noise on Marine Mammals.

Discharge (DCH)

DCH Comments regarding discharge levels, including requests for zero discharge requirements, and deep waste injection wells does not include contamination of subsistence resources.

DCH 1 Without the benefit of EPA evaluation, the persistence of pollutants, bioaccumulation, and vulnerability of biological communities cannot be addressed.

DCH 2 There is insufficient knowledge and no scientific evidence that zero discharge would have any impacts on animals or humans.

DCH 3 The term zero discharge should not be used due to discharges guaranteed under any exploration scenario. This can be confusing to the public

DCH 4 Zero discharge should be a requirement and implemented for all drilling proposals.

DCH 5 Concerns for the people in regards to discharges from drilling muds, the development process, the industrial activities, and water discharges from these activities.

Editorial (EDI)

EDI	Comments to be dealt with directly by NMFS.
EDI 1	NMFS should consider incorporating the following edits into the Executive Summary
EDI 2	NMFS should consider incorporating the following edits into Chapter 1
EDI 3	NMFS should consider incorporating the following edits into Chapter 2
EDI 4	NMFS should consider incorporating the following edits into Chapter 3 – Physical Environment
EDI 5	NMFS should consider incorporating the following edits into Chapter 3 – Biological Environment
EDI 6	NMFS should consider incorporating the following edits into Chapter 3 – Social Environment
EDI 7	NMFS should consider incorporating the following edits into Chapter 4 – Methodology
EDI 8	NMFS should consider incorporating the following edits into Chapter 4 – Physical Environment
EDI 9	NMFS should consider incorporating the following edits into Chapter 4 – Biological Environment
EDI 10	NMFS should consider incorporating the following edits into Chapter 4 – Social Environment
EDI 11	NMFS should consider incorporating the following edits into Chapter 4 – Oil Spill Analysis
EDI 12	NMFS should consider incorporating the following edits into Chapter 4 – Cumulative Effects Analysis
EDI 13	NMFS should consider incorporating the following edits into Chapter 5 – Mitigation
EDI 14	NMFS should consider incorporating the following edits into these figures of the EIS
EDI 15	NMFS should consider incorporating the following edits into these tables of the EIS
EDI 16	NMFS should consider incorporating the following edits into Appendix A

Physical Environment – General (GPE)

GPE Comments related to impacts on resources within the physical environment (Physical Oceanography, Climate, Acoustics, Environmental Contaminants & Ecosystem Functions)

GPE 1 Offshore oil and gas exploration in the Arctic produces some of the loudest noises humans put in the water and interfere with marine mammals' migration routes, feeding opportunities, resting areas, and other adverse impacts to marine life.

GPE 2 NMFS should assess the cumulative and synergistic impacts of the multiple noise sources required for a drilling and exploratory operation in the Arctic. While each individual vessel or platform can be considered a single, periodic or transient source of noise, all components are required to successfully complete the operation. As a result, the entire operation around a drilling ship or drilling platform will need to be quieter than 120 dB in order to be below NMFS disturbance criteria for continuous noise exposure.

GPE 3 The EIS should include an analysis of impacts associated with climate change and ocean acidification including:

- Addressing threats to species and associated impacts for the bowhead whale, pacific walrus, and other Arctic species.
- Effects of loss of sea ice cover, seasonally ice-free conditions on the availability of subsistence resources to Arctic communities.
- Increased community stress, including loss of subsistence resources and impacts to ice cellars.

GPE 4 Oil and gas activities can release numerous pollutants into the atmosphere. Greater emissions of nitrogen oxides and carbon monoxide could triple ozone levels in the Arctic, and increased black carbon emissions would result in reduced ice reflectivity that could exacerbate the decline of sea ice. The emission of fine particulate matter (PM 2.5), including black carbon, is a human health threat. Cumulative impacts will need to be assessed.

GPE 5 The EIS should include a more detailed analysis of the impact of invasive species, particularly in how the current "moderate" impact rating was determined.

GPE 6 A more detailed analysis should be conducted to assess how interactions between high ice and low ice years and oil and gas activities, would impact various resources (sea ice, lower trophic levels, fish/EFH, marine mammals).

GPE 7 Recommendations should be made to industry engineering and risk analysts to ensure that well design is deep enough to withstand storms and harsh environment based on past experience of workers in the late 1980's.

GPE 8 Bowhead whales and seals are not the only subsistence resource that Native Alaskan communities rely upon. Fishing is also an important resource and different species are hunted throughout the year. Subsistence users have expressed concern that activities to support offshore exploration will change migratory patterns of fish and krill that occur along the coastlines.

GPE 9 NMFS needs to revise the Environmental Consequences analysis presented in the DEIS since it overstates the potential for impacts from sounds introduced into the water by oil and gas exploration activity on marine mammals.

Social Environment – General (GSE)

GSE Comments related to impacts on resources within the social environment (Public Health, Cultural, Land Ownership/Use/Mgt., Transportation, Recreation & Tourism, Visual Resources, and Environmental Justice)

GSE 1 The potential short and long-term benefits from oil and gas development have been understated in the DEIS and do not take into account the indirect jobs and business generated by increased oil and gas activity. By removing restrictions on seismic surveys and oil and gas drilling, there will be an increase in short and long term employment and economic stability.

GSE 2 Ensure that current human health assessment and environmental justice analysis from offshore activities in the Arctic are adequately disclosed for public review and comment before a decision is made among the project alternatives.

GSE 3 The current environmental justice analysis is inadequate and the NMFS has downplayed the overall threat to the Iñupiat people. The agency does not adequately address the following:

- The combined impacts air pollution, water pollution, sociocultural impacts (disturbance of subsistence practices), and economic impacts on Iñupiat people;
- The baseline health conditions of local communities and how it may be impacted by the proposed oil and gas activities;
- Potential exposure to toxic chemicals and diminished air quality;
- The unequal burden and risks imposed on Iñupiat communities; and
- The analysis fails to include all Iñupiat communities.

GSE 4 Current and up to date health information should be evaluated and presented in the human health assessments. Affected communities have a predisposition and high susceptibility to health problems that need to be evaluated and considered when NMFS develops alternatives and mitigation measures to address impacts.

GSE 5 When developing alternatives and mitigation measures, NMFS needs to consider the length of the work season since a shorter period will increase the risks to workers.

GSE 6 The DEIS does not address how the proceeds from offshore oil and gas drilling will be shared with affected communities through revenue sharing, royalties, and taxes.

GSE 7 The DEIS should broaden the evaluation of impacts of land and water resources beyond subsistence. There are many diverse water and land uses that will be restricted or prevented because of specific requirements in the proposed Alternatives.

GSE 8 The conclusion of negligible or minor cumulative impacts on transportation for Alternative 4 was not substantiated in the DEIS. The impacts to access, restrictions on vessel traffic, seismic survey, exploration drilling and ancillary services transportation are severely restricted both in time and in areal/geographic extent (page 4-551, paragraph 1).

GSE 9 The Draft EIS should not assume that any delay in exploration activity compromises property rights or immediately triggers compensation from the government. Offshore leases do not convey a fee simple interest with a guarantee that exploration activities will take place. As the Supreme Court recognized, OCSLA‘s plain language indicates that the purchase of a lease entails no right to proceed with full exploration, development, or production.

Habitat (HAB)

HAB Comments associated with habitat requirements, or potential habitat impacts from seismic activities and exploratory drilling. Comment focus is habitat, not animals.

HAB 1 Alaska's Arctic wildlife and their habitat are currently being threatened by the many negative effects of oil and gas exploration.

HAB 2 NMFS should consider an ecosystem-based management plan (EBM) to protect habitat for the bowhead whale and other important wildlife subsistence species of the Arctic.

HAB 3 The DEIS does not adequately consider the increased risk of introducing aquatic invasive species to the Beaufort and Chukchi seas through increased oil and gas activities.

- Invasive species could be released in ballast water, carried on ship's hulls or on drill rigs.
- Invasive species could compete with or prey on Arctic marine fish or shellfish species, which may disrupt the ecosystem and predators that depend on indigenous species for food.
- Invasive species could impact the biological structure of bottom habitat or change habitat diversity.
- Invasive species, such as rats, could prey upon seabirds or their eggs.
- Establishment of a harmful invasive species could threaten Alaska’s economic well-being.

HAB 4 Occasional feeding by bowhead whales in Camden Bay is insufficient justification for designating Camden Bay as a Special Habitat Area. Special Habitat would then have to include the entire length of the Alaska Beaufort Sea coast along which bowhead whales occasionally feed.

Iñupiat Culture and Way of Life (ICL)

ICL Comments related to potential cultural impacts or desire to maintain traditional practices (PEOPLE).

ICL 1 Industrial activities (such as oil and gas exploration and production) jeopardize the long-term health and culture of native communities. Specific concerns include:

- Impacts to Arctic ecosystems and the associated subsistence resources from pollutants, noise, and vessel traffic;
- Community and family level cultural impacts related to the subsistence way of life;
- Preserving resources for future generations.

ICL 2 Native communities would be heavily impacted if a spill occurs, depriving them of subsistence resources. NMFS should consider the impact of an oil spill when deciding upon an alternative

ICL 3 Native communities are at risk for changes from multiple threats, including climate change, increased industrialization, access to the North Slope, melting ice, and stressed wildlife. These threats are affecting Iñupiat traditional and cultural uses and NMFS should stop authorizing offshore oil and gas related activities until these threats to our culture are addressed.

Mitigation Measures (MIT)

MIT Comments related to suggestions for or implementation of mitigation measures.

MIT 1 Mitigation measures should be mandatory for all activities, rather than on a case-by-case basis. Currently identified areas with high wildlife and subsistence values should also receive permanent deferrals, including Camden Bay, Barrow Canyon/Western Beaufort Sea, Hanna Shoal, shelf break at the Beaufort Sea, and Kasegaluk Lagoon/Ledyard Bay Critical Habitat Unit.

MIT 2 Bristol Bay, the Chukchi, and the Beaufort seas are special nursery areas for Alaska salmon and should have the strongest possible protections.

MIT 3 The proposed mitigation measures will severely compromise the economic feasibility of developing oil and gas in the Alaska OCS:

- Limiting activity to only two exploration drilling programs in each the Chukchi and Beaufort seas during a single season would lock out other lease holders and prevent them from pursuing development of their leases.
- Arbitrary end dates for prospective operations effectively restrict exploration in Camden Bay removes 54 percent of the drilling season.
- Acoustic restrictions extend exclusion zones and curtail lease block access (e.g., studies by JASCO Applied Sciences Ltd in 2010 showed a 120 dB safety zone with Hanna Shoal as the center would prevent Statoil from exercising its lease rights because the buffer zone would encompass virtually all of the leases. A 180 dB buffer zone could still have a significant negative impact lease rights depending on how the buffer zone was calculated).
- Special Habitat Areas arbitrarily restrict lease block access.
- Arbitrary seasonal closures would effectively reduce the brief open water season by up to 50 percent in some areas of the Chukchi and Beaufort seas.
- The realistic drilling window for offshore operations in the Arctic is typically 70 - 150 days. Any infringement on this could result in insufficient time to complete drilling operations.
- Timing restrictions associated with Additional Mitigation Measures (e.g., D1, B1) would significantly reduce the operational season.

MIT 4 Many mitigation measures are unclear or left open to agency interpretation, expanding uncertainties for future exploration or development.

MIT 5 The DEIS includes mitigation measures which would mandate portions of Conflict Avoidance Agreements with broad impacts to operations. Such a requirement supersedes the authority of NMFS.

MIT 6 Limiting access to our natural resources is NOT an appropriate measure and should not be considered.

MIT 7 A specially equipped, oceangoing platform(s) is needed to carry out the prevention, diagnosis and treatment of disease in marine animals, including advanced action to promote population recovery of threatened and endangered species, to restore marine ecosystems health, and to enhance marine animal welfare. Activities thereby to be made possible or facilitated include,

but are not limited to: Response to marine environmental disasters and incidents; in particular oil spills by rescue and decontamination of oil-fouled birds, pinnipeds, otters, and other sea life. Rescue, treatment and freeing of sea turtles, pinnipeds, cetaceans, and otters that become entangled in sport fishing lines, commercial fishing gear, and/or marine debris. General pathobiological research on marine animals to advance basic knowledge of their diseases and to identify promising avenues for treatment. Specialized pathobiological research on those marine animals known to provide useful sentinels for toxicological and other hazards to human health. Evaluation of the safety of treatment modalities for marine animals, including in particular large balaenopterids. This will have as its ultimate aim countering problems of climate change and ecosystems deterioration by therapeutic enhancement of the ecosystems services contributed by now depleted populations of Earth's largest and most powerful mammals. Pending demonstration of safety, offshore deployment of fast boats and expert personnel for the treatment of a known endemic parasitic disease threatening the health and population recovery of certain large balaenopterids. Rapid transfer by helicopter of technical experts in disentanglement of large whales to offshore sites not immediately accessible from land-based facilities. Rapid transfer by helicopter of diseased and injured marine animals to land-based veterinary hospitals. Coordination with U.S. Coast Guard's OCEAN STEWARD mission to reduce the burden on government in this area and to implement more fully the policy of the United States promulgated by Executive Order 13547.

MIT 8 Considering current and ongoing oil and gas exploration disasters, the public needs to be assured of the safety and effectiveness of Arctic environmental safety and mitigation strategies.

MIT 9 Mitigation distances and thresholds for seismic surveys are inadequate as they fall far short of where significant marine mammal disturbances are known to occur.

MIT 10 There is no need for additional mitigation measures:

- The DEIS seeks to impose mitigation measures on activities that are already proven to be adequately mitigated and shown to pose little to no risk to either individual animals or populations.
- Many of these mitigation measures are of questionable effectiveness and/or benefit, some are simply not feasible, virtually all fall outside the bounds of any reasonable cost-benefit consideration, most are inadequately evaluated.
- The key impact findings in the DEIS are arbitrary and unsupportable.
- These additional mitigation measures far exceed the scope of NMFS's authority.

MIT 11 Active Acoustic Monitoring should be further studied, but it is not yet ready to be imposed as a mitigation measure.

MIT 12 Because NMFS is already requiring Passive Acoustic Monitoring (PAM) as a monitoring or mitigation requirement during the Service's regulation of offshore seismic and sonar, and in conjunction with Navy sonar, we recommend that the Service emphasize the availability and encourage the use of PAMGUARD in all NMFS's actions requiring or recommending the use of PAM. PAMGUARD is an open source, highly tested and well documented version of PAM that is an acceptable method of meeting any PAM requirements or recommendations.

MIT 13 If Kotzebue is included in the EIS area because it is an eligible area for exploration activities, then the DEIS needs to include recommendations for mitigating impacts through exclusion areas, or timing issues, including:

- remove the Hope Basin from the EIS area

- develop and include additional area/time closures/restrictions for nearshore Kotzebue Sound and for Point Hope and Kivalina in the Final EIS.

MIT 14 There should be no on ice discharge of drilling muds due to concentrated - nature of waste and some likely probability of directly contacting marine mammals, or other wildlife like arctic foxes and birds. Even if the muds are considered non-toxic the potential for fouling fur and feathers and impeding thermal regulation properties seems a reasonable concern.

MIT 15 There should be com centers in the villages during bowhead and beluga hunting if villagers find this useful and desirable.

MIT 16 The benefits of concurrent ensonification areas need to be given more consideration in regards to 15 miles vs. 90 mile separation distances. It is not entirely clear what the cost/benefit result is on this issue including:

- Multiple simultaneous surveys in several areas across the migratory corridor could result in a broader regional biological and subsistence impact -deflection could occur across a large area of feeding habitat.
- Potential benefit would depend on the trajectory of migrating animals in relation to the activity and total area ensonified.
- Consideration needs to be given to whether mitigation is more effective if operations are grouped together or spread across a large area.

MIT 17 Use mitigation measures that are practicable and produce real world improvement on the level and amount of negative impacts. Don't use those that theoretically sound good or look good or feel good, but that actually result in an improved situation. Encourage trials of new avoidance mechanisms.

MIT 18 Trained dogs are the most effective means of finding ringed seal dens and breathing holes in Kotzebue Sound, so should be used to clear path for on ice roads or other on ice activities.

MIT 19 The potential increased risk associated with the timing that vessels can enter exploration areas needs to be considered:

- A delayed start could increase the risk of losing control of a VLOS that will more likely occur at the end of the season when environmental conditions (ice and freezing temperatures) rapidly become more challenging and hazardous.
- Operators could stage at leasing areas but hold off on exploration activity until July l5, or Point Lay beluga hunt is completed.

MIT 20 The proposed time/area closures are insufficient to protect areas of ecological and cultural significance. Alternatives in the final EIS that consider any level of industrial activity should include permanent subsistence and ecological deferral areas in addition to time and place restrictions, including:

- Hanna and Herald shoals, Barrow Canyon, and the Chukchi Sea ice lead system.

MIT 21 The DEIS should definitively establish the full suite of mandatory mitigation measures for each Alternative that will be required for any given site-specific activity, instead of listing a series of mitigation measures that may or may not apply to site-specific actions.

- NMFS should ensure that mitigation measures are in place prior to starting any activity rather than considering mitigation measures on a case by case basis later in the process when it is more difficult as activities have advanced in planning.
- Make additional mitigation measures standard and include both for any level of activity that includes, at a minimum, those activities described in section 2.4.9 and 2.4.10.
- Mitigation measures required previously by IHAs (e.g., a 160dB vessel monitoring zone for whales during shallow hazard surveys) show it is feasible for operators to perform these measures.
- NMFS to require a full suite of mitigation measures to every take authorization issued by the agency.
- A number of detection-based measures should be standardized (e.g., sound source verification, PAM).
- Routing vessels around important habitat should be standard.

MIT 22 NMFS could mitigate the risk ice poses by including seasonal operating restrictions in the final EIS and preferred alternative.

MIT 23 The time/area closures (Alternative 4 and Additional Mitigation Measure B1) of Camden Bay, Barrow Canyon and the Western Beaufort Sea, the Shelf Break of the Beaufort Sea, Hanna Shoal, Kasegaluk Lagoon/Ledyard Bay are unwarranted, arbitrary measures in search of an adverse impact that does not exist:

- The DEIS does not identify any data or other scientific information establishing that past, present, or reasonably anticipated oil and gas activity in these areas has had, or is likely to have, either more than a negligible impact on marine mammals or any unmitigable adverse impact on the availability of marine mammals for subsistence activities.
- There is no information about what levels of oil and gas activity are foreseeably expected to occur in the identified areas in the absence of time/area closures, or what the anticipated adverse impacts from such activities would be. Without this information, the time/area closure mitigation measures are arbitrary because there is an insufficient basis to evaluate and compare the effects with and without time/area closures except through speculation.
- The time/area closures are for mitigation of an anticipated large number of 2D/3D seismic surveys, but few 2D/3D seismic surveys are anticipated in the next five years. There is no scientific evidence that these seismic surveys, individually or collectively, resulted in more than a negligible impact.
- The designation of geographic boundaries by NMFS and BOEM should be removed, and projects should be evaluated based upon specific project requirements, as there is not sufficient evidence presented that supports that arbitrary area boundary determinations will provide protection to marine mammal species.
- There is a lack of scientific evidence around actual importance level and definition of these closure areas. The descriptions of these areas do not meet the required standard of using the best available science.
- With no significant purpose, they should be removed from consideration.

- If the closures intended to reduce disturbances of migrating, feeding, and resting whales are not reducing the level of impact they should not be considered effective mitigation measures.

MIT 24 The time/area closure for Camden Bay (Alternative 4 and Additional Mitigation Measure B1) is both arbitrary and impracticable because there is no demonstrated need. It needs to be clarified, modified, or removed:

- BOEM's analysis of Shell's exploration drilling program in Camden Bay found anticipated impacts to marine mammals and subsistence are minimal and fully mitigated.
- The proposed September 1 to October 15 closure effectively eliminates over 54 percent of the open water exploration drilling season in Camden Bay and would likely render exploration drilling in Camden Bay economically and logistically impracticable, thereby effectively imposing a full closure of the area under the guise of mitigation.
- The conclusion that Camden Bay is of particular importance to bowhead whales is not supported by the available data (e.g., Huntington and Quakenbush 2009, Koski and Miller 2009, and Quakenbush et al. 2010). Occasional feeding in the area and sightings of some cow/calf pairs in some years does not make it a uniquely important area.
- A standard mitigation measure already precludes all activities until the close of the Kaktovik and Nuiqsut fall bowhead hunts. Furthermore, in the last 10 years no bowhead whales have been taken after the third week of September in either the Nuiqsut or Kaktovik hunts so proposing closure to extend well into October is unjustified.
- This Additional Mitigation Measure (B-1) should be deleted for the reasons outlined above. If not, then start and end dates of the closure period must be clarified; hard dates should be provided for the start and end of the closure or the closure should be tied to actual hunts.
- How boundaries and timing were determined needs to be described.

MIT 25 Restrictions intended to prevent sound levels above 120 dB or 160 dB are arbitrary, unwarranted, and impractical.

- Restrictions at the 120 dB level, are impracticable to monitor because the resulting exclusion zones are enormous, and the Arctic Ocean is an extremely remote area that experiences frequent poor weather.
- The best scientific evidence does not support a need for imposition of restrictions at 120 dB or 160 dB levels. One of the most compelling demonstrations of this point comes from the sustained period of robust growth and recovery experienced by the Western Arctic stock of bowhead whales, while exposed to decades of seismic surveys and other activities without restrictions at the 120 dB or 160 dB levels.

MIT 26 The DEIS should not limit the maximum number of programs per year. Implementing multiple programs per year is the preferred option for the Alternatives 2, 3, 4, and 5 as there is not just cause in the DEIS to validate that acoustic and non-acoustic impacts from these programs are severe enough to cause long term acute or cumulative negative impacts or adverse modifications to marine mammals throughout the planning area.

MIT 27 The State recommends that no maximum limit be set on the number of seismic or exploratory drilling projects per year. The appropriate mitigations can be determined and implemented for each program at the time of ITA and G&G permit approvals.

MIT 28 The time/area closures are not warranted and would severely negatively impact seismic and exploration program activity opportunities:

- Placing the time closures chronologically in sequence, results in closures from mid-July through at least mid-September, and in some cases through mid-October. This leaves less than half of the non-ice season available for activity in those areas, with no resulting resource and species protection realized.
- The arbitrary limits to the duration of programs will cause high intensity, short and long term adverse effects and restrictions to oil and gas land and water uses.
- The identified time/area closures, and the use of a 120 dB and 160 dB buffer zones, have no sound scientific or other factual basis and would, in several instances, render oil and gas exploration impracticable.

MIT 29 Additional Mitigation Measure C2 should be discussed in more detail, clarified, or deleted in the final EIS:

- Shipping routes or shipping lanes of this sort are established and enforced under the regulatory authority of the U.S. Coast Guard. While NOAA or BOEM could establish restricted areas, they could not regulate shipping routes.
- With this mitigation measure in place, successful exploration cannot be conducted in the Chukchi Sea.
- Not only would lease holders be unable to conduct seismic and shallow hazard surveys on some leases, but essential geophysical surveys for pipelines to shore, such as ice gouge surveys, strudel scour surveys, and bathymetric surveys could not be conducted.

MIT 30 There is no scientific justification for Additional Mitigation Measure C3. NMFS needs to explain in the final EIS how NOAA's recommendations can justify being more stringent than EPA's permit conditions, limitations and requirements.

MIT 31 The purpose, intent and description of Additional Mitigation Measure C4 need to be clarified (see page 4-67).

MIT 32 Additional Mitigation Measure D1 needs to be clarified as to what areas will be impacted/closed, and justified and/or modified accordingly:

- It is not clear if this restriction is focused on the nearshore Chukchi Sea or on all areas.
- The logic of restrictions on vessels due to whales avoiding those areas may justify restrictions in the nearshore areas, but it is not clear how this logic would justify closing the entire Chukchi offshore areas to vessel traffic if open water exists.
- If a more specific exclusion area (e.g., within 30 miles of the coast) would be protective of beluga whale migration routes, it should be considered instead of closing the Chukchi Sea to transiting vessels.
- It is not scientifically supported to close the entire Chukchi Sea to vessel traffic when the stated intent is to avoid disrupting the subsistence hunt of beluga whales during their migration along or near the coast near Point Lay.
- Transits should be allowed provided that they do not interfere with the hunt.
- Transits far off shore should be allowed and transits that are done within the conditions established through a Conflict Avoidance Agreement should be allowed.
- Prohibiting movement of drilling vessels and equipment outside of the barrier islands would unreasonably limit the entire drilling season to less than two months.

- Movement of drilling vessels and related equipment in a manner that avoids impacts to subsistence users should be allowed on a case-by-case basis and as determined through mechanisms such as the Conflict Avoidance Agreement not through inflexible DEIS mitigation requirements.
- BOEM (2011b) has previously concluded that oil and gas activities in the Chukchi Sea would not overlap in space with Point Lay beluga hunting activities, and therefore would have no effect on Point Lay beluga subsistence resources. Given that the entire Lease Sale 193 area does not overlap geographically with Point Lay subsistence activities, it is reasonable to draw the same conclusion for activities of other lease holders in the Chukchi Sea as well.
- This measure also prohibits all geophysical activity within 60 mi of the Chukchi coastline. No reason is offered. The mitigation measure would prohibit lease holders from conducting shallow hazards surveys and other geophysical surveys on and between leases. Such surveys are needed for design and engineering.

MIT 33 The time/area closure of Hanna Shoal is difficult to assess and to justify and should be removed from Alternative 4 and Additional Mitigation Measure B1:

- There needs to be information as to how and why the boundaries of the Hanna Shoal were drawn; it is otherwise not possible to meaningfully comment on whether the protection itself is justified and whether it should be further protected by a buffer zone.
- The closure cannot be justified on the basis of mitigating potential impacts to subsistence hunters during the fall bowhead whale hunt as the DEIS acknowledges that the actual hunting grounds are well inshore of Hanna Shoal and there is no evidence that industry activities in that area could impact the hunts.
- Current science does not support closure of the area for protection of the walrus.
- Closure of the area for gray whales on an annual basis is not supported, as recent aerial survey data suggests that it has not been used by gray whales in recent years and the historic data does not suggest that it was important for gray whales on a routine (annual) basis.
- The October 15 end date for the closure is too late in the season to be responsive to concerns regarding walrus and gray whales. As indicated in the description in the DEIS of the measure by NMFS and USGS walrus tracking data, the area is used little after August. Similarly, few gray whales are found in the area after September.

MIT 34 Plans of Cooperation (POCs) and CAAs are effective tools to ensure that meaningful consultations continue to take place. We strongly urge NMFS to ensure that POCs and CAAs continue to be available to facilitate interaction between the oil and gas industry and local communities for the proper balance that allows for continued development subject to mitigation measures that adequately protect our subsistence hunting, as well as our local customs and cultural resources.

MIT 35 The number of mitigation measures that are necessary or appropriate should be analyzed case-by-case in the context of issuing ITA/IHA/permit/approval, the nature and extent of the risk or effect they are mitigating, and cost and effectiveness. The scope of necessary measures should be dictated by specific activity for which approval or a permit is being sought.

MIT 36 NMFS and BOEM are strongly urged to consult closely with locally affected whaling communities when evaluating potential mitigation measures, including the

scheduling/timing/scope of specific activities, using tools such as the POC, CAA, and any other appropriate mechanisms.

MIT 37 Restricting the number of programs does not necessarily correlate to decreased impacts.

MIT 38 The additional mitigation measures are too restrictive and could result in serving as the no action alternative.

MIT 39 NMFS cannot reasonably mandate use of the technologies to be used under Alternative 5, since they are not commercially available, not fully tested, unproven and should not be considered reasonably foreseeable.

MIT 40 For open water and in-ice marine surveys include the standard mitigation measure of a mitigation airgun during turns between survey lines and during nighttime activities.

MIT 41 Include shutdown of activities in specific areas corresponding to start and conclusion of bowhead whale hunts for all communities that hunt bowhead whales, not just Nuiqsut (Cross Island) and Kaktovik (as stated on p. 2-41).

MIT 42 Evaluate the necessity of including dates within the DEIS. Communication with members of village Whaling Captains Associations indicate that the dates of hunts may shift due to changing weather patterns, resulting in a shift in blackout dates.

MIT 43 Additional Mitigation Measure B3 should not be established, particularly at these distances, because it is both unwarranted from an environmental protection perspective and unnecessary given how seismic companies already have an incentive for separation.

- The basis for the distances is premised on use of sound exposure levels that are indicative of harm. Use of the 160 dB standard would establish a propagation distance of 9-13 kilometers. The distance in the mitigation measure therefore seems excessive and no scientific basis was provided.
- NMFS has justified the 120 dB threshold based on concerns of continuous noise sources, not impulsive sound sources such as seismic surveys.
- The argument that overlapping sound fields could mask cetacean communication has already been judged to be a minor concern. NMFS has noted, "in general, NMFS expects the masking effects of seismic pulses to be minor, given the normally intermittent nature of seismic pulses." 76 Fed. Reg. at 6438.
- The mitigation measure is prohibitively restrictive and it is unclear what, if any mitigation of impacts this measure would result.

MIT 44 Additional Mitigation Measure D4 should be consistent with surrounding mitigation measures that consider start dates of bowhead whale hunting closed areas based on real-time reporting of whale presence and hunting activity rather than a fixed date.

MIT 45 Additional Mitigation Measure B3 should not be considered as an EIS area wide alternative.

- NMFS should only impose limitations of the proximity of seismic surveys to each other (or to specific habitat areas) when and where they are applicable to known locations where biologically significant impacts might occur. There is no evidence that such important feeding areas occur within the EIS area other than just east of Pt. Barrow.
- It should only be used at specific times and locations and after a full evaluation of the likelihood of overlap of seismic sound and/or disturbance impacts has actually taken

place. Simply assuming that seismic sound might overlap and be additive in nature is incorrect.

MIT 46 Additional Mitigation Measure A5 provisions are unclear, unjustified, and impractical:

- The justification for believing that biologically significant effects to individuals or the bowhead population would occur from exposure of four or more bowhead cow/calf pairs to >120 dB pulsed sounds is not provided or referenced.
- The amount of time and effort required to monitoring for four or more bowhead cow/calf pairs within the 120 dB seismic sound level area take away from better defining the distances and/or sound level thresholds at which more substantial impacts may be occurring.
- Would the referenced 4 or more cow/calf pairs have to be actually observed within the area to trigger mitigation actions or would mitigation be required if survey data corrected for sightability biases using standard line-transect protocols suggested 4 or more were present?
- If a mitigation measure for aggregations of 12 or more whales were to be included there needs to be scientific justification for the number of animals required to trigger the mitigation action.

MIT 47 Additional Mitigation Measure C1 needs to be more clearly defined (or deleted), as it is redundant and nearly impossible and impractical for industry to implement.

- Steering around a loosely aggregated group of animals is nearly impossible as Protected Species Observers (PSOs) often do not notice such a group until a number of sightings have occurred and the vessel is already within the higher density patch. At that point it likely does more harm than good trying to steer away from each individual or small group of animals as it will only take the vessel towards another individual or small group.
- This measure contains requirements that are already requirements, such as Standard Mitigation Measures B1 and D3, such as a minimum altitude of 457 m.
- The mitigation measure requires the operator to adhere to USFWS mitigation measures. Why is a measure needed to have operators follow another agency's mitigation measures which already would have the force of law.
- The measure states that there is a buffer zone around polar bear sea ice critical habitat which is false.

MIT 48 NMFS' conclusion that implementation of time closures does not reduce the spatial distribution of sound levels is not entirely correct (Page 4- 283 Section 4.7.1.4.2). The closures of Hanna Shoal would effectively eliminate any industrial activities in or near the area, thereby reducing the spatial distribution of industrial activities and associated sound.

MIT 49 The time/area closure for the Beaufort Sea shelf needs to be justified by more than speculation of feeding there by beluga whales.

- There is no evidence cited in the EIS stating that the whales are feeding there at that time and that it is an especially important location.
- Most beluga whales sighted along the shelf break during aerial surveys are observed traveling or migrating, not feeding.
- Placing restrictions on the shelf break area of the Beaufort Sea is arbitrary especially when beluga whale impact analyses generally find only low level impacts under current standard mitigation measures.

MIT 50 More stringent mitigation measures are needed to keep oil and gas activities in the Arctic from having more than a negligible impact

MIT 51 Quiet buffer areas should be established to protect areas of biological and ecological significance, such as Hanna Shoal and Barrow Canyon.

MIT 52 Quieter alternative technologies should be required in areas newly opened to oil and gas activities

MIT 53 Noise reduction measures should be implemented by industry within U.S. waters and by U.S. companies internationally but especially in areas of the Arctic which have not yet been subjected to high levels of man-made noise.

MIT 54 Vessel restrictions and other measures need to be implemented to mitigate ship strikes, including:

- Vessels should be prohibited from sensitive areas with high levels of wildlife presence that are determined to be key habitat for feeding, breeding, or calving.
- Ship routes should be clearly defined including a process for annual review to update and re-route shipping around these sensitive areas.
- Speed restrictions may also need to be considered if re-routing is not possible.
- NMFS should require use of real-time passive acoustic monitoring in migratory corridors and other sensitive areas to alert ships to the presence of whales, primarily to reduce ship-strike risk.

MIT 55 NMFS should pair the additional mitigation measures with the level 1 exploration of Alternative 2 and not support higher levels of exploration of Alternatives 3-5.

MIT 56 The DEIS should clearly identify areas where activities will be prohibited to avoid any take of marine mammals. It should also establish a framework for calculating potential take and appropriate offsets

MIT 57 Time/area closures should be included in any Alternative as standard avoidance measures and should be expanded to include other deferral areas, including:

- Dease Inlet.
- Boulder patch communities.
- Particular caution should be taken in early fall throughout the region, when peak use of the Arctic by marine mammals takes place.
- Add the Coastal Band of the Chukchi Sea (~50 miles wide) [Commenting on the original Lease Sale 193 draft EIS, NMFS strongly endorse[d] an alternative that would have avoided any federal leases out to 60 miles and specifically argued that a 25-mile buffer [around deferral areas] is inadequate].
- Expand Barrow Canyon time/area closure area to the head of Barrow Canyon (off the coast between Point Barrow and Point Franklin) as well as the mouth of Barrow Canyon along the shelf break.
- Areas to the south of Hanna Shoal are important to walrus, bowhead whales, and gray whales.
- Encourage NMFS to consider a time and area closure during the winter and spring in the Beaufort Sea that captures the ice fracture zone between landfast ice and the pack ice where ringed seal densities are the highest.

- Nuiqsut has long asked federal agencies to create a deferral area in the 20 miles to the east of Cross Island. This area holds special importance for bowhead whale hunters and the whales.
- NMFS should consider designing larger exclusion zones (detection-dependent or -independent) around river mouths with anadromous fish runs to protect beluga whale foraging habitat, insofar as these areas are not encompassed by seasonal closures.
- Final EIS must consider including additional (special habitat) areas and developing a mechanism for new areas to be added over the life of the EIS.
- Any protections for Camden Bay should extend beyond the dimensions of the Bay itself to include areas located to the west and east, recently identified by NMFS as having special significance to bowhead whales
- Additional analysis is required related to deferral areas specific to subsistence hunting. Any final EIS must confront the potential need for added coastal protections in the Chukchi Sea.
- There should be a buffer zone between Burger and the coast during migration of walrus and other marine mammals
- Future measures should include time/area closures for IEAs (Important Ecological Areas)

MIT 58 The mitigation measures need to include clear avoidance measures and a description of offsets that will be used to protect and/or restore marine mammal habitat if take occurs.

- The sensitivity of the resource (e.g., the resource is irreplaceable and where take would either cause irreversible impact to the species or its population or where mitigation of the take would have a low probability of success), not the level of activity should dictate the location of avoidance areas.
- NMFS should consider adding an Avoidance Measures section to Appendix A.

MIT 59 The DEIS fails to address the third step in the mitigation hierarchy which is to compensate for unavoidable and incidental take. NMFS should provide a clear framework for compensatory mitigation activities.

MIT 60 Many of the mitigation measures suggested throughout the DEIS are not applicable to in-ice towed streamer 2D seismic surveys and should not be required during these surveys.

MIT 61 NMFS should not seek to pre-empt or undermine the CAA process that industry and the Alaska Eskimo Whaling Commission have used for many years to develop mitigations that result in a determination of no "unmitigable adverse effect" on the hunt.

MIT 62 NMFS needs to clarify the use of adaptive management:

- In the DEIS the term is positioned toward the use of adaptive management to further restrict activities and it does not leave room for adaptive management to reduce restrictions.
- If monitoring shows undetectable or limited impacts, an adaptive management strategy should allow for decreased restrictions on oil and gas exploration. The conditions under which decreased restrictions will occur should be plainly stated in the discussion of adaptive management.

MIT 63 Mitigation Measure A3: It is neither practicable nor reasonable to require observers on all support vessels, especially on Ocean Bottom Cable seismic operations, where support vessels often include small boats without adequate space for observers.

MIT 64 Aerial overflights are infeasible and risky and should not be required as a monitoring tool:

- Such mitigation requirements are put forward only in an effort to support the 120dB observation zones, which are both scientifically unjustified and infeasible to implement.
- Such over flights pose a serious safety risk. Requiring them as a condition of operating in the Arctic conflicts with the statutory requirements of OCSLA, which mandates safe operations.

MIT 65 The purpose of Mitigation Measure A6 needs to be clarified:

- If the purpose is to establish a shutdown zone, it is unwarranted because the nature of drilling operations is such that they cannot sporadically be shutdown or ramped up and down.
- If the purpose is the collection of research data, then it should be handled as part of the BOEM research program.

MIT 66 Mitigation Measure D2: There should be no requirement for communications center operations during periods when industry is not allowed to operate and by definition there is not possibility for industry impact on the hunt.

MIT 67 Additional Mitigation Measure A1 is problematic and should not be required:

- Sound source verification tests take time, are expensive, and can expose people to risks.
- Modeling should eventually be able to produce a reliable estimate of the seismic source emissions and propagation, so sound source verification tests should not be required before the start of every seismic survey in the Arctic.
- This should be eliminated unless NMFS is planning to require the same measurements for all vessels operating in the Beaufort and Chukchi seas.
- Sound source verification for vessels has no value because there are no criteria for shut down or other mitigation associated with vessel sounds.

MIT 68 NMFS should not require monitoring measures to be designed to accomplish or contribute to what are in fact research goals. NMFS and others should work together to develop a research program targeting key research goals in a prioritized manner following appropriate scientific method, rather than attempting to meet these goals through monitoring associated with activities.

MIT 69 Additional Mitigation Measure A3 Lacks a Basic Description of the Measure and must be deleted or clarified as:

- NMFS provides no further information in the DEIS with regard to what conditions or situations would meet or fail to meet visibility requirements.
- NMFS also does not indicate what exploration activities would be affected by such limitations.
- Operators cannot assess the potential effects of such mitigation on their operations and lease obligations, or its practicability, without these specifics.
- NMFS certainly cannot evaluate the need or efficacy of the mitigation measure without these details.
- Cetaceans are not at significantly greater risk of harm when a soft-start is initiated in poor visibility conditions.

MIT 70 Additional Mitigation Measure A4: There are limitations to current PAM technology, but its use may improve monitoring results in some situations and should be used during certain conditions, with these caveats:

- A period of confidence in the current PAM capabilities, understanding of limitations, and experienced operator capacity-building is needed before requiring PAM as a mandatory monitoring tool during seismic operations.
- Basic training criteria, such as that specified by many countries for PSOs, should be developed and required for PAM operators.
- Minimum requirements for PAM equipment (including capabilities of software and hardware) should be considered.

MIT 71 Proposed restrictions under Additional Mitigation Measure B2 are unnecessary, impractical and must be deleted or clarified:

- The likelihood of redundant or duplicative surveys is small to non-existent. A new survey is conducted only if the value of the additional information to be provided will exceed the cost of acquisition.
- The restriction is based on the false premise that surveys, which occur in similar places and times, are the same. A new survey may be warranted by its use of new technology, a better image, a different target zone, or a host of other considerations.
- Implementing such a requirement poses several large problems. First, who would decide what is redundant and by what criteria? Second, recognizing the intellectual property and commercial property values, how will the agencies protect that information? Any proposal that the companies would somehow be able to self-regulate is infeasible and potentially illegal given the various anti-trust statutes. A government agency would likely find it impossible to set appropriate governing technical and commercial criteria, and would end up stifling the free market competition that has led to technological innovations and success in risk reduction.
- This is already done by industry in some cases, but as a regulatory requirement it is very vague and needs clarification.

MIT 72 Additional Mitigation Measures D3, D4, D5, D6, and D8 need clarification about how the real-time reporting would be handled:

- If there is the expectation that industry operations could be shutdown quickly and restarted quickly, the proposal is not feasible.
- Who would conduct the monitoring for whales?
- How and to whom would reporting be conducted?
- How whale presence would be determined and who would make the determination must be elucidated in this measure. This is vague and impracticable.

MIT 73 NMFS and BOEM should consider various strategies for avoiding unnecessarily redundant seismic surveys as a way of ensuring the least practicable impact on marine mammals and the environment. Companies that conduct geophysical surveys for the purpose of selling the data could make those data available to multiple companies, avoiding the need for each company to commission separate surveys.

MIT 74 The list of standard mitigation measures should be incorporated in all incidental take authorizations issued by NMFS and be included under the terms and conditions for the

BOEM's issuance of geological and geophysical permits and ancillary activity and exploratory drilling approvals.

MIT 75 NMFS should expand many of the additional mitigation measures and include them as standard conditions.

MIT 76 The Marine Mammal Commission recommends that the National Marine Fisheries Service work with the Bureau of Ocean Energy Management to incorporate a broader list of mitigation measures that would be standard for all oil and gas-related incidental take authorizations in the Arctic region, including:

a) Detection-based measures intended to reduce near-source acoustic impacts on marine mammals

- require operators to use operational- and activity-specific information to estimate exclusion and buffer zones for all sound sources (including seismic surveys, subbottom profilers, vertical seismic profiling, vertical cable surveys, drilling, icebreaking, support aircraft and vessels, etc.) and, just prior to or as the activity begins, verify and (as needed) modify those zones using sound measurements collected at each site for each sound source;
- assess the efficacy of mitigation and monitoring measures and improve detection capabilities in low visibility situations using tools such as forward-looking infrared or 360o thermal imaging;
- require the use of passive acoustic monitoring to increase detection probability for real-time mitigation and monitoring of exclusion zones; and
- require operators to cease operations when the exclusion zone is obscured by poor sighting conditions;

b) Non-detection-based measures intended to lessen the severity of acoustic impacts on marine mammals or reduce overall numbers taken by acoustic sources

- limit aircraft overflights to an altitude of 457 m or higher and a horizontal distance of 305 m or greater when marine mammals are present (except during takeoff, landing, or an emergency situation)1;
- require temporal/spatial limitations to minimize impacts in particularly important habitats or migratory areas, including but not limited to those identified for time-area closures under Alternative 4 (i.e., Camden Bay, Barrow Canyon/Western Beaufort Sea, Hanna Shoal, the Beaufort Sea shelf break, and Kasegaluk Lagoon/Ledy Bay critical habitat);
- prevent concurrent, geographically overlapping surveys and surveys that would provide the same information as previous surveys; and
- restrict 2D/3D surveys from operating within 145 km of one another;

c) Measures intended to reduce/lessen non-acoustic impacts on marine mammals reduce vessel speed to 9 knots or less when transiting the Beaufort Sea2

- reduce vessel speed to 9 knots or less within 274 m of whales2,3;
- avoid changes in vessel direction and speed within 274 m of whales3;
- reduce speed to 9 knots or less in inclement weather or reduced visibility conditions2;
- use shipping or transit routes that avoid areas where marine mammals may occur in high densities, such as offshore ice leads;

- establish and monitor a 160-dB re 1 ¬Pa zone for large whales around all sound sources and do not initiate or continue an activity if an aggregation of bowhead whales or gray whales (12 or more whales of any age/sex class that appear to be engaged in a non-migratory, significant biological behavior (e.g., feeding, socializing)) is observed within that zone;
- require operators to cease drilling operations in mid- to late-September to reduce the possibility of having to respond to a large oil spill in ice conditions;
- require operators to develop and implement a detailed, comprehensive, and coordinated Wildlife Protection Plan that includes strategies and sufficient resources for minimizing contamination of sensitive marine mammal habitats and that provides a realistic description of the actions that operators can take, if any, to deter animals from spill areas or respond to oiled or otherwise affected marine mammals the plan should be developed in consultation with Alaska Native communities (including marine mammal co-management organizations), state and federal resource agencies, and experienced non-governmental organizations; and
- require operators to collect all new and used drilling muds and cuttings and either reinject them or transport them to an Environmental Protection Agency-licensed treatment/disposal site outside the Arctic;

d) Measures intended to ensure no unmitigable adverse impact to subsistence users

- require the use of Subsistence Advisors; and
- facilitate development of more comprehensive plans of cooperation/conflict avoidance agreements that involve all potentially affected communities and comanagement organizations and account for potential adverse impacts on all marine mammal species taken for subsistence purposes.

MIT 77 The Marine Mammal Commission also recommends that the National Marine Fisheries Service include additional measures to verify compliance with mitigation measures and work with the Bureau and industry to improve the quality and usefulness of mitigation and monitoring measures:

- Track and enforce each operator's implementation of mitigation and monitoring measures to ensure that they are executed as expected; provide guidance to operators regarding the estimation of the number of takes during the course of an activity (e.g., seismic survey) that guidance should be sufficiently specific to ensure that take estimates are accurate and include realistic estimates of precision and bias;
- Provide additional justification for the determination that the mitigation and monitoring measures that depend on visual observations would be sufficient to detect, with a high level of confidence, all marine mammals within or entering identified mitigation zones;
- Work with protected species observers, observer service providers, the Fish and Wildlife Service, and other stakeholders to establish and implement standards for protected species observers to improve the quality and usefulness of information collected during exploration activities;
- Establish requirements for analysis of data collected by protected species observers to ensure that those data are used both to estimate potential effects on marine mammals and to inform the continuing development of mitigation and monitoring measures;
- Require operators to make the data associated with monitoring programs publicly available for evaluation by independent researchers;
- Require operators to gather the necessary data and work with the Bureau and the Service to assess the effectiveness of soft-starts as a mitigation measure; and

- Require operators to suspend operations immediately if a dead or seriously injured marine mammal is found in the vicinity of the operations and the death or injury could be attributed to the applicant's activities any suspension should remain in place until the Service has reviewed the situation and determined that further deaths or serious injuries are unlikely or has issued regulations authorizing such takes under section 101(a)(5)(A) of the Act.

MIT 78 There is no need for the Additional Mitigation Measures in the DEIS and they should be removed:

- Potential impacts of oil and gas exploration activities under the Standard Mitigation Measures, BOEM lease stipulations (MMS 2008c), and existing industry practices, are already negligible.
- Analysis of the effectiveness of the Additional Mitigation Measures in reducing any impacts (especially for marine mammals and subsistence) was not established in the DEIS so there is no justification for their implementation.
- The negative impacts these measures would have on industry and on the expeditious development of resources in the OCS as mandated by OCSLA are significant, and were not described, quantified, or seriously considered in the DEIS.
- Any Additional Mitigation Measures carried forward must be clarified and made practicable, and further analysis must be conducted and presented in the FEIS to explain why they are needed, how they were developed (including a scientific basis), what conditions would trigger their implementation and how they would affect industry and the ability of BOEM to meet its OCSLA mandate of making resources available for expeditious development.
- NMFS failed to demonstrate the need for most if not all of the Additional Mitigation Measures identified in the DEIS, especially Additional Mitigation Measures A4, B1 (time/area closures), C3, D1, D5, D6, and D8.
- NMFS has failed to fully evaluate and document the costs associated with their implementation.

MIT 79 The time/area closure for Barrow Canyon needs to be clarified or removed:

- A time area closure is indicated from September 1 to the close of Barrow's fall bowhead hunt, but dates are also provided for bowhead whales (late August to early October) and beluga whales (mid-July to late August), which are both vague and outside the limits of the closure.
- It is also not clear if Barrow Canyon and the Western Beaufort Sea Special Habitat Areas one and the same. Only Barrow Canyon (not the Western Beaufort) is referenced in most places, including the only map (Figure 3.2-25) of the area.

MIT 80 Additional Mitigation Measure D7 must be deleted or clarified

- This is vague. The transit restrictions are not identified, nor are the conditions under which the transit might be allowed.
- Some hunting of marine mammals in the Chukchi Sea occurs year round making this measure impracticable.

MIT 81 Either the proposed action for the EIS needs to be changed or the analysis is too broad for the proposed action stated. NMFS should not limit the number of activities allowed:

- As long as the number of takes has no more than a negligible impact on species or stock.
- Limiting the level of activities also limits the amount of data that can be collected. Industry will not be able to collect the best data in the time allotted.

MIT 82 Ice distribution in recent years indicates drilling at some lease holdings could possibly occur June-November. NMFS should, therefore, extend the temporal extent of the exploration drilling season.

MIT 83 NMFS should not automatically add Additional Mitigation Measures without first assessing the impact without Additional Mitigation Measures to determine whether they are needed.

MIT 84 Appendix A Additional Mitigation Measure C4 (the zero discharge additional mitigation measure) should be deleted since all exploration drilling programs are already required by regulation to have oil spill response plans.

- DEIS stated that NPDES permitting effectively regulates/handles discharges from operations and Zero Discharge was removed from further analysis in Chapter 2.5.4.

MIT 85 The requirement to recycle drilling muds should not become mandatory as it is not appropriate for all programs. Drilling mud discharges are already regulated by the EPA NPDES program and are not harmful to marine mammals or the availability of marine mammals for subsistence.

MIT 86 Page 4-68 - For exploratory drilling operations in the Beaufort Sea west of Cross Island, no drilling equipment or related vessels used for at-sea oil and gas operations shall be moved onsite at any location outside the barrier islands west of Cross Island until the close of the bowhead whale hunt in Barrow. This measure would prevent exploration of offshore leases west of Cross Island during the open water season and would require refunding of lease purchase and investment by companies that are no longer allowed to explore their leases.

MIT 87 The statement that eliminating exploration activities through the time/area closures on Hanna Shoal would benefit all assemblages of marine fish, with some anticipated benefit to migratory fish, is incorrect. Most migratory fish would not be found in offshore waters.

MIT 88 Given that the Time/Area closures are for marine mammals, Alternative 4 would be irrelevant and generally benign in terms of fish and EFH, so it is wrong to state that the closures would further reduce impact.

MIT 89 Mitigation Measure A5 can be deleted as it is essentially the same as A4.

MIT 90 Standard Mitigation Measures under B1 and D3 have identical requirements regarding aircraft operations and appear to apply to the same activities, so they should be deleted from one or the other.

MIT 91 Under conditions when exploration is determined to be acceptable, monitoring and mitigation plans on a wide range of temporal scales should become both a standard requirement and industry practice. These must be designed in a manner specific to the nature of the operation and the environment to minimize the risks of both acute impacts (i.e., direct, short-term, small-scale harm as predicted from estimates of noise exposure on individuals) and to

measure/minimize chronic effects (i.e., cumulative, long-term, large-scale adverse effects on populations as predicted from contextually mediated behavioral responses or the loss of acoustic habitat).

MIT 92 To date, standard practices for individual seismic surveys and other activities have been of questionable efficacy for monitoring or mitigating direct physical impacts (i.e., acute impacts on injury or hearing) and have essentially failed to address chronic, population level impacts from masking and other long-term, large-scale effects, which most likely are the greatest risk to long-term population health and viability.

MIT 93 More meaningful monitoring and mitigation measures that should be more fully considered and implemented in the programmatic plans for the Arctic include:

- Considerations of time and area restrictions based on known sensitive periods/areas;
- Sustained acoustic monitoring, both autonomous and real-time, of key habitat areas to assess species presence and cumulative noise exposure with direct federal involvement and oversight;
- Support or incentives for research to develop and apply metrics for a population's health, such as measures of vital rates, prey availability, ranging patterns, and body condition;
- Specified spatial-temporal separation zones between intense acoustic events; and
- Requirements or incentives for the reduction of acoustic footprints of intense noise sources.

MIT 94 The mitigation measures outlined in the EIS need to be more stringent and expanded by:

- Coverage of an adequate amount of important habitat and concentration areas for marine mammals.
- Identifying and protecting Important Ecological Areas of the Arctic.

MIT 95 Time/area closures represent progress, but NMFS's analysis that the closures provide limited benefits is faulty and needs further evaluation

- The current analysis does not well reflect the higher densities of marine mammals in concentration areas and other Important Ecological Areas (IEAs).
- The analysis also does not fully recognize the importance of those areas to the overall health of the species being impacted, and thus underestimates the likely disproportionate effects of activities in those areas.
- The analysis concludes no benefit as a result of mitigating impacts. This, along with a lack of information to assess the size of the benefit beyond unclear and ill-defined levels, mistakenly results in analysts concluding there is no benefit.
- The inability to quantitatively estimate the potential impacts of oil and gas activities, or express the benefits of time and area closures of important habitats, likely has much more to do with incomplete information than with a perceived lack of benefits from the time and area closures.

MIT 96 A precautionary approach should be taken:

- Faulty analysis, along with the clear gaps in good data for a number of species, only serves to bolster the need for precaution in the region.
- While there is good information on the existence of some Important Ecological Areas, the lack of information about why some concentration areas occur and what portion of a

population of marine mammals uses each area hampers the ability of NMFS to determine the benefits of protecting the area. This lack of scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

MIT 97 Ledyard Bay and Kasegaluk Lagoon merit special protection through time and area closures for all the reasons highlighted in the EIS.

- Walrus also utilize these areas from June through September, with large haulouts on the barrier islands of Kasegaluk Lagoon in late August and September.

MIT 98 Hanna Shoal merits special protection through time and area closures for all the reasons highlighted in the EIS.

- It is also a migration area for bowhead whales in the fall, and used by polar bears.

MIT 99 Barrow Canyon merits considerable protection through time and area closures for all the reasons highlighted in the EIS.

MIT 100 Beaufort Shelf Break and Camden Bay merit special protection through time and area closures for all the reasons highlighted in the EIS.

- The Beaufort Shelf Break should be included in the map of special habitat areas of the Beaufort Sea and it is unclear why that area was left out of that section.

MIT 101 NMFS should create a system where as new and better information becomes available, there is opportunity to add and adjust areas to protect important habitat.

MIT 102 There is no point to analyzing hypothetical additional mitigation measures in a DEIS that is a theoretical analysis of potential measures undertaken in the absence of a specific activity, location or time. If these measures were ever potentially relevant, reanalysis in a project¬ specific NEPA document would be required.

MIT 103 NMFS needs to expand and update its list of mitigation measures to include:

- Zero discharge requirement to protect water quality and subsistence resources.
- Require oil and gas companies who are engaging in exploration operations to obtain EPA issued air permits.
- More stringent regulation of marine vessel discharge for both exploratory drilling operations, support vessels, and other operations to eliminate possible environmental contamination through the introduction of pathogens and foreign organisms through ballast water, waste water, sewage, and other discharge streams.
- The requirement that industry signs a CAA with the relevant marine mammal co-management organizations.
- Another Standard Mitigation Measure should be developed with regards to marine mammal monitoring during darkness and inclement weather. This should require more efficient and appropriate protocols. If more appropriate monitoring methods cannot be developed, NMFS should not allow for seismic surveys during times when monitoring is severely limited.
- NMFS should consider for mitigation a requirement that seismic survey vessels use the lowest practicable source levels, minimize horizontal propagation of the sound signal, and/or minimize the density of track lines consistent with the purposes of the survey. Accordingly, the agencies should consider establishing a review panel, potentially

overseen by both NMFS and BOEM, to review survey designs with the aim of reducing their wildlife impacts.

- A requirement that all vessels undergo measurement for their underwater noise output per American National Standards Institute/Acoustical Society of America standards (S12.64); that all vessels undergo regular maintenance to minimize propeller cavitation, which is the primary contributor to underwater ship noise; and/or that all new vessels be required to employ the best ship quieting designs and technologies available for their class of ship.
- NMFS should consider requiring aerial monitoring and/or fixed hydrophone arrays to reduce the risk of near-source injury and monitor for impacts.
- Make Marine Mammal Observers (MMOs) and PSOs mandatory on the vessels.
- Unmanned flights should also be investigated for monitoring, as recommended by NMFS's Open Water Panel.
- Mitigation and monitoring measures concerning the introduction of non-native species need to be identified and analyzed.

MIT 104 Both the section on water quality and subsistence require a discussion of mitigation measures and how NMFS intends to address local community concerns about contamination of subsistence food from sanitary waste and drilling muds and cuttings.

MIT 105 NMFS must discuss the efficacy of mitigation measures:

- Including safety zones, start-up and shut-down procedures, use of Marine Mammal Observers during periods of limited visibility for preventing impacts to bowhead whales and the subsistence hunt.
- Include discussion of the significant scientific debate regarding the effectiveness of many mitigation measures that are included in the DEIS and that have been previously used by industry as a means of complying with the MMPA.
- We strongly encourage NMFS to include in either Chapter 3 or Chapter 4 a separate section devoted exclusively to assessing whether and to what extent each individual mitigation measure is effective at reducing impacts to marine mammals and the subsistence hunt. NMFS should use these revised portions of the DEIS to discuss and analyze compliance with the "least practicable adverse impact" standard of the MMPA.
- NMFS must discuss to what extent visual monitoring is effective as a means of triggering mitigation measures, and, if so, how specifically visual monitoring can be structured or supplemented with acoustic monitoring to improve performance.
- NMFS should clearly analyze whether poor visibility restrictions are appropriate and whether those restrictions are necessary to comply with the "least practicable impact" standard of the MMPA.
- NMFS should disclose in the EIS uncertainties as to the efficacy of ramp up procedures and then discuss and analyze how that uncertainty relates to an estimate of impacts to marine mammals and, in particular, bowhead whales.
- This EIS is an important opportunity for NMFS to assess the efficacy of these proposed measures with the full input of the scientific community before making a decision on overall levels of industrial activity in the Beaufort and Chukchi seas. NMFS should, therefore, amend the DEIS to include such an analysis, which can then be subject to further public review and input pursuant to a renewed public comment period.

MIT 106 NMFS must include in a revised DEIS a discussion of additional deferral areas and a reasoned analysis of whether and to what extent those deferral areas would benefit our subsistence practices and habitat for the bowhead whale.

MIT 107 NMFS should create an alternative modeled off of the adaptive management process of the CAA. Without doing so the agency cannot fully analyze and consider the benefits provided by this community based, collaborative approach to managing multiple uses on the Outer Continental Shelf.

MIT 108 NMFS needs to it revise the DEIS to include a more complete description of the proposed mitigation measures, eliminate the concept of "additional mitigation measures," and then decide in the Record of Decision on a final suite of applicable mitigation measures.

MIT 109 The peer review panel states that "a single sound source pressure level or other single descriptive parameter is likely a poor predictor of the effects of introduced anthropogenic sound on marine life." The panel recommends that NMFS develop a "soundscape" approach to management, and it was understand that the NSB Department of Wildlife suggested such an alternative, which was rejected by NMFS. If NMFS moves forward with using simple measures, it is recommended that these measures "should be based on the more comprehensive ecosystem assessments and they should be precautionary to compensate for remaining uncertainty in potential effects." NMFS should clarify how these concerns are reflected in the mitigation measures set forth in the DEIS and whether the simple sound pressure level measures are precautionary as suggested by the peer review panel.

MIT 110 NMFS needs to clarify why it is using 160 dB re 1 Pa rms as the threshold for level B take. Clarification is needed on whether exposure of feeding whales to sounds up to 160 dB re 1 Pa rms could cause adverse effects, and, if so, why the threshold for level B harassment is not lower.

MIT 111 NMFS should consider implementing mitigation measures designed to avoid exposing migrating bowhead whales to received sound levels of 120dB or greater given the best available science, which demonstrates that such noise levels cause behavioral changes in bowhead whales.

MIT 112 The DEIS does not list aerial surveys as a standard or additional mitigation measure for either the Beaufort or Chukchi seas. There is no reasonable scientific basis for this. NMFS should include aerial surveys as a possible mitigation measure along with a discussion of the peer review panel's concerns regarding this issue.

MIT 113 Standard mitigation measures are needed to protect autumn bowhead hunting at Barrow, Wainwright, and possibly at Point Lay and Point Hope and subsistence hunting of beluga whales at Point Lay and Wainwright and seal and walrus hunting along the Chukchi Sea coasts.

- One approach for protecting beluga hunting at Point Lay would be to implement adaptive management; whereby, ships and drill rigs would not come within 60 miles of the community of Point Lay until the beluga hunt is completed.
- These types of mitigation measures should be standard and should be applied to any Incidental Take Authorization (ITA).

MIT 114 The mitigation measure related to discharge of drilling muds does not address the current industry plan of recycling muds and then discharging any unused or remaining muds at the end of the season. At the very least, no drilling muds should be discharged.

- Furthermore, using the best management practice of near- zero discharge, as is being implemented by Shell in Camden Bay in the Beaufort Sea, would be the best method for

mitigating impacts to marine mammals and ensuring that habitat is kept as clean and healthy as possible.

MIT 115 Reduction levels associated with Additional Mitigation Measure C3 should be specified and applied to marine vessel traffic supporting operations as well as drill ships.

MIT 116 NMFS should consider using an independent panel to review survey designs. For example, an independent peer review panel has been established to evaluate survey design of the Central Coastal California Seismic Imaging Project, which is aimed at studying fault systems near the Diablo Canyon nuclear power plant. See California Public Utilities Commission, Application of Pacific Gas and Electric Company for Approval of Ratepayer Funding to Perform Additional Seismic Studies Recommended by the California Energy Commission: Decision Granting the Application, available at docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/122059-09.htm.

MIT 117 Prohibiting all seismic surveys outside proposed lease sale areas is not essential to the stated purpose and need.

MIT 118 Use additional best practices for monitoring and maintaining safety zones around active airgun arrays and other high-intensity underwater noise sources as set forth in Weir and Dolman (2007) and Parsons et al. (2009)

MIT 119 The existing draft EIS makes numerous errors regarding mitigation:

- Mischaracterizing the effectiveness and practicability of particular measures.
- Failing to analyze variations of measures that may be more effective than the ones proposed.
- Failing to standardize measures that are plainly effective.

MIT 120 Language regarding whether or not standard mitigation measures are required is confusing and NMFS should make clear that this mitigation is indeed mandatory.

MIT 121 The rationale for not including mitigation limiting activities in low-visibility conditions, which can reduce the risk of ship-strikes and near-field noise exposures, as standard mitigation is flawed and this measure needs to be included:

- First, it suggests that the restriction could extend the duration of a survey and thus the potential for cumulative disturbance of wildlife; but this concern would not apply to activities in migratory corridors, since target species like bowhead whales are transient.
- Second, while it suggests that the requirement would be expensive to implement, it does not consider the need to reduce ship-strike risk in heavily-used migratory corridors in order to justify authorization of an activity under the IHA process.
- This requirement should be standardized for all activities involving moving vessels that occur in bowhead whale migratory corridors during the latter parts of the open-water season (i.e., September-October); and for all transits of support vessels in all areas at all times.

MIT 122 NMFS fails to consider a number of recent studies on temporary threshold shift in establishing its 180/190 dB safety zone standard should conservatively recalculate its safety zone distances in light of these studies, which indicate the need for larger safety zones, especially for the harbor porpoise:

1) A controlled exposure experiment demonstrating that harbor porpoises are substantially more susceptible to temporary threshold shift than the two species, bottlenose dolphins and beluga whales, that have previously been tested;
2) A modeling effort indicating that, when uncertainties and individual variation are accounted for, a significant number of whales could suffer temporary threshold shift beyond 1 km from a seismic source;
3) Studies suggesting that the relationship between temporary and permanent threshold shift may not be as predictable as previously believed; and
4) The oft-cited Southall et al. (2007), which suggests use of a cumulative exposure metric for temporary threshold shift in addition to the present RMS metric, given the potential occurrence of multiple surveys within reasonably close proximity.

MIT 123 The draft EIS improperly rejects the 120 dB safety zone for bowhead whales, and the 160 dB safety zone for bowhead and gray whales that have been used in IHAs over the past five seasons:

- It claims that the measure is ineffective because it has never yet been triggered, but does not consider whether a less stringent, more easily triggered threshold might be more appropriate given the existing data. For example, the draft EIS fails to consider whether requiring observers to identify at least 12 whales within the 160 dB safety zone, and then to determine that the animals are engaged in a nonmigratory, biologically significant behavior, might not constitute too high a bar, and whether a different standard would provide a greater conservation benefit while enabling survey activity.

MIT 124 The assertion by industry regarding the overall safety of conducting fixed-wing aircraft monitoring flights in the Arctic, especially in the Chukchi Sea, should be reviewed in light of the multiple aerial surveys that are now being conducted there (e.g., COMIDA and Shell is planning to implement an aerial monitoring program extending 37 kilometers from the shore, as it has for a number of years).

MIT 125 The draft EIS implies that requiring airgun surveys to maintain a 90-mile separation distance would reduce impacts in some circumstances but not in others, depending on the area of operation, season, and whether whales are feeding or migrating.

- NMFS does not provide any biological basis for this finding.
- This analysis fails to consider that the measure would affect only the timing, not the spatial extent of the survey effort: the overall area of ensonification would remain the same over the course of a season since survey activities would only be separated, not curtailed.
- If NMFS believes that surveys should not be separated in all cases, it should consider a measure that defines the conditions in which greater separation would be required.

MIT 126 Restrictions on numbers of activities to reduce survey duplication: While acknowledging the conservation benefits of this measure, the draft EIS argues that the agencies have no legal authority to impose it. This position is based on an incorrect reading of OCSLA.

MIT 127 The draft EIS should also consider to what degree the time/place restrictions could protect marine mammals from some of the harmful effects from an oil spill. Avoiding exploration drilling during times when marine mammals may be concentrated nearby could help to ameliorate the more severe impacts discussed in the draft EIS.

MIT 128 Avoiding exploratory drilling proximate to the spring lead system and avoiding late season drilling would help to reduce the risk of oil contaminating the spring lead. At a minimum, NMFS should consider timing restrictions in the Chukchi Sea to avoid activities taking place too early in the open water season.

MIT 129 NMFS should consider timing restrictions to avoid the peak of the bowhead migration throughout the Beaufort Sea, particularly north of Dease Inlet to Smith Bay; northeast of Smith Bay; and northeast of Cape Halkett where bowhead whales feed.

MIT 130 The draft EIS's reliance on future mitigation measures required by the FWS and undertaken by industry is unjustified. It refers to measures typically required through the MMPA and considers that it is in industry's self-interest to avoid harming bears. The draft EIS cannot simply assume that claimed protections resulting from the independent efforts of others will mitigate for potential harm.

MIT 131 The EIS identifies appropriate mitigation to address impacts to the extent possible.

MIT 132 Allowing only one or two drilling programs per sea to proceed: Since six operators hold leases in the Chukchi and 18 in the Beaufort, the DEIS effectively declares as worthless leases associated with four Chukchi operators and 16 Beaufort operators. How NMFS expects to choose which operators can work is not clear, nor is it clear how it would compensate those operators not chosen for the value of their lease and resources expenditures to date.

MIT 133 The time/area closures in protecting critical ecological and subsistence use areas are very important in ensuring that subsistence way of life continues. Please consider that when you make your final determination.

MIT 134 Adaptive management should be used, and an area should not be closed if there are no animals there.

MIT 135 The stipulations that are put in or the mitigations that are put in for the Beaufort Sea should not affect activity in the Chukchi Sea. They are two different worlds, if you think about it, the depth of the ocean, the movement of the ice, the distance away from our subsistence activity. Don't take the Beaufort Sea restrictions and make it harder to work in the Chukchi Sea.

MIT 136 Only grant permits and allow work when whaling is not occurring.

MIT 137 When examined the time/area closures proposed in the alternatives, specific dates are listed, but dates for closures need to be flexible to adjust for changes in migration; fixed dates are very difficult to change.

MIT 138 Based on traditional knowledge, there is not enough data to really determine season closures or times of use because we don't know where so many of these animals go when they are not right here on the coast.

MIT 139 The MMO (PSO) program is not very effective:

- Only MMOs who are ethical and work hard see marine mammals; and
- There is no oversight to make sure the MMO was actually working.

MIT 140 The most effective means of creating mitigation that works is to start small and focused and reassess after a couple of seasons to determine what works and what doesn't work. Mitigation measures could then be adjusted to match reality.

MIT 141 There should be a mechanism by which the public can be apprised of and provide input on the efficacy of mitigation efforts. Suggestions include:

- Something similar to the Open Water meetings.
- Put out a document about the assumptions upon which all these NEPA documents and permits are based and assess mitigation - Are they working, how did they work, what were the problems and challenges, where does attention need to be focused.
- Include dates if something unusual happened that season that would provide an opportunity to contact NOAA or BOEM and report what was observed.
- This would just help us to again refine mitigation recommendations in the future.

MIT 142 If explosives are used, there needs to be mitigation to ensure that the explosives are accounted for.

Marine Mammal and other Wildlife Impacts (MMI)

MMI General comments related to potential impacts to marine mammals or wildlife, unrelated to subsistence resource concepts.

MMI 1 The draft EIS improperly dismisses the risk of mortality and serious injury from acoustic impacts:

- The draft EIS fails to consider the adverse synergistic effect that at least some types of anthropogenic noise can have on ship-strike risk (for example mid-frequency sounds with frequencies in the range of some sub-bottom profilers have been shown to cause North Atlantic right whales to break off their foraging dives and lie just below the surface, increasing the risk of vessel strike).
- Recent studies indicate that anthropogenic sound can induce permanent threshold shift at lower levels than anticipated.
- Hearing loss remains a significant risk where, as here, the agency has not required aerial or passive acoustic monitoring as standard mitigation, appears unwilling to restrict operations in low-visibility conditions, and has not firmly established seasonal exclusion areas for biologically important habitat.
- The draft EIS discounts the potential for marine mammal strandings, even though at least one stranding event of beaked whales in the Gulf of California correlated with geophysical survey activity.
- The draft EIS makes no attempt to assess the long-term effects of chronic noise and noise-related stress on life expectancy and survival, although terrestrial animals could serve as a proxy.
- The agencies' reliance on monitoring for adaptive management, and their assurance that activities will be reassessed if serious injury or mortality occurs, is inappropriate given the probability that even catastrophic declines in Arctic populations would go unobserved.
- The DEIS fails to address the wide-ranging impacts that repeated, high-intensity airgun surveys will have on wildlife.
- We know far too little about these vulnerable [endangered] species to ensure that the industry's constant pounding does not significantly impact their populations or jeopardize their survival.

MMI 2 Loss of sea-ice habitat due to climate change may make polar bears, ice seals, and walrus more vulnerable to impacts from oil and gas activities, which needs to be considered in the EIS. The draft EIS need to adequately consider impacts in the context of climate change:

- The added stress of habitat loss due to climate change should form a greater part of the draft EIS analysis.
- Both polar bears and ringed seals may be affected by multiple-year impacts from activities associated with drilling (including an associated increase in vessel traffic) given their dependence on sea-ice and its projected decline.
- Shifts in distribution and habitat use by polar bears and walrus in the Beaufort and Chukchi seas attributable to loss of sea ice habitat is insufficiently incorporated into the DEIS analysis. The DEIS only asserts that possible harm to subsistence and to polar bear habitat from oil and gas operations would be negligible compared to the potential for dramatic sea ice loss due to climate change and changes in ecosystems due to ocean

acidification. For walrus and ice seals, the DEIS simply notes potentially catastrophic climate effects without adequately considering how oil and gas activities might leave species more vulnerable to that outcome.

- Subadult polar bears that return to land in summer because of sea-ice loss are more likely to be impacted by activities in the water, onshore support of open water activities, and oil spills; this could represent potentially major impacts to polar bear populations and should be considered in any final EIS.
- Walrus feeding grounds are being transformed and walrus are hauling out on land in large numbers, leaving them vulnerable to land-based disturbances.

MMI 3 Consider that effects of an oil spill would be long-lasting. Petroleum products cause malformation in fish, death in marine mammals and birds, and remain in the benthos for at least 25 years, so would impact the ecosystem for at least a quarter of a century.

MMI 4 In addition to noise, drilling wastes, air pollution, habitat degradation, shipping, and oil spills would also adversely affect marine mammals. These adverse effects are ethical issues that need to be considered.

MMI 5 Seismic airgun surveys are more disruptive to marine mammals than suggested by the "unlikely impacts" evaluation peppered throughout the DEIS:

- They are known to disrupt foraging behavior at distances greater than the typical 1000 meter observation/mitigation threshold.
- Beluga whales are known to avoid seismic surveys at distances greater than 10 km.
- Behavioral disturbance of bowhead whales have been observed at distances of 7km to 35km.
- Marine mammals are seen in significantly lower numbers during seismic surveys indicating impacts beyond the standard 1000 meter mitigation set-back.
- Impacts may vary depending on circumstances and conditions and should not be dismissed just because of a few studies that indicate only "negligible" impacts.

MMI 6 There is not enough known about Arctic fish and invertebrate acoustical adaptations to adequately analyze acoustic impacts, contrary to what is stated in the DEIS.

- For example: While migratory fish may evade threats by swimming away, many fish, especially sedentary fish, will "entrench" into their safe zone when threatened, and prolong exposure to potentially damaging stimulus. Assuming that fish will "move out harm's way" is an irresponsible management assumption and needs to be verified prior to stating that "enough information exists to perform a full analysis."

MMI 7 The high probability for disruption or "take" of marine mammals in the water by helicopters and other heavy load aircraft during the spring and summer months is not adequately addressed in the DEIS.

MMI 8 Impacts on Arctic fish species, fish habitat, and fisheries are poorly understood and inadequately presented in the DEIS. NMFS should consider the following:

- The DEIS substantially understates the scale of impact on Arctic fish species, and fails to consider any measures to mitigate their effects.

- Airgun surveys are known to significantly affect the distribution of some fish species, which can impact fisheries and displace or reduce the foraging success of marine mammals that rely on them for prey.
- Airguns have been shown experimentally to dramatically depress catch rates of some commercial fish species, by 40 to 80% depending on catch method, over thousands of square kilometers around a single array.
- Impacts on fisheries were found to last for some time beyond the survey period, not fully recovering within 5 days of post-survey monitoring.
- The draft EIS appears to assume without support that effects on both fish and fisheries would be localized.
- Fish use sound for communication, homing, and other important purposes, and can experience temporary or permanent hearing loss on exposure to intense sound.
- Other impacts on commercially harvested fish include reduced reproductive performance and mortality or decreased viability of fish eggs and larvae.
- A rigorous analysis is necessary to assess direct and indirect impacts of industry activities on rare fish populations.
- The DEIS lacks a rigorous analysis of noise impacts to fish, particularly relating to the interaction of two or more acoustic sources (e.g., two seismic surveys).
- A rigorous analysis is needed that investigates how two or more noise generating activities interact to displace fish moving/feeding along the coast, as acoustic barriers may interrupt natural processes important to the life cycle and reproductive success of some fish species/populations.

MMI 9 Impacts of seismic airgun surveys on squid and other invertebrates need to be included and considered in terms of the particular species and their role as prey of marine mammals and commercial and protected fish.

MMI 10 Oil and gas leasing, exploration, and development in the Arctic Ocean has had no known adverse impact on marine mammal species and stocks, and the reasonably anticipated impacts to marine mammals from OCS exploration activities occurring in the next five years are, at most, negligible.

- There is no evidence that serious injury, death, or stranding by marine mammals can occur from exposure to airgun pulses, even in the case of large airgun arrays.
- No whales or other marine mammals have been killed or injured by past seismic operations.
- The western Arctic bowhead whale population has been increasing for over 20 years, suggesting impacts of oil and gas industry on individual survival and reproduction in the past have likely been minor.
- These activities are unlikely to have any effect on the other four stocks of bowhead whales.
- Only the western North Pacific stock of humpback whales and the Northeast Pacific stock of fin whales would be potentially affected by oil and gas leasing and exploration activities in the Chukchi Sea. There would be no effect on the remaining worldwide stocks of humpback or fin whales.
- Most impacts would be due to harassment of whales, which may lead to behavioral reactions from which recovery is fairly rapid.
- There is no evidence of any biologically significant impacts at the individual or population level.

MMI 11 Noise impacts on key habitats and important biological behaviors of marine mammals (e.g., breeding, feeding, communicating) could cause detrimental effects at the population level. Consider the following:

- According to an IWC Scientific Committee report, repeated and persistent exposure of noise across a large area could cause detrimental impacts to marine mammal populations.
- A recent study associated reduced underwater noise with a reduction in stress hormones, providing evidence that noise may contribute to long-term stress (negatively affecting growth, immune response to diseases, and reproduction) for individuals and populations.

MMI 12 Most marine mammals primarily rely on their acoustic sense, and they would likely suffer more from noise exposure than other species. While marine mammals have seemingly developed strategies to deal with noise and related shipping traffic (e.g., changing vocalizations, shifting migration paths, etc.), the fact that some species have been exposed to anthropogenic changes for only one generation (e.g., bowhead whales) makes it unlikely that they have developed coping mechanisms appropriate to meet novel environmental pressures, such as noise. Marine mammals living in relatively pristine environments, such as the Arctic Ocean, and have less experience with noise and shipping traffic may experience magnified impacts.

MMI 13 Impacts from ship-strikes (fatal and non-fatal) need to be given greater consideration, especially with increased ship traffic and the development of Arctic shipping routes.

- Potential impacts on beluga whales and other resources in Kotzebue Sound needs to be considered with vessels traveling past this area.
- There is great concern for ship strikes of bowhead and other whales and these significant impacts must be addressed in conjunction with the project alternatives.

MMI 14 Walrus could also be affected by operations in the Bering Sea. For instance, the winter range and the summer range for male and subadult walrus could place them within the Bering Sea, potentially overlapping with bottom trawling.

MMI 15 Surveys recently conducted during the open water season documented upwards of a thousand walrus in a proposed exploratory drilling (study) area, potentially exposing a large number of walrus to stresses associated with oil and gas activity, including drilling and vessel activity. Since a large proportion of these animals in the Chukchi Sea are comprised of females and calves, it is possible that the production of the population could be differentially affected.

MMI 16 The 120 dB threshold may represent a lower level at which some individual marine mammals will exhibit minor avoidance responses. While this avoidance might, in some but not all circumstances, be meaningful to a native hunter, scientific research does not indicate dramatic responses in most animals. In fact, the detailed statistical analyses often needed to confirm subtle changes in direction are not available. The significance of a limited avoidance response (to the animal) likely is minor (Richardson et al., 2011).

MMI 17 Seismic operations are most often in timescales of weeks and reduce the possibility of significant displacement since they do not persist in an area for an extended period of time. However, little evidence of area-wide displacement exists or has been demonstrated.

MMI 18 The DEIS analysis does not adequately consider the fact that many animals avoid vessels regardless of whether they are emitting loud sounds and may increase that avoidance distance during seismic operations (Richardson et al. 2011). Therefore, it should be a reasonable

assumption that natural avoidance serves to provide another level of protection to the animals.

MMI 19 Bowhead whale cows do not abandon or separate from their calves in response to seismic exploration or other human activities. There is no scientific support whatsoever for any assumption or speculation that seismic operations have such impacts or could result in the loss or injury of a whale. To the contrary, all of the scientific evidence shows that seismic and other anthropogenic activities, including commercial whaling, have not been shown to cause the separation or abandonment of cow/calf pairs.

MMI 20 Bowhead whales do not routinely deflect 20 kilometers from seismic operations. The DEIS asserts that bowhead whales have rarely been observed within 20 kilometers of active seismic operations but fails to utilize other information that challenge the validity of this assertion.

MMI 21 In the Arctic, sound levels follow a highly distinct seasonal pattern dominated in winter by ice-related sound and then altered by sound from wind, waves, vessels, seismic surveys, and drilling in the open-water period. The sound signatures (i.e., frequency, intensity, duration, variability) of the various sources are either well known or easily described and, for any given region, they should be relatively predictable. The primary source of anthropogenic sound in the Arctic during the open-water season is oil and gas-related seismic activity, and those activities can elevate sound levels by 2-8 dB (Roth et al. 2012). The Service and Bureau should be able to compare seasonal variations in the Arctic soundscape to the movement patterns and natural histories of marine mammals and to subsistence hunting patterns.

MMI 22 The lack of observed avoidance is not necessarily indicative of a lack of impact (e.g., animals that have a learned tolerance of sound and remain in biologically important areas may still incur physiological (stress) costs from exposure or suffer significant communication masking).

MMI 23 Marine mammal concentration areas are one potential example of Important Ecological Areas that require robust management measures to ensure the health of the ecosystem as a whole. Impacts to marine mammal concentration areas, especially those areas where multiple marine mammal species are concentrated in a particular place and time, are more likely to cascade throughout populations and ecosystems.

- Displacement from a high-density feeding area-in the absence of alternate feeding areas - may be energetically stressful.

MMI 24 Bowhead whales are long-lived and travel great distances during their annual migration, leaving them potentially exposed to a wide range of potential anthropogenic impacts and cumulative effects over broad geographical and temporal scales. This is why an ecosystem based management system is useful.

MMI 25 NMFS should include a discussion of the recent disease outbreak affecting seals and walrus, include this outbreak as part of the baseline, and discuss how potential similar future events (of unknown origin) are likely to increase in the future.

MMI 26 There remains great uncertainty in the nature and extent of the impacts of oil and gas exploration on marine mammals, which needs to be taken into consideration.

- All industrial activity is not the same and some will likely have more of an impact on marine mammals than others.

MMI 27 Short-term displacement that occurs during a critical and stressful portion on the animals annual life cycle (e.g., molt in seals) could further increase stress to displaced individuals and needs to be considered.

- Disturbance to ringed and bearded seals from spill clean-up activities during the early summer molt period would greatly increase stress to these species.

MMI 28 The effects that a very large oil spill could have on seal populations are understated in the analyses.

- The oil spill would not have to reach polyna or lead systems to affect seals. Ringed seals feed under the pack ice in the water column layer where oil would likely be entrained and bearded seals travel through this water layer.
- Numerous individuals are likely to become oiled no matter where such a spill is likely to occur.
- Food sources for all seal species would be heavily impacted in spill areas.
- More than one "subpopulation" could likely be affected by a very large oil spill.

MMI 29 Analysis should include the high probability for polar bears to be impacted if a spill reached the lead edge between the shorefast and pack ice zones, which is critical foraging habitat especially during spring after den emergence by females with cubs.

MMI 30 The draft EIS must further explore a threat of biologically significant effects, since as much as 25% of the EIS project area could be exposed to 120 dB sound levels known to provoke significant behavioral reactions in migrating bowhead whales, multiple activities could result in large numbers of bowhead whales potentially excluded from feeding habitat, exploration activities would occur annually over the life of the EIS, and there is a high likelihood of drilling around Camden Bay.

MMI 31 The draft EIS should compare the extent of past activities and the amount of noise produced to what is projected with the proposed activities under the alternatives and the draft EIS must also consider the fact that the bowhead population may be approaching carrying capacity, potentially altering the degree to which it can withstand repeated disturbances.

MMI 32 Impacts to beluga whales needs to be more thoroughly considered:

- Beluga whales' strong reactions to higher frequencies illustrate the failure of the draft EIS to calculate ensonified zones for sub-bottom profilers, side scan sonar, and echosounders
- The draft EIS does not discuss beluga whales' well-documented reaction to ships and ice breakers in the context of surveying with ice breaker support or exploratory drilling. Ice management activity has the potential to disturb significant numbers of beluga whale
- The draft EIS makes very little effort to estimate where and when beluga whales might be affected by oil and gas activities. If noise disrupts important behaviors (mating, nursing, or feeding), or if animals are displaced from important habitat over long periods of time, then impacts of noise and disturbance could affect the long-term survival of the population.

MMI 33 NMFS should consider whether ice management or ice breaking have the potential to seriously injure or kill ice seals resting on pack ice, including in the area of Hanna Shoal that is an important habitat for bearded seals.

MMI 34 NMFS should consider that on-ice surveys may directly disrupt nursing polar bears in their dens and ringed seals in their lairs, potentially causing abandonment, or mortality if the dens or lairs are crushed by machinery.

MMI 35 The draft EIS's analysis for gray whales is faulty:

- Gray whales were grouped with other cetaceans, so more attention specific to gray whales is needed.
- Contrary to what the draft EIS claims (without support), gray whale feeding and migration patterns do not closely mimic those of bowhead whales: gray whales migrate south to Mexico and typically no farther north than the Chukchi Sea, and are primarily benthic feeders.
- Analysis of the effects for Alternatives 2 and 3 does not discuss either the gray whale's reliance on the Chukchi Sea for its feeding or its documented preference for Hanna Shoal.
- In another comparisons to bowhead whales, the draft EIS states that both populations increased despite previous exploration activities. Gray whale numbers, however, have declined since Endangered Species Act (ESA) protections were removed in 1994, and there is speculation that the population is responding to environmental limitations.
- Gray whales can be disturbed by very low levels of industrial noise, with feeding disruptions occurring at noise levels of 110 dB.
- The DEIS needs to more adequately consider effects of activities and possible closure areas in the Chukchi Sea (e.g., Hanna Shoal) on gray whales. When discussing the possibility that area closures could concentrate effects elsewhere, the draft EIS focuses on the Beaufort Sea, such as on the Beaufort shelf between Harrison Bay and Camden Bay during those time periods.

MMI 36 There needs to be more analysis of noise and other disturbance effects specific to harbor porpoise; the DEIS acknowledges that harbor porpoise have higher relative abundance in the Chukchi Sea than other marine mammals.

MMI 37 The agencies must consider the impacts of seismic surveys and other activities on invertebrates [e.g. sea turtles, squid, cephalopods].

MMI 38 NMFS and BOEM must expand their impacts analysis to include a rigorous and comprehensive analysis of potential non-native species introductions via industry vessel traffic stopping in Alaska ports and transiting its coastal waters in southern and western Alaska.

MMI 39 NMFS should conduct more rigorous analysis for birds and mammals, including:

- How do multiple seismic surveys in the same region modify the foraging of marine birds (e.g., where forage fish have been displaced to deeper water or away from nesting areas).
- How do multiple surveys interact to modify marine mammal foraging?

MMI 40 NMFS should analyze the impacts to invertebrate and fish resources of introducing artificial structures (i.e., drilling platform and catenaries; seafloor structures) into the water column or the seafloor.

MMI 41 The draft EIS does not do enough to look at how severe direct impacts to the bowhead whale during the migration, as well as the cumulative impacts to the bowhead whales could be.

- NMFS must quantify how many bowhead whales or other marine mammals are going to be affected.

MMI 42 One of the challenges is that sometimes these best geological prospects happen to conflict with some of the marine mammal productivity areas, calving areas, birthing. And that's the challenge is that you look at these geological areas, there is often a conflict.

MMI 43 It is important for NMFS to look at the possibility of affecting a global population of marine mammals; just not what's existing here, but a global population.

MMI 44 NMFS should reexamine the DEIS's analysis of sockeye and coho salmon. Comments include:

- The known northern distribution of coho salmon from southern Alaska ends at about Point Hope (Mecklenburg et al. 2002).
- Sockeye salmon's (O. nerka) North Pacific range ends at Point Hope (Mecklenburg et al. 2002).
- Both sockeye and coho salmon are considered extremely rare in the Beaufort Sea, representing no more than isolated migrants from populations in southern Alaska or Russian (Mecklenburg et al. 2002).
- The discussion of coho salmon and sockeye salmon EFH on pages 3-74 to 3-75 is unnecessary and should be deleted.

MMI 45 NMFS should reconsider the DEIS's analysis of Chinook salmon and possibly include the species based on the small but significant numbers of the species that are harvested in the Barrow domestic fishery.

MMI 46 NMFS is asked to revise the following statement "Migratory fish are likely to benefit from this closure… and many amphidromous fish also use brackish water for substantial portions of their life. Therefore, increased protection of these areas would be beneficial to migratory species (4-290)." It is felt that this statement is likely incorrect. In one of the few nearshore fish surveys conducted in the coastal waters of the Chukchi Sea, Fechhelm et al. (1984) conducted summer sampling in Kasegaluk Lagoon proper and in the nearshore coastal waters in the vicinity. They reported "When compared with nearshore summer surveys in the Beaufort Sea, the most prominent feature of the Point Lay catch is the virtual absence of anadromous fish [anadromous/amphidromous] fish" (Fechhelm et al. 1984).

National Energy Demand and Supply (NED)

NED Comments related to meeting national energy demands, supply of energy.

NED 1 The U.S needs stable sources of energy from oil and natural gas to meet its increasing energy demands. Access to domestic supplies, such as those located on the Alaska Arctic outer continental shelf, is important to meeting this demand. Other benefits include: Decreased reliance on foreign sources and less dependence on other countries. More jobs, income, energy for the state and nation, and lowering our nations trade deficit.

NED 2 Proposed restrictions make it difficult and uneconomical for developers and could preclude any development in Alaska and the continental U.S. needs.

NED 3 Leases and future leases in the Beaufort and Chukchi seas will be handicapped in performing the work necessary due to the mitigation measures and will severely compromise the feasibility of developing oil and gas resources in Alaska

NED 4 The DEIS environmental consequences analysis incorrectly describes the environmental effects of energy exploration and production activities and then conversely understates the economic consequences of limiting American exploration programs. The analysis therefore has no merit.

NEPA (NEP)

NEP Comments on impact criteria (Chapter 4) that require clarification of NEPA process and methodologies for impact determination

NEP 1 The scope of the DEIS is flawed, and misaligned with any incidental take action that NMFS might take under authority of the MMPA. MMPA ITAs may only be issued if the anticipated incidental take is found to have no more than a negligible impact. There can never be a purpose or need to prepare an EIS to evaluate the impact of actions that must have no more than a negligible impact. Accordingly, there is no need now, nor can there ever be a need, for NMFS to prepare an EIS in order to issue an MMPA incidental take authorization. NMFS decision to prepare an EIS reflects a serious disconnect between its authority under the MMPA and its NEPA analysis.

NEP 2 The EIS should be limited exclusively to exploration activities. Any additional complexities associated with proposed future extraction should be reviewed in their own contexts.

NEP 3 The 'need' for the EIS presupposes the extraction of hydrocarbons from the Arctic and makes the extraction of discovered hydrocarbons inevitable by stating that NMFS and BOEM will tier from this EIS to support future permitting decisions if such activities fall outside the scope of the EIS.

NEP 4 The purpose and need of this DEIS is described and structured as though NMFS intends to issue five-year ITRs for all oil and gas activities in the Arctic Ocean regarding all marine mammal species. However, there is no such pending proposal with NMFS for any ITRs for any oil and gas activity in the Arctic Ocean affecting any marine mammal stock or population. The DEIS is not a programmatic NEPA analysis. Accordingly, were NMFS to complete this NEPA process, there would be no five-year ITR decision for it to make and no Record of Decision (ROD) to issue. Because the IHA process is working adequately, and there is no bases for NMFS to initiate an ITR process, this DEIS is disconnected from any factual basis that would provide a supporting purpose and need.

NEP 5 The scope of NEPA analysis directed to issuance of any form of MMPA incidental take authorization should be necessarily limited to the impacts of the anticipated take on the affected marine mammal stocks, and there is no purpose or need for NMFS to broadly analyze the impacts of future oil and gas activities in general. Impacts on, for example, terrestrial mammals, birds, fish, land use, and air quality are irrelevant in this context because in issuing IHAs (or, were one proposed, an ITR), NMFS is only authorizing take of marine mammals. The scope of the current DEIS is vastly overbroad and does not address any specific incidental take authorization under the MMPA.

NEP 6 The stated purpose of the DEIS has expanded significantly to include the evaluation of potential effects of a Very Large Oil Spill, as well as the potential effects of seismic activity and alternate approaches for BOEM to issue G&G permit decisions. Neither of these topics were considered in the original 2007 DEIS. The original assumption was that the DEIS would include an evaluation of the effects of Outer Continental Shelf (OCS) activities as they relate to authorizing the take of marine mammals incidental to oil and gas activities pursuant to the MMPA. Per NEPA requirements, the public should have been informed about the expansion of the original EIS scope at a minimum, and the lead federal agency should have offered additional scoping opportunities to gather comments from the public, affected State and local

agencies, and other interested stakeholders. This is a significant oversight of the NEPA process.

NEP 7 It is troubling that the DEIS has failed to describe which specific action has triggered the NEPA process, explaining only that conceptual ideas of seismic effects from possible OCS oil and gas activities are being evaluated. The analysis is not based on reasonably foreseeable levels of activity in the Beaufort and Chukchi seas. This vague understanding of conceptual ideas would complicate and limit the ability to properly assess environmental impacts and provide suitable mitigation. There is no purpose or need for NMFS to prepare a non-programmatic EIS for future MMPA ITAs that have not been requested. NEPA does not give agencies the authority to engage in non-programmatic impact analyses in the absence of a proposed action, which is what NMFS has done.

NEP 8 Although NMFS has stated that the new 2011 DEIS is based on new information becoming available, the 2011 DEIS does not appear to define what new information became available requiring a change in the scope, set of alternatives, and analysis, as stated in the 2009 NOI to withdraw the DPEIS. Although Section 1.7 of the 2011 DEIS lists several NEPA documents (most resulting in a finding of no significant impact) prepared subsequent to the withdrawal of the DPEIS, NMFS has not clearly defined what new information would drive such a significant change to the proposed action and require the radical alternatives analysis presented in the 2011 DEIS.

NEP 9 The NOI for the 2011 DEIS did not specify that the intent of the document was to evaluate finite numbers of exploration activities. As stated in the NOI, NMFS prepared the DEIS to update the previous 2007 DPEIS based on new information and to include drilling. Additionally, the NOI indicated that NMFS' analysis would rely on evaluating a range of impacts resulting from an unrestricted number of programs to no programs. NMFS did not analyze an unrestricted range of programs in any of the alternatives. The original scope proposed in the NOI does not match what was produced in the DEIS; therefore NMFS has performed an incomplete analysis.

NEP 10 It is discordant that the proposed action for the DEIS would include BOEM actions along with NMFS' issuance of ITAs. Geological and geophysical activities are, by definition, limited in scope, duration and impact. These activities do not have the potential to significantly affect the environment and so do not require an EIS.

NEP 11 The structural issues with the DEIS are so significant that NMFS should:

- Abandon the DEIS and start a new NEPA process, including a new round of scoping, development of a new proposed action, development of new alternatives that comply with the MMPA, and a revised environmental consequences analysis;
- Abandon the DEIS and work in collaboration with BOEM to initiate a new NEPA process, and conduct a workshop with industry to develop and analyze a feasible set of alternatives;
- Abandon the EIS process entirely and continue with its past practice of evaluating impact of oil and gas activities in the Arctic through project-specific NEPA analyses; or
- Abandon the EIS and restart the NEPA process when a project has been identified and there is need for such analysis.

NEP 12 The current DEIS process is unnecessary and replicates NEPA analyses that have already been performed. There has already been both a final and supplemental EIS for Chukchi Sea

Lease Sale 193, which adequately addressed seismic exploration and other lease activities to which this DEIS is intended to assess. In addition, BOEM has prepared NEPA analyses for Shell's exploration drilling programs and will prepare a project specific analysis for all other Arctic OCS exploration programs. As a result, the DEIS duplicates and complicates the NEPA process by introducing a competing impact assessment to BOEM's work.

NEP 13 NMFS should add Cook Inlet to the project area for the EIS, as Cook Inlet is tied into the five year OCS Plan.

NEP 14 As the ultimate measure of potential effects, the impact criteria provided in the DEIS are problematic. They do not inform the relevant agencies as to how impacts relate to their substantive statutory responsibilities, and they do not provide adequate information as to their relationship to the NEPA significance threshold, the MMPA, or OCSLA. The DEIS should be revised to reflect these concerns:

- The DEIS does not articulate thresholds for "significance," the point at which NEPA requires the preparation of an EIS. This is important given the programmatic nature of the document, and because there have been conflicting definitions of significance in recent NEPA documents related to the Arctic; and
- The DEIS does not provide the necessary information to determine whether any of the proposed alternatives will have more than a negligible impact on any marine mammal stock, no unmitigable adverse impacts on subsistence uses, and whether there may be undue harm to aquatic life. NMFS has previously recommended such an approach to BOEM for the Draft Supplemental EIS for lease sale 193. Any impact conclusion in the DEIS greater than "negligible" would be in conflict with the MMPA "negligible impact" finding. Future site-specific activities will require additional NEPA analysis.

NEP 15 NMFS should characterize this analysis as a programmatic EIS, and should make clear that additional site-specific NEPA analysis must be performed in conjunction to assess individual proposed projects and activities. A programmatic EIS, such as the one NMFS has proposed here, cannot provide the detailed information required to ensure that specific projects will avoid serious environmental harm and will satisfy the standards established by the MMPA. For example, it may be necessary to identify with specificity the locations of sensitive habitats that may be affected by individual projects in order to develop and implement appropriate mitigation measures. The DEIS, as written, cannot achieve this level of detail.

NEP 16 The DEIS presents an environmental consequences analysis that is inadequate and does not provide a basis for assessing the relative merits of the alternatives.

- The criteria for characterizing impact levels are not clear and do not provide adequate, distinct differences between categories. Ratings are given by agency officials, which could vary from person to person and yield inconsistent assessments. This methodology is in contradiction to the NEPA requirements and guidelines that require objective decision-making procedures.
- A basis for comparison across alternatives, such as a cost-benefit analysis or other assessment of relative value between human economic activity and physical/biological impacts, is not included. From the existing evaluation system, a "minor" biological effect and a "minor" social environment effect would be equivalent.
- Minor and short-term behavioral effects appear to be judged more consequential than known causes of animal mortality.

- Available technical information on numerous issues does not appear to have been evaluated or included in the impact analysis.
- The assumptions for analysis are flawed and substantially underestimates industry activities.
- There is no attention to the probability of impacts.
- There is little attention paid to the severity of effects discussed.
- Many conclusions lack supporting data, and findings are not incorporated into a biologically meaningful analysis.

NEP 17 There is no purpose and need for the scope of any NEPA analysis prepared by NMFS to address the impacts of incidental take of polar bears and walrus by the oil and gas industry. There are existing ITRs and NEPA analyses that cover these species. The scope of the DEIS should be revised to exclude polar bears and walrus.

NEP 18 NMFS should extend the public comment period to accommodate the postponed public meetings in Kaktovik and Nuiqsut. It seems appropriate to keep the public comment period open for all public entities until public meetings have been completed. NMFS should ensure that adherence to the public process and NEPA compliance has occurred.

NEP 19 The DEIS should define the potential future uses of tiering from the NEPA document, specifically related to land and water management and uses. This future management intent may extend the regulatory jurisdiction beyond the original scope of the DEIS.

NEP 20 There are no regulations defining the term “potential effects,” which is used quite frequently in the DEIS. Many of these potential effects are questionable due the lack of scientific certainty, and in some critical areas, the virtual absence of knowledge. The DEIS confuses agency decision-making by presenting an extensive list of “potential effects” as if they are certainties -- and then demands they be mitigated. Thus, it is impossible for the DEIS to inform, guide or instruct agency managers to differentiate between activities that have no effect, minor or major effect to a few animals or to an entire population.

NEP 21 The DEIS analysis provides inconsistent conclusions between resources and should be revised. For example:

- The analysis appears to give equivalent weight to potential risks for which there is no indication of past effect and little to no scientific basis beyond the hypothesis of concern. The analysis focuses on de minimus low-level industry acoustic behavioral effects well below either NMFS’ existing and precautionary acoustic thresholds and well below levels that recent science indicates are legitimate thresholds of harm. These insupportably low behavioral effect levels are then labeled as a greater risk ("moderate") than non-industry activities involving mortality to marine mammals of concern, which are labeled as "minor" environmental effects.
- Beneficial socioeconomic impacts are characterized as “minor” while environmental impacts are characterized as “major.” This level of impact characterization implies an inherent judgment of relative value, not supported by environmental economic analysis or valuation.
- The DEIS concedes that because exploration activities can continue for several years, the duration of effects on the acoustic environment should be considered “long term,” but this overview is absent from the bowhead assessment.
- In discussing effects to subsistence hunting from permitted discharges, the DEIS refers to the section on public health. The summary for the public health effects, however, refers

to the entirety of the cumulative effects discussion. That section appears to contain no more than a passing reference to the issue. The examination of the mitigation measure that would require recycling of drilling muds fares no better. The section simply reinforces the fact that residents are very concerned about contamination without considering the benefits that could come from significantly reducing the volume of toxic discharges.

- The only category with differently rated impacts between Alternatives 3 and 4 is "cultural resources." Although authorization of marine mammal incidental take would have no impact on cultural resources, for Alternatives 2 and 3, impacts to cultural resources are rated as "negligible" rather than none. With imposition of additional mitigation measures in Alternative 4, NMFS inexplicably increased the impact to "minor."

NEP 22 The DEIS fails to explain how the environmental consequences analysis relates single animal risk effect to the population level effect analysis and whether the analysis is premised on a deterministic versus a probabilistic risk assessment approach. The DEIS apparently relies on some type of "hybrid" risk assessment protocol and therefore is condemned to an unscientific assessment that leads to an arbitrary and unreasonable conclusion that potential low-level behavioral effects on few individual animals would lead to a biologically significant population level effect.

NEP 23 As written, the DEIS impact criteria provide no objective or reproducible scientific basis for agency personnel to make decisions. The DEIS process would inherently require agency decision makers to make arbitrary decisions not based upon objective boundaries. The DEIS impact criteria are hard to differentiate between and should be revised to address the following concerns:

- The distinction made among these categories raises the following questions: What is "perceptible" under Low Impact? What does "noticeably alter" mean? How does "perceptible" under Low Impact differ from "detectable" under Moderate Impact? What separates an "observable change in resource condition" under Moderate Intensity from an "observable change in resource condition" under High Impact? Is it proper to establish an "observable change" without assessment of the size of the change or more importantly the effect as the basis to judge whether an action should be allowable?
- There is no reproducible scientific process to determine relative judgment about intensity, duration, extent, and context.

NEP 24 The projection of risk in the DEIS is inconsistent with reality of effect. The characterizations of risk are highly subjective and fully dependent upon the selection of the evaluator who would be authorized to use his/her own, individual scientific understanding, views and biases. The assessments cannot be replicated. The DEIS itself acknowledges the inconsistency from assessment to assessment. This creates a situation in which the DEIS determines that otherwise minor effects from industry operations (ranging from non-detectable to short-term behavioral effects with no demonstrated population-level effects) are judged to be a higher rated risk to the species than known causes of mortality.

NEP 25 NMFS and BOEM should examine this process to handle uncertainty, and should include in a revised DEIS the assumptions and precautionary factors applied that are associated with each step of this process such as:

1) Estimates of seismic activity;
2) Source sizes and characterizations;

3) Underwater sound propagation;
4) Population estimates and densities of marine mammals;
5) Noise exposure criteria; and
6) Marine mammal behavior.

Until the agencies document and communicate these underlying decisions in a transparent fashion neither the industry nor agency resource managers can know and understand how such decisions are made and therefore the range and rate of error. The DEIS as presently written presents an "on the one hand; on the other" approach which does not inform the issue for agency resource managers.

NEP 26 It is necessary for the DEIS to clearly define what constitutes a “take” and why, and what thresholds will be utilized in the rulemaking. If there is reason for differing thresholds, those differences should be clearly communicated and their rationale thoroughly explained. The DEIS should:

- Assert that exposure to sound does not equal an incidental taking.
- Communicate that the 120/160/180 dB thresholds used as the basis of the DEIS analysis are inappropriate and not scientifically supportable.
- Adopt the Southall Criteria (Southall, et al. 2007), which would establish the following thresholds: Level A at 198 dB re 1 µPa-rms; Level B at the lowest level of TTS-onset as a proxy until better data is developed.

NEP 27 The DEIS analysis should consider the frequency component, nature of the sound source, cetacean hearing sensitivities, and biological significance when determining what constitutes Level B incidental take. The reliance on the 160 dB guideline for Level B take estimation is antiquated and should be revised by NMFS.

NEP 28 The DEIS fails to:

- Adequately reflect prior research contradicting the Richardson et al. (1999) findings;
- Address deficiencies in the Richardson et al. (1999) study; and
- Present and give adequate consideration to newer scientific studies that challenge the assertion that bowhead whales commonly deflect around industry sound sources.

NEP 29 Fundamental legal violations of Administrative Procedure Act (APA), NEPA, and OCSLA may have occurred during the review process and appear throughout the DEIS document. There are significant NEPA failures in the scoping process, in the consultation process with agency experts, in the development and assessment of action alternatives, and in the development and assessment of mitigation measures. There are also many assumptions and conclusions in the DEIS that are clearly outside of NMFS’ jurisdiction, raise anti-competitiveness concerns, and are likely in violation of the contract requirements and property rights established through the OCSLA. In total, these legal violations create the impression that NMFS pre-judged the results of their NEPA analysis.

- NMFS did not evaluate different numbers per sea/alternative of drilling programs, as was requested in public comments listed as COR 38 in Appendix C [of the EIS scoping report].
- The arbitrary ceiling on exploration and development activities chosen by NMFS raises anti-competitiveness concerns. NMFS will be put in the position of picking and choosing which lessees will get the opportunity to explore their leases.

NEP 30 The various stages of oil and gas exploration and development are connected actions that should have been analyzed in the DEIS. The DEIS analyzes activities independently, but fails to account for the temporal progression of exploration toward development on a given prospect. By analyzing only a "snapshot" of activity in a given year, the DEIS fails to account for the potential bottleneck caused by its forced cap on the activity allowed under its NEPA analysis. NMFS should have considered a level of activity that reflected reasonably foreseeable lessee demand for authorization to conduct oil and gas exploration and development, and because it did not, the DEIS is legally defective and does not meet the requirement to provide a reasonably accurate estimate of future activities necessary for the DEIS to support subsequent decision-making under OCSLA.

NEP 31 The DEIS should also include consideration of the additional time required to first oil under each alternative and mitigation measure, since the delay between exploration investment and production revenue has a direct impact on economic viability and, by extension, the cumulative socioeconomic impacts of an alternative.

NEP 32 NMFS should consider writing five-year Incidental Take Regulations for oil and gas exploration activities rather than using this DEIS as the NEPA document.

NEP 33 In order to designate "special habitat areas," NMFS must go through the proper channels, including a full review process. No such process was undertaken prior to designating these "special habitat areas" in the DEIS.

NEP 34 NMFS should consider basing its analysis of bowhead whales on the potential biological removal (PBR) – a concept that reflects the best scientific information available and a concept that is defined within the MMPA. NMFS could use information from the stock assessments, current subsistence harvest quotas, and natural mortality to assess PBR. If NMFS does not include PBR as an analysis technique in the DEIS, it should be stated why it was not included.

NEP 35 NMFS needs to quantify the number of marine mammals that it expects to be taken each year under all of the activities under review in the DEIS, and provide an overall quantification. This is critical to NMFS ensuring that its approval of IHAs will comport with the MMPA.

NEP 36 The impact criteria that were used for the magnitude or intensity of impacts for marine mammals are not appropriate. For a high intensity activity, whales and other marine mammals would have to entirely leave the EIS project area. This criterion is arbitrary and has no basis in biology. Instead, the intensity of the impact should relate to animals missing feeding opportunities, being deflected from migratory routes, the potential for stress related impacts, or other risk factors.

NEP 37 The DEIS repeatedly asserts, without support, that time and place limitations may not result in fewer exploration activities. The DEIS must do more to justify its position. It cannot simply assume that desirable locations for exploration activities are fungible enough that a restriction on activities in Camden Bay, for example, will lead to more exploration between Camden Bay and Harrison Bay.

NEP 38 NMFS must revise the thresholds and methodology used to estimate take from airgun use to incorporate the following parameters:

- Employ a combination of specific thresholds for which sufficient species-specific data are available and generalized thresholds for all other species. These thresholds should be

expressed as linear risk functions where appropriate. If a risk function is used, the 50% take parameter for all the baleen whales (bowhead, fin, humpback, and gray whales) and odontocetes occurring in the area (beluga whales, narwhals, killer whales, harbor porpoises) should not exceed 140 dB (RMS). Indeed, at least for bowhead whales, beluga whales, and harbor porpoises, NMFS should use a threshold well below that number, reflecting the high levels of disturbance seen in these species at 120 dB (RMS) and below.

- Data on species for which specific thresholds are developed should be included in deriving generalized thresholds for species for which less data are available.
- In deriving its take thresholds, NMFS should treat airgun arrays as a mixed acoustic type, behaving as a multi-pulse source closer to the array and, in effect, as a continuous noise source further from the array, per the findings of the 2011 Open Water Panel cited above. Take thresholds for the impulsive component of airgun noise should be based on peak pressure rather than on RMS.
- Masking thresholds should be derived from Clark et al. (2009), recognizing that masking begins when received levels rise above ambient noise.

NEP 39 The DEIS fails to consider masking effects in establishing a 120 dB threshold for continuous noise sources. Some biologists have analogized the increasing levels of noise from human activities as a rising tide of "fog" that is already shrinking the sensory range of marine animals by orders of magnitude from pre-industrial levels. As noted above, masking of natural sounds begins when received levels rise above ambient noise at relevant frequencies. Accordingly, NMFS must evaluate the loss of communication space, and consider the extent of acoustic propagation, at far lower received levels than the draft EIS currently employs.

NEP 40 The DEIS fails to consider the impacts of sub-bottom profilers and other active acoustic sources commonly featured in deep-penetration seismic and shallow hazard surveys, and should be included in the final analysis, regardless of the risk function NMFS ultimately uses.

NEP 41 As the Ninth Circuit has found, "the considerations made relevant by the substantive statute during the proposed action must be addressed in NEPA analysis." Here, in assessing their MMPA obligations, the agencies presuppose that industry will apply for IHAs rather than five-year take authorizations and that BOEM will not apply to NMFS for programmatic rulemaking. But the potential for mortality and serious injury bars industry from using the incidental harassment process to obtain take authorizations under the MMPA.

In 1994, Congress amended the MMPA to add provisions that allow for the incidental harassment of marine mammals through IHAs, but only for activities that result the "taking by harassment" of marine mammals. For those activities that could result in 'taking" other than harassment, interested parties must continue to use the pre-existing procedures for authorization through specific regulations, often referred to as "five-year regulations." Accordingly, NMFS' implementing regulations state that an IHA in the Arctic cannot be used for "activities that have the potential to result in serious injury or mortality." In the preamble to the proposed regulations, NMFS explained that if there is a potential for serious injury or death, it must either be "negated" through mitigation requirements or the applicant must instead seek approval through five-year regulations.

Given the clear potential for serious injury and mortality, few if any seismic operators in the Arctic can legally obtain their MMPA authorizations through the IHAs process. BOEM should consider applying to NMFS for a programmatic take authorization, and NMFS should

revise its impact and alternatives analyses in the EIS on the assumption that rulemaking is required.

NEP 42 The DEIS contains very little discussion of the combined effects of drilling and ice management. Ice management can significantly expand the extent of a disturbance zone. It is unclear as to how the disturbance zones for exploratory drilling in the Chukchi Sea were determined as well.

NEP 43 The analysis of impacts under Alternative 3 is insufficient and superficial, and shows little change from the analysis of impacts under Alternative 2 despite adding four additional seismic surveys, four shallow hazard surveys, and two drilling programs. The analysis in Alternative 3 highlights the general failure to consider the collective impact of different activities. For example, the DEIS notes the minimum separation distance for seismic surveys, but no such impediment exists for separating surveying and exploration drilling, along with its accompanying ice breaking activities.

NEP 44 The DEIS references the "limited geographic extent" of ice breaking activities, but it does not consistently recognize that multiple ice breakers could operate as a result of the exploration drilling programs.

NEP 45 NEPA regulations make clear that agencies should not proceed with authorizations for individual projects until an ongoing programmatic EIS is complete. That limitation is relevant to the IHAs application currently before NMFS, including Shell's plan for exploration drilling beginning in 2012. It would be unlawful for NMFS to approve the marine mammal harassment associated with Shell's proposal without completing the EIS.

NEP 46 The DEIS states that the final document may be used as the "sole" NEPA compliance document for future activities. Such an approach is unwarranted. The EIS, as written, does not provide sufficient information about the effects of specific activities taking place in any particular location in the Arctic. The Ninth Circuit has criticized attempts to rely on a programmatic overview to justify projects when there is a lack of "any specific information" about cumulative effects. That specificity is missing here as well. For example, Shell's proposed a multi-year exploration drilling program in both seas beginning in 2012 will involve ten wells, four ice management vessels, and dozens of support ships. The EIS simply does not provide an adequate analysis that captures the effects of the entire enterprise, including: 1) the Kulluk's considerable disturbance zone; 2) the proximity of the drill sites to bowhead feeding locations and the number of potentially harassed whales; or 3) the total combined effects of drilling, ice management, and vessel traffic.

NEP 47 The DEIS fails to incorporate impacts consistently and accurately through all layers of the food web. A flow chart showing cause-and-effect relationships through each biological layer may help correct truncation of analyses between resource groups. The resource specialists/authors should coordinate on the analyses, particularly for prey resources or habitat parameters.

NEP 48 NMFS should come back to the communities after comments have been received on the DEIS and provide a presentation or summary document that shows how communities comments were incorporated.

NEP 49 The definition of take should be revised to be more protective of marine mammals.

NEP 50 The communities are feeling overwhelmed with the amount of documents they are being asked to review related to various aspects of oil and gas exploration and development activities. The system of commenting needs to be revised. However, the forums of public meetings are important to people in the communities so their concerns can be heard before they happen.

NEP 51 NMFS should consider making document such as the public meeting powerpoint, project maps, the mitigation measures, the Executive Summary available in hard copy form to the communities. Even though these documents are on the project website, access to the internet is not always available and/or reliable.

NEP 52 Deferring the selection of mitigation measures to a later date, where the public may not be involved, fails to comport with NEPA's requirements. "An essential component of a reasonably complete mitigation discussion is an assessment of whether the proposed mitigation measures can be effective." In reviewing NEPA documents, courts require this level of disclosure, because "without at least some evaluation of effectiveness," the discussion of mitigation measures is "useless" for "evaluating whether the anticipated environmental impacts can be avoided." A "mere listing of mitigation measures is insufficient to qualify as the reasoned discussion required by NEPA." The EIS should identify which mitigation measures will be used.

NEP 53 The DEIS provides extensive information regarding potential impacts of industry activities on marine life. However, it gives insufficient attention to the impacts the alternatives and mitigation measures would have on development of OCS resources. This should include information on lost opportunity costs and the effect of time and area closures given the already very short open water and weather windows available for Arctic industry operations.

Oil Spill Risks (OSR)

OSR — Concerns about potential for oil spill, ability to clean up spills in various conditions, potential impacts to resources or environment from spills.

OSR 1 — A large oil spill in the extreme conditions present in Arctic waters would be extremely difficult or impossible to clean up. Current cleanup methods are unsuitable and ineffective. Current technology only allows rescue and repair attempts during ice free parts of the year. Oil spill responses need to be developed in advance of offshore development.

OSR 2 — An oil spill being a low probability event is optimistic, and would only apply to the exploration phase. Once full development or production goes into effect an oil spill is more likely. Is there any data suggesting this is a low probability. Assume a spill will occur and plan accordingly.

OSR 3 — Concerns about how oil will be skimmed with sea ice present, how would boats be deployed in heavy ice conditions, how would rough waters effect oil spill response, could the rough seas and ice churn surface oil, what about oil tramped under ice especially during spring melt, how would all of this effect spill response?

OSR 4 — It makes sense to drill for more oil, but the problem is where the oil is being drilled. In the Arctic Ocean there is a chance the well will start to leak.

OSR 5 — Oil spill in the arctic environment would be devastating to numerous biological systems, habitats, communities and people. There is too little known about Arctic marine wildlife to know what the population effects would be. Black (oiled) ice would expedite ice melt. The analysis section needs to be updated. Not only would the Arctic be affected but the waters surrounding the Arctic as well.

OSR 6 — The company that is held responsible for an oil spill will face financial losses and be viewed negatively by the public.

OSR 7 — An Oil Spill Response Gap Analysis needs to be developed for existing Arctic Oil and Gas Operations

OSR 8 — If an oil spill occurs near or into freeze-up, the oil will remain trapped there until spring. These spring lead systems and melt pools are important areas where wildlife collect.

OSR 9 — The effects of an oil spill on indigenous peoples located on the Canadian side of the border needs to be assessed.

OSR 10 — The use of dispersants could have more unknown effects in the cold and often ice covered seas of the Arctic.

OSR 11 — There are many physical effects a spill can have on marine mammals. Thoroughly consider the impact of routine spills on marine mammals. The marine mammal commissions briefing on the Deepwater Horizon spill listed many.

OSR 12 — Mitigation measures need to reflect the possibility of an oil spill and lead to a least likely impact. Identify areas to be protected first in case a spill does occur.

OSR 13 Production facilities increase the risk of spills and have long term environmental impacts.

OSR 14 Pinnipeds and walruses are said to have only minor to moderate impacts with a very large oil spill. The conclusion is peculiar since NMFS is considering ringed and bearded seals and USFWS is considering walruses to be listed under the ESA.

OSR 15 Proven technology that could operate outside the open-water season should be specified. The EIS needs to determine if certain vessels like the drillship Discoverer can actually complete a relief-well late in the operating season when ice may be present, since it is not a true ice class vessel.

OSR 16 Hypothetical spill real time constraints and how parameters for past VLOS events need to be explained and identified. A range of representative oils should be used for scenarios not just a light-weight oil. Percentages of trajectories need to be explained and identified.

OSR 17 Ribbon seals could be significantly impacted through prey as concluded in impacts to fish in the DEIS, but not included in the pinniped impacts, which describes them as not be affected.

OSR 18 The oil spill section needs to be reworked. No overall risks to the environment are stated, or severity of spills in different areas, shoreline oiling is inadequate, impacts to whales may be of higher magnitude due to important feeding areas and spring lead systems. Recovery rates should be reevaluated for spilled oil. There are no site-specific details. The trajectory model needs to be more precise.

OSR 19 Concerns about the dispersants being discussed in the spill response plans. People are reported to be sick or dead from past use of these dispersants, but yet they are still mentioned as methods of cleanup.

OSR 20 The DEIS confirms our [the affected communities] worst fears about both potential negative impacts from offshore drilling and the fact that the federal government appears ready to place on our communities a completely unacceptable risk at the behest of the international oil companies.

OSR 21 To the extent that a VLOS is not part of the proposed action covered in the DEIS, it is inappropriate to include an evaluation of the impacts of such an event in this document

OSR 22 NMFS should recommend an interagency research program on oil spill response in the Arctic and seek appropriations from the Oil Spill Liability Trust Fund to carry out the program as soon as possible.

OSR 23 It is recommended that NMFS reassess the impact of oil spills on seal populations. Based on animal behavior and results from the Exxon Valdez Oil Spill (EVOS) it is much more likely that seals would be attracted to a spill area particularly cleanup operations, leading to a higher chance of oiling (Nelson 1969, Herreman 2011 personal observation).

OSR 24 This DEIS should explain how non-Arctic analogs of oil spills are related to the Arctic and what criteria are used as well as highlight the USGS Data-Gap Report that recommends for continuous updating of estimates.

Peer Review (PER)

PER Suggestions for peer review of permits, activities, proposals.

PER 1 A higher-quality survey effort needs to be conducted by an independent and trusted 3rd party.

PER 2 An open-ended permit should not move into production without proper review of the extensive processes, technologies, and infrastructure required for commercial hydrocarbon exploitation.

PER 3 Research and monitoring cannot just be industry controlled; it needs to be a transparent process with peer review.

Regulatory Compliance (REG)

REG Comments associated with compliance with existing regulations, laws and statutes.

REG 1 NMFS should reconsider the use of the word “taking” in reference to the impacts to marine mammals since these animals are not going to be taken, they are going to be killed and wasted.

REG 2 NMFS needs to determine in the DEIS whether the proposed alternatives would cause impacts "that cannot be reasonably expected to, and is not reasonably likely to adversely affect the species or stock through effects on annual rates of recruitment or survival.” To ensure that is the case, it is recommended that NMFS revise the DEIS to include a fuller analysis of each alternative and discuss whether it meets the requirements of the MMPA for issuing incidental take authorizations.

REG 3 Narrative impact levels need to be changed since they are vague, relativistic, narrative standards that do not bear any direct relation the MMPA standards. Although these impact criteria may be considered sufficient for purposes of the analyses required under NEPA, the Council on Environmental Quality (CEQ) regulations require that NMFS analyze whether the proposed alternatives will comply with the substantive requirements of the MMPA. It appears from the text of the DEIS that NMFS does not fully grasp the importance of the MMPA standards and how they are to be applied. This approach to analyzing potential impacts represents a significant weakness in the DEIS that may render the final decision arbitrary, capricious and in noncompliance with NEPA and the MMPA and Administrative Procedure Act.

REG 4 It is requested that NMFS quantify the number of bowhead whales that will potentially be taken by the proposed activities, required to assess compliance with the "negligible impact" standard of the MMPA and its implementing regulations. Without this information, the Service cannot make an informed, science-based judgment as to whether those takes will involve a small number of animals and whether their total impact will be negligible as required under the MMPA.

REG 5 Permitted activity level should not exceed what is absolutely essential for the industry to conduct seismic survey activities. NMFS needs to be sure that activities are indeed, negligible and at the least practicable level for purposes of the MMPA.

REG 6 NMFS is encouraged to amend the DEIS to include a more complete description of the applicable statute and implementing regulations and analyze whether the proposed levels of industrial activity will comply with the substantive standards of the MMPA.

REG 7 NMFS should revise the DEIS to encompass only those areas that are within the agency’s jurisdiction and remove provisions and sections that conflicts with other federal and state agency jurisdictions (BOEM, USFWS, EPA, Coast Guard, and State of Alaska). The current DEIS is felt to constitute a broad reassessment and expansion of regulatory oversight. Comments include:

- The EIS mandates portions of Conflict Avoidance Agreements, which are voluntary and beyond NMFS jurisdiction.
- The EIS proposes polar bear mitigations measures that could contradict those issued by USFWS under the MMPA and ESA.

- Potential requirements for zero discharge encroach on EPA's jurisdiction under the Clean Water Act regarding whether and how to authorize discharges.
- Proposed mitigation measures, acoustic restrictions and "Special Habitat" area effectively extend exclusion zones and curtail lease block access, in effect "capping" exploration activities. These measures encroach on the Department of the Interior's jurisdiction to identify areas open for leasing and approve exploration plans, as designated under OCSLA.
- The proposed requirement for an Oil Spill Response Plan conflicts with BOEM, Bureau of Safety and Environmental Enforcement and the Coast Guard's jurisdiction, as established in OPA-90, which requires spill response planning.
- NMFS does not have the authority to restrict vessel transit, which is under the jurisdiction of the Coast Guard.
- Proposed restrictions, outcomes, and mitigation measures duplicate and contradict existing State lease stipulations and mitigation measures.

REG 8 It is recommended that NMFS take into account the safety and environmental concerns highlight in the Gulf of Mexico incident and how these factors will be exacerbated in the more physically challenging Arctic environment. Specifically, NMFS is asked to consider the systematic safety problems with the oil and gas industry, the current lack regulatory oversight and the lax enforcement of violations.

REG 9 The DEIS needs to be revised to comply with Executive Order 13580, "Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska," issued on July 12,2011 by President Obama. It is felt that the current DEIS is in noncompliance because it does not assess a particular project, is duplicative, creates the need for additional OCS EIS documents, and is based upon questionable authority.

REG 10 NMFS should take a precautionary approach in its analysis of impacts of oil and gas activities and in the selection of a preferred alternative.

REG 11 The EIS needs to be revised to ensure compliance with Article 18 of the Vienna Convention of the Law on Treaties and the Espoo Convention, which states that a country engaging in offshore oil and gas development must take all appropriate and effective measures to prevent, reduce and control significant adverse transboundary environmental impacts from proposed activities and must notify and provide information to a potentially affected country.

REG 12 The Arctic DEIS needs to identify and properly address the importance of balancing the requirements of the Outer Continental Shelf Lands Act, the MMPA and ESA. Currently, the DEIS substantially gives undue weight to considerations involving incidental taking of marine mammals under the MMPA and virtually ignores the requirements of OCSLA.

REG 13 The DEIS needs to address several essential factors and requirements of the Outer Continental shelf Lands Act. Comments include:

- The DEIS contains little or no assessment of the impact of alternatives on BOEM's ability to meet the OCSLA requirements for exploration and development.
- A forced limitation in industry activity by offering only alternatives that constrain industry activities would logically result in violating the expeditious development provisions of OCSLA.
- All of the alternatives would slow the pace of exploration and development so much that lease terms may be violated and development may not be economically viable.

REG 14 The range of alternatives in the DEIS needs to be expanded to avoid violating a variety of anti-trust statues. By capping industry activity, the DEIS would create a situation where some applicants "would be selected" and granted permits and others not.

REG 15 NMFS's actions under both NEPA and OCSLA need to be reviewed under the arbitrary and capricious standard of the Administrative Procedure Act (APA). An agency's decision is arbitrary and capricious under the APA where the agency (i) relies on factors Congress did not intend it to consider, (ii) entirely fails to consider an important aspect of the problem, or (iii) offers an explanation that runs counter to the evidence before the agency or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise. Lands Council v. McNair, 537 F.3d 981, 987 (9th Cir. 2008) (en banc). The current DEIS errs in all three ways.

REG 16 NMFS's explicit limitations imposed on future exploration and development on existing leases in the DEIS undermine the contractual agreement between lessees and the Federal government in violation of the Supreme Court's instruction in Mobil Oil Exploration & Producing Southeast v. United States, 530 U.S. 604 (2000).

REG 17 The DEIS needs to be changed to reflect the omnibus bill signed by President Obama on December 23, 2011 that transfers Clean Air Act permitting authority from the EPA Administrator to the Secretary of Interior (BOEM) in Alaska Arctic OCS.

REG 18 Until there an indication that BOEM intends to adopt new air permitting regulations for the Arctic or otherwise adopt regulations that will ensure compliance with the requirements of the Clean Air Act, it is important that NMFS address the worst case scenario- offshore oil and gas activities proceeding under BOEM's current regulations.

REG 19 The DEIS needs to discuss threatened violations of substantive environmental laws. In analyzing the effects "and their significance" pursuant to 40 C.F.R. Â§ 1502.16, CEQ regulations require the agency to consider "whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment."

REG 20 The current DEIS impact criteria need to be adjusted to reflect MMPA standards, specifically in relation to temporal duration and the geographical extent of impacts. In assessing whether the proposed alternatives would comply with the MMPA standards, NMFS must analyze impacts to each individual hunt to identify accurately the potential threats to each individual community. MMPA standards focuses on each individual harvest for each season and do not allow NMFS to expand the geographic and temporal scope of its analysis. MMPA regulations define an unmitigable adverse impact as one that is "likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs." Within the DEIS, the current impact criteria would tend to mask impacts to local communities over shorter durations of time.

REG 21 Language needs to be changed throughout the conclusion of impacts to subsistence, where NMFS repeatedly discusses the impacts using qualified language; however, the MMPA requires a specific finding that the proposed activities "will not" have an adverse impact to our subsistence practices. It is asked that NMFS implement the will of Congress and disclose whether it has adequate information to reach these required findings before issuing ITAs.

REG 22 It is suggested that NMFS include in the DEIS an explicit discussion of whether and to what extent the options available for mitigation comply with the "lease practicable adverse impact" standard of the MMPA. This is particularly important for the "additional mitigation

measures" that NMFS has, to this point, deferred for future consideration. By focusing its analysis on the requirements of MMPA, we believe that NMFS will recognize its obligation to make an upfront determination of whether these additional mitigation measures are necessary to comply with the law. Deferring the selection of mitigation measures to a later date, where the public may not be involved, fails to comport with NEPA's requirements.

REG 23 The DEIS needs to consistently apply section 1502.22 and consider NMFS and BOEM's previous conclusions as to their inability to make informed decisions as to potential effects. NMFS acknowledges information gaps without applying the CEQ framework and disregards multiple sources that highlight additional fundamental data gaps concerning the Arctic and the effects of oil and gas disturbance.

REG 24 NMFS needs to reassess the legal uncertainty and risks associated with issuing marine mammal take authorizations under the MMPA based upon a scope as broad as the Arctic Ocean.

REG 25 NMFS needs to assess the impact of offshore coastal development in light of the fact that Alaska lacks a coastal management program, since the State lacks the program infrastructure to effectively work on coastal development issues.

REG 26 NMFS needs to ensure that it is in compliance with the Ninth Circuit court ruling that when an action is taken pursuant to a specific statute, not only do the statutory objectives of the project serve as a guide by which to determine the reasonableness of objectives outlined in an EIS, but the statutory objectives underlying the agency's action work significantly to define its analytic obligations. As a result, NMFS is required by NEPA to explain how alternatives in an EIS will meet requirements of other environmental laws and policies.

Research, Monitoring, Evaluation Needs (RME)

RME Comments on baseline research, monitoring, and evaluation needs

RME 1 The United States Geological Survey identified important gaps in existing information related to the Beaufort and Chukchi seas, including gaps on the effects of noise on marine mammals which highlighted that the type of information needed to make decisions about the impact of offshore activity (e.g., seismic noise) on marine mammals remains largely lacking. A significant unknown is the degree to which sound impacts marine mammals, from the individual level to the population level.

The degree of uncertainty regarding impacts to marine mammals greatly handicaps the agencies' efforts to fully evaluate the impacts of the permitted activities, and NMFS' ability to determine whether the activity is in compliance with the terms of the MMPA. The agency should acknowledge these data-gaps required by applicable NEPA regulations (40 C.F.R. §1502.22), and gather the missing information.

While research and monitoring for marine mammals in the Arctic has increased, NMFS still lacks basic information on abundance, trends, and stock structure of most Arctic marine mammal species. This information is needed to gauge whether observed local or regional effects on individuals or groups of marine mammals are likely to have a cumulative or population level effect.

The lack of information about marine mammals in the Arctic and potential impacts of anthropogenic noise, oil spills, pollution and other impacts on those marine mammals undercuts NMFS ability to determine the overall effects of such activities.

RME 2 The DEIS does not address or acknowledge the increasingly well-documented gaps in knowledge of baseline environmental conditions and data that is incomplete in the Beaufort and Chukchi seas for marine mammals and fish, nor how baseline conditions and marine mammal populations are being affected by climate change. Information regarding information regarding the composition, distribution, status, ecology of the living marine resources and sensitive habitats in these ecosystems needs to be better known. Baseline data are also critical to developing appropriate mitigation measures and evaluating their effectiveness. It is unclear what decisions over what period of time would be covered under the DEIS or how information gaps would be addressed and new information incorporated into future decisions. The information gaps in many areas with relatively new and expanding exploration activities are extensive and severe enough that it may be too difficult for regulators to reach scientifically reliable conclusions about the risks to marine mammals from oil and gas activities.

To complicate matters, much of the baseline data about individual species (e.g., population dynamics) remains a noteworthy gap. It is this incomplete baseline that NMFS uses as their basis for comparing the potential impacts of each alternative.

RME 3 Prior to installation and erection, noises from industry equipment need to be tested:

- Jack-up drilling platforms have not been evaluated in peer reviewed literature and will need to be evaluated prior to authorizing the use of this technology under this EIS. The DEIS states that it is assumed that the first time a jack-up rig is in operation in the Arctic, detailed measurements will be conducted to determine the acoustic characteristics. This

statement implies an assumption that the noise levels found on erecting the jack-up rig will be below levels required for mitigation. The DEIS needs to explain what would be the procedure if the noise exposure threshold was exceeded. It is suggest that the noises of erecting a jack-up rig be characterized in a trial basis before deployment to a remote location where the environment is more sensitive to disruption and where the phrase "practical mitigation" can be applied.

- Noise from the erection and deployment of Jack-up rigs and other stationary platforms need to be quantified and qualified prior to introducing them into the Arctic.
- Noise from thruster-driven dynamic positioning systems on drilling platforms and drill ships need to be quantified and qualified prior to introducing them into the Arctic.

RME 4 Propagation of airgun noise from in-ice seismic surveys is not accurately known, complicating mitigation threshold distances and procedures.

RME 5 Noise impacts of heavy transport aircraft and helicopters needs to be evaluated and incorporated into the DEIS

RME 6 Protection of acoustic environments relies upon accurate reference conditions and that requires the development of procedures for measuring the source contributions of noise as well as analyses of historical patterns of noise exposure in a particular region. Even studies implemented at this very moment will not be entirely accurate since shipping traffic has already begun taking advantage of newly ice-free routes. The Arctic is likely the last place on the planet where acoustic habitat baseline information can be gathered and doing so is imperative to understanding the resulting habitat loss from these activities. A comprehensive inventory of acoustical conditions would be the first step towards documenting the extent of current noise conditions, and estimating the pristine historic and desired future conditions.

Analysis of potential impacts at this stage is speculative at best because of the lack of definitive information regarding sound source levels, the type and duration of proposed exploration activities, and the mitigation measures that each operator would be required to meet. However, before an incidental take authorization can be issued NMFS will need such information to make the findings required under the MMPA.

RME 7 Information on Page 4-355, Section 4.9.4.9 Volume of Oil Reaching Shore includes some older references to research work that was done in the 1980's and 1990's. More recent research or reports based on the Deepwater Horizon incident could be referenced here. In addition NMFS and BOEM should consider a deferral on exploration drilling until the concerns detailed by the U.S. Oil Spill Commission are adequately addressed.

RME 8 The DEIS does not explain why obtaining data quality or environmental information on alternative technologies would have been exorbitant.

RME 9 It was recommended that agencies and industry involved in Arctic oil and gas exploration establish a research fund to reduce source levels in seismic surveys. New techniques including vibroseis should be considered particularly in areas where there have not been previous surveys and so comparability with earlier data is not an issue. Likewise, similar to their vessel-quieting technology workshops, NOAA is encouraged to fund and facilitate expanded research and development in noise reduction measures for seismic surveys.

RME 10 The DEIS wrongly reverts to dated acoustic thresholds and ignores significant more recent recommendations on improving criteria. At a minimum, NMFS should substantiate for the record its basis for retaining these old criteria. The DEIS in several places relies on Root

Mean Square (RMS) Sound Pressure Level criteria for acoustic impacts. The most recent research has questioned the adequacy of these criteria. Instead, the criteria should be replaced by a combination of Sound Exposure Level limits and Peak (not RMS) Sound Pressure Levels or other metric being considered.

RME 11 NMFS has provided only conceptual examples of the temporal and spatial distribution of proposed activities under each alternative and the maps and figures provided do not include all possible activities considered for each alternative or how these activities might overlap spatially and temporally. The lack of specific information precludes a full assessment of the potential effects of the combined activities, including such things as an estimation of the number of takes for species that transit through the action area during the timeframe being considered. Similarly, the range of airgun volumes, source levels, and distances to the 190-, 180-, 160-, and 120-dB re ÂµPa harassment thresholds (Table 4.5- 10, which are based on measurements from past surveys) vary markedly and cannot be used to determine with any confidence the full extent of harassment of marine mammals. Such assessment requires modeling of site-specific operational and environmental parameters, which is simply not possible based on the information in this programmatic assessment.

To assess the effects of the proposed oil and gas exploration activities under the MMPA, NMFS should work with BOEM estimate the site-specific acoustic footprints for each sound threshold (i.e., 190, 180, 160, and 120 dB re 1 ÂµPa) and the expected number of marine mammal takes, accounting for all types of sound sources and their cumulative impacts.

Any analysis of potential impacts at this stage is speculative at best because of the lack of definitive information regarding sound source levels, the type and duration of proposed exploration activities, and the mitigation measures that each operator would be required to meet. However, before an incidental take authorization can be issued, NMFS will need such information to make the findings required under the MMPA.

RME 12 There is missing information regarding:

- Whether enough is known about beluga whales and their habitat use to accurately predict the degree of harm expected from multiple years of exploration activity.
- Issues relevant to effects on walrus regarding the extent of the missing information are vast, as well summarized in the USGS Report. Information gaps include: population size; stock structure; foraging ecology in relation to prey distributions and oceanography; relationship of changes in sea ice to distribution, movements, reproduction, and survival; models to predict the effects of climate change and anthropogenic impacts; and improved estimates of harvest. Impacts to walrus of changes in Arctic and subarctic ice dynamics are not well understood.

RME 13 To predict the expected effects of oil and gas and other activities more accurately, a broader synthesis and integration of available information on bowhead whales and other marine mammals is needed. That synthesis should incorporate such factors as ambient sound levels, natural and anthropogenic sound sources, abundance, movement patterns, the oceanographic features that influence feeding and reproductive behavior, and traditional knowledge (Hutchinson and Ferrero 2011).

RME 14 An ecosystem-wide, integrated synthesis of available information would help identify important data gaps that exist for Arctic marine mammals, particularly for lesser-studied species such as beluga whales, walruses, and ice seals. It also would help the agencies better understand and predict the long-term, cumulative effects of the proposed activities, in light of

increasing human activities in the Arctic and changing climatic conditions. It is recommended that NMFS work with BOEM and other entities as appropriate to establish and fully support programs designed to collect and synthesize the relevant scientific information and traditional knowledge necessary to evaluate and predict the long-term and cumulative effects of oil and gas activities on Arctic marine mammals and their environment.

Robust monitoring plans for authorized activities could be a key component to filling some of these gaps. Not only do these monitoring plans need to be implemented, but all data collected should be publically available for peer review and analysis. In the current system, there is no choice but to accept industries' interpretation of results. This is not appropriate when we are talking about impacts to the public and its resources. Since industry is exploring for oil and gas that belongs to the people of the US and they are potentially impacting other resources that also belong to the people of the US, data from monitoring programs should be available to the public.

RME 15 Additional Mitigation Measure C3 - Measures to Ensure, Reduced, Limited, or Zero Discharges. This measure purports to contain requirements to ensure reduced, limited, or zero discharge of any or all of the discharge streams identified with potential impacts to marine mammals or habitat and lists drill cuttings, drilling fluids, sanitary waste, bilge water, ballast water, and domestic waste. We know of absolutely no scientific reports that indicate any of these discharges have any effect on marine mammals and anything beyond a negligible effect on habitat.

RME 16 Page 4-516 Section 4.10.5.4.4 the DEIS suggests that marine mammals may have trouble navigating between seismic surveys and drill operations because of overlapping sound signatures but the analysis does not provide any distances or data to support this conclusion.

RME 17 Page 4-98 Bowhead Whales, Direct and Indirect Effects [Behavioral Disturbance]. This section on bowhead whales does not include more recent data in the actual analysis of the impacts though it does occasionally mention some of the work. Rather it falls back to previous analyses that did not have this work to draw upon and makes similar conclusions. NMFS makes statements that are conjectural to justify its conclusions and not based on most recent available data.

RME 18 The continued reliance on overly simplified, scientifically outdated, and artificially rigid impact thresholds used in MMPA rulemakings and environmental assessments to predict potential impacts of discrete events associated with seismic exploration is of great concern. The working assumption that impulsive noise never disrupts marine mammal behavior at levels below 160 dB (RMS), and disrupts behavior with 100% probability at higher levels has been repeatedly demonstrated to be incorrect, including in cases involving the sources and areas being considered in the Arctic DEIS. That 160 dB (RMS) threshold level originated from the California HESS panel report in the late 1990s1 and was based on best available data from reactions to seismic surveys measured in the 1980s. Since then considerable evidence has accumulated, and these newer data indicate that behavioral disruptions from pulsed sources can occur well below that 160 dB (RMS) threshold and are influenced by behavioral and contextual co-variates.

RME 19 It has become painfully obvious that the use of received level alone is seriously limited in terms of reliably predicting impacts of sound exposure. However, if NMFS intends to continue to define takes accordingly, a more representative probabilistic approach would be more defensible. A risk function with a 50% midpoint at 140 dB (RMS) that accounts, even qualitatively, for contextual issues likely affecting response probability, comes much closer to

reflecting the existing data for marine mammals, including those in the Arctic, than the 160 dB (RMS) step-function that has previously been used and is again relied upon in the Arctic DEIS.

RME 20 Page 3-68, Section 3.2.2.3.2 - The Cryopelagic Assemblage: The sentence "The arctic cod is abundant in the region, and their enormous autumn-winter pre spawning swarms are well known" is misleading. What is the referenced region? There are no well-known pre spawning swarms known if for the Beaufort and Chukchi Sea Oil and Gas leasing areas. Furthermore large aggregations of arctic Cod have not been common in the most recent fish surveys conducted in the Beaufort and Chukchi Seas (same references used in this EIS).

RME 21 Page 400, 3rd paragraph Section 4.5.2.4.9.1. The middle of this paragraph states that "behavioral responses of bowhead whales to activities are expected to be temporary." There are no data to support this conclusion. The duration of impacts from industrial activities to bowhead whales is unknown. This statement should clearly state the limitations in data. If a conclusion is made without data, more information is needed about how NMFS reached this conclusion.

RME 22 Page 4-102, 2nd paragraph, Section 4.5.2.4.9.1. Direct and Indirect Effects, Site Clearance and High Resolution Shallow Hazards Survey Programs: A discussion about how bowhead whales respond to site clearance/shallow hazard surveys occurs in this paragraph but references only Richardson et al. (1985). Given the number of recent site clearance/shallow hazard surveys, there should be additional information to be available from surveys conducted since 2007. If there are not more recent data, this raises questions regarding the failure of monitoring programs to examine effects to bowhead whales from site clearance/shallow hazard surveys.

RME 23 Page 4-104, 1st paragraph, 1st sentence, Section 4.5.2.4.9.1 Direct and Indirect Effects, Exploratory Drilling: The conclusions based on the impact criteria are not supported by data. For example, there are no data on the duration of impacts to bowhead whales from exploratory drilling. If NMFS is going to make conclusions, they should highlight that conclusions are not based on data but on supposition.

RME 24 Page 4-104, Section 4.5.2.4.9.1, Direct and Indirect Effects, Associated Vessels and Aircraft: This section does not use the best available science. A considerable effort has occurred to evaluate impacts from activities associated with BP's Northstar production island. Those studies showed that resupply vessels were one of the noisiest activities at Northstar and that anthropogenic sounds caused bowhead whales to deflect north of the island or to change calling behavior. This EIS should provide that best available information about how bowhead whales respond to vessel traffic to the public and decision makers.

RME 25 Page 4-104, Section 4.5.2.4.9.1, Direct and Indirect Effects, Associated Vessels and Aircraft: This section does not use the best available science. A considerable effort has occurred to evaluate impacts from activities associated with BP's Northstar production island. Those studies showed that resupply vessels were one of the noisiest activities at Northstar and that anthropogenic sounds caused bowhead whales to deflect north of the island or to change calling behavior. This EIS should provide that best available information about how bowhead whales respond to vessel traffic to the public and decision makers.

RME 26 Page 4-107, Section 4.5.2.4.9.1 Direct and Indirect Effects, Hearing Impairment, Injury, and Mortality: The sentence states that hearing impairment, injury or mortality is "highly unlikely." Please confirm if there are data to support this statement. It is understood is that

there are no data about hearing impairment in bowhead or beluga whales. Again, if speculation or supposition is used to make conclusions, this should be clearly stated.

RME 27 The draft EIS contains a number of instances in which it acknowledges major information gaps related to marine mammals but insists that there is an adequate basis for making an assessment of impacts. For example, the draft EIS finds that it is not known whether impulsive sounds affect reproductive rate or distribution and habitat use [of bowhead whales] over periods of days or years. Moreover, the potential for increased stress, and the long-term effects of stress, are unknown, as research on stress effects in marine mammals is limited. Nevertheless, the draft EIS concludes that for bowhead whales the level of available information is sufficient to support sound scientific judgments and reasoned managerial decisions, even in the absence of additional data of this type. The draft EIS also maintains that sufficient information exists to evaluate impacts on walrus and polar bear despite uncertainties about their populations.

RME 28 Although the draft EIS takes note of some of the missing information related to the effects of noise on fish, it maintains that what does exist is sufficient to make an informed decision. BOEM's original draft supplemental EIS for Lease Sale 193, however, observed that experiments conducted to date have not contained adequate controls to allow us to predict the nature of the change or that any change would occur. NOAA subsequently submitted comments noting that BOEM's admission indicated that the next step would be to address whether the cost to obtain the information is exorbitant, or the means of doing so unclear.

The draft EIS also acknowledges that robust population estimates and treads for marine fish are unavailable and detailed information concerning their distribution is lacking. Yet the draft EIS asserts that [g]eneral population trends and life histories are sufficiently understood to conclude that impacts on fish resources would be negligible. As recently as 2007, BOEM expressed stronger concerns when assessing the effects of a specific proposal for two drillships operating in the Beaufort Sea. It found that it could not concur that the effects on all fish species would be short term or that these potential effects are insignificant, nor would they be limited to the localized displacement of fish, because they could persist for up to five months each year for three consecutive years and they could occur during critical times in the life cycle of important fish species. The agencies' prior conclusions are equally applicable in the context of this draft EIS.

Fish and EFH Impacts Analysis (Direct and Indirect; Alternatives 2 through 5) is substantively incomplete and considered to be unsupported analysis lacking analytical rigor and depth; conclusions are often not rationally and effectively supported by data; some statements are simply false and can be demonstrated so with further analysis of available data, studies, and a plethora of broad data gaps that include data gaps concerning the distribution, population abundance, and life history statistics for the various arctic fish species.

RME 29 Significant threshold discussion should be expanded based on MMS, Shell Offshore Inc. Beaufort Sea Exploration Plan, Environmental Assessment, OCS EIS/EA MMS 2007-009 at 50-51 (Feb. 2007) (2007 Drilling EA), available at http://www.alaska.boemre.gov/ref/EIS%20EA/ShellOffshoreInc_EA/SOI_ea.pdf. BOEM avoided looking more closely at the issue by resting on a significance threshold that required effects to extend beyond multiple generations. The issue of an appropriate significance threshold in the draft EIS is discussed in the text. A panel of the Ninth Circuit determined that the uncertainty required BOEM to obtain the missing information or provide a convincing

statement of its conclusion of no significant impacts notwithstanding the uncertainty. Alaska Wilderness League v. Salazar, 548 F.3d 815, 831 (9th Cir. 2008), opinion withdrawn, 559 F.3d 916 (9th Cir. Mar 06, 2009), vacated as moot, 571 F.3d 859 (9th Cir. 2009).

RME 30 The draft EIS reveals in many instances that studies are in fact already underway, indicating that the necessary information gathering is not cost prohibitive. A study undertaken by BP, the North Slope Borough, and the University of California will help better understand masking and the effects of masking on marine mammals[.] It will also address ways to overcome the inherent uncertainty of where and when animals may be exposed to anthropogenic noise by developing a model for migrating bowhead whales. NOAA has convened working groups on Underwater Sound mapping and Cetacean Mapping in the Arctic. BOEM has an Environmental Studies Program that includes a number of ongoing and proposed studies in the Beaufort and Chukchi seas that are intended to address a wide-variety of issues relevant to the draft EIS.

NMFS's habitat mapping workshop is scheduled to release information this year, and the Chukchi Sea Acoustics, Oceanography, and Zooplankton study is well underway. These and other studies emphasize the evolving nature of information available concerning the Arctic. As part of the EIS, NMFS should establish a plan for continuing to gather information. As these and other future studies identify new areas that merit special management, the EIS should have a clearly defined process that would allow for their addition.

RME 31 The draft EIS's use of the Conoco permit is also improper because the draft EIS failed to acknowledge all of Conoco's emissions and potential impacts. The draft EIS purports to include a list of typical equipment for an Arctic oil and gas survey or exploratory drilling. The list set forth in the draft EIS is conspicuously incomplete, however, as it assumes that exploratory drilling can be conducted using only a single icebreaker. Conoco's proposed operations were expected to necessitate two icebreakers. Indeed, the three other OCS air permits issued in 2011 also indicate the need for two icebreakers. The failure of the draft EIS to account for the use of two icebreakers in each exploratory drilling operations is significant because the icebreakers are the largest source of air pollution associated with an exploratory drilling operation in the Arctic.

RME 32 Recent regulatory decisions cutting the annual exploratory drilling window by one third, purportedly to temporally expand the oil spill response window during the open water season. At the least, the agencies should collect the necessary data by canvassing lessees as to what their exploration schedules are, instead of guessing or erroneously assuming what that level of activity might be over the five years covered by the EIS. This is an outstanding example of not having basic information (e.g., lessee planned activity schedules) necessary even though such information is available (upon request) to assess environmental impacts. Such information can be and should be obtained (at negligible cost) by the federal government, and used to generate accurate assumptions for analysis. Sharing activity plans/schedules are also the best of interest of lessees so as to expedite the completion of the EIS and subsequent issuance of permits. NMFS and BOEM should also canvas seismic survey companies to gather information concerning their interest and schedules of conducting procured or speculative seismic surveys in the region and include such data in the generation of their assumptions for analysis.

RME 33 Throughout the draft EIS, there are additional acknowledgements of missing information, but without any specific findings as to the importance to the agencies' decision making, as required by Section 1502.22, including: Foraging movements of pack-ice breeding seals are

not known. There are limited data as to the effects of masking. The greatest limiting factor in estimating impacts of masking is a lack of understanding of the spatial and temporal scales over which marine mammals actually communicate. It is not known whether impulsive noises affect marine mammal reproductive rate or distribution. It is not currently possible to predict which behavioral responses to anthropogenic noise might result in significant population consequences for marine mammals, such as bowhead whales, in the future. The potential long-term effects on beluga whales from repeated disturbance are unknown. Moreover, the current population trend of the Beaufort Sea stock of beluga whales is unknown. The degree to which ramp-up protects marine mammals from exposure to intense noises is unknown. Chemical response techniques to address an oil spill, such as dispersants could result in additional degradation of water quality, which may or may not offset the benefits of dispersant use.

There is no way to tell what may or may not affect marine mammals in Russian, U.S. or in Canadian waters.

RME 34 As noted throughout these comments, the extent of missing information in the Arctic is daunting and this holds equally true for bowhead whales. The long-term effects of disturbance on bowhead whales are unknown. The potential for increased stress is unknown, and it is unknown whether impulsive sounds affect the reproductive rate or distribution and habitat use over a period of days or years. Although there are some data indicting specific habitat use in the Beaufort Sea, information is especially lacking to determine where bowhead aggregations occur in the Chukchi Sea. What is known about the sensitivity of bowhead whales to sound and disturbance indicates that the zones of influence for a single year that included as many as twenty-one surveys, four drillships, and dozens of support vessels "including ice management vessels" would be considerable and almost certainly include important habitat areas. The assumption that the resulting effects over five years would be no more than moderate is unsupported.

RME 35 There is too little information known about the existing biological conditions in the Arctic, especially in light of changes wrought by climate change, to be able to reasonably understand, evaluate and address the cumulative, adverse impacts of oil and gas activities on those arctic ice environments including:

- Scientific literature emphasizes the need to ensure that the resiliency of ecosystems is maintained in light of the changing environmental conditions associated with climate change. Uncertainties exist on topics for which more science focus is required, including physical parameters, such as storm frequency and intensity, and circulation patterns, and species response to environmental changes.
- There is little information on the potential for additional stresses brought by oil and gas activity and increased shipping and tourism and how these potential stressors may magnify the impacts associated with changing climate and shrinking sea ice habitats. There are more studies that need to be done on invasive species, black carbon, aggregate noise.
- It was noted that a majority of the studies available have been conducted during the summer and there is limited data about the wintertime when there is seven to eight months of ice on the oceans.

RME 36 Oil and gas activities in the Arctic Ocean should not be expanded until there is adequate information available both from western science and local and traditional knowledge to adequately assess potential impacts and make informed decisions.

RME 37 The EIS in that it consistently fails to use new information as part of the impact analysis instead relying on previous analyses from other NMFS or MMS EIS documents conducted without the benefit of the new data. There are a number of instances in this DEIS where NMFS recognizes the lack of relevant data, or instances where conclusions are drawn without supporting data.

RME 38 In the case of seismic surveys, improvements to analysis and processing methods would allow for the use of less powerful survey sources reducing the number of air-gun blasts. Better planning and coordination of surveys along with data sharing will help to reduce the number and lengths of surveys by avoiding duplication and minimizing survey noise. Requirements should be set in place for data collection, presence of adequate marine mammal observers, and use of passive acoustic monitoring to avoid surveys when and where marine mammals are present.

RME 39 NMFS should make full use of the best scientific information and assessment methodologies, and rigorously analyze impacts to the physical, biological, and subsistence resources identified in the DEIS. Steps should be taken to:

- Move away from arbitrary economic, political or geographic boundaries and instead incorporate the latest science to address how changes in one area or species affect another.
- Develop long-term, precautionary, science-based planning that acknowledges the complexity, importance, remoteness and fragility of America's Arctic region. The interconnected nature of Arctic marine ecosystems demands a more holistic approach to examining the overall health of the Arctic and assessing the risks and impacts associated with offshore oil and gas activities in the region.
- NMFS should carefully scrutinize the impacts analysis for data deficiencies, as well as statements conflicting with available scientific studies.

It is impossible to know what the effects would be on species without more information or to determine mitigation measures on species without any effectiveness of said measures without first knowing what the impacts would be.

RME 40 Modeling allows for only have a small census of data that is used to develop an area around planes, plants that are not well understood, it's very different on the Chukchi side versus the Beaufort side. Yet your own guidelines do not have effective criteria saying that you should cut off some of these activities on the Beaufort side real early versus the Chukchi side.

RME 41 Electronic data available to rural Alaskans is extremely limited. The conversion of documented science to electronic format is slow and information that is available in repositories and libraries are not available through the Internet.

RME 42 The final EIS should state that Active Acoustic Monitoring should be further studied, but is not yet ready to be imposed as a mitigation measure.

RME 43 At present the ambient noise budgets are not very well known in the Arctic, but the USGS indicated that this type of data was needed for scientists to understand the magnitude and significance of potential effects of anthropogenic sound on marine mammals. Noise impacts on marine mammals from underwater acoustic communication systems needs to be evaluated and incorporated into the DEIS.

The U.S. Geological Survey's recommendation to develop an inventory/database of seismic sound sources used in the Arctic would be a good first step toward a better understanding of long-term, population-level effects of seismic and drilling activities. Two recent projects that will help further such an integrated approach are NOAA's recently launched Synthesis of Arctic Research (SOAR) and the North Pacific Marine Research Institute's industry-supported synthesis of existing scientific and traditional knowledge of Bering Strait and Arctic Ocean marine ecosystem information.

RME 44 G&G activities in the Arctic must be accompanied by a parallel research effort that improves understanding of ecosystem dynamics and the key ecological attributes that support polar bears, walrus, ice seals and other ice-dependent species. NMFS, as the agency with principal responsibility for marine mammals, should acknowledge that any understanding of cumulative effects is hampered by the need for better information. NMFS should acknowledge the need for additional research and monitoring coupled with long-term species monitoring programs supported by industry funding, and research must be incorporated into a rapid review process for management on an ongoing basis. By allowing the science and technology to develop, more concrete feasible and effective mitigation strategies can be provided which in turn would benefit energy security and proper wildlife protections.

Identification of important ecological areas should be an ongoing part of an integrated, long-term scientific research and monitoring program for the Arctic, not a static, one-time event. As an Arctic research and monitoring program gives us a greater understanding of the ecological functioning of Arctic waters, it may reveal additional important ecological areas that BOEM and NMFS should exclude from future lease sales and other oil and gas activities.

RME 45 While it is reasonable to assume that many outstanding leases will not ultimately result in development (or even exploration), NMFS should have truth-tested with its cooperating agency whether the maximum level of activity it assumed was, in fact, a reasonable assumption of the upper limit on anticipated activity. BOEM would have been able to provide NMFS with guidance on one of these leases. Use of a properly constructed scenario would have provided NMFS with a more realistic understanding of the level of activity necessary to allow current leaseholders an opportunity to develop their leases within the lease terms.

Socioeconomic Impacts (SEI)

SEI Comments on economic impacts to local communities, regional economy, and national economy, can include changes in the social or economic environments (MONEY, JOBS).

SEI 1 The analysis of socioeconomic impacts in the DEIS inadequate. Comments include:

- The analysis claims inaccurately many impacts are unknown or cannot be predicted and fails to consider the full potential of unrealized employment, payroll, government revenue, and other benefits of exploration and development, as well as the effectiveness of local hire efforts.
- The analysis is inappropriately limited in a manner not consistent with the analysis of other impacts in the DEIS. Potential beneficial impacts from development should not be considered "temporary" and economic impacts should not be considered "minor". This characterization is inconsistent with the use of these same terms for environmental impacts analysis.
- NMFS did not provide a complete evaluation of the socioeconomic impacts of instituting the additional mitigation measures;
- The projected increase in employment appears to be low.
- The forecasts for future activity in the DEIS scope of alternatives, if based on historical activity, appear to ignore the impact of economic forces, especially resource value as impacted by current and future market prices. Historical exploration activity in the Chukchi and Beaufort OCS in the 1980s and early 1990s declined and ceased due to low oil price rather than absence of resource.
- Positive benefits were not captured adequately.

SEI 2 The DEIS will compromise the economic feasibility of developing oil and gas in the Alaska OCS. Specific issues include:

- It would also adversely impact the ability of regional corporations to meet the obligations imposed upon them by Congress with regard to their shareholders;
- Development will not go forward if exploration is not allowed or is rendered impractical and investors may dismiss Alaska's future potential for offshore oil and gas exploration, further limiting the state's economic future;
- The limited alternatives considered would significantly increase the length of time required to explore and appraise hydrocarbon resources.

SEI 3 As a result of the restricted number of programs for seismic surveys and exploratory drilling in both the Chukchi and Beaufort Seas, the long-term effects will negatively impact the economy of Alaskans

SEI 4 It was recommends that an Economic Impact Study be conducted on the Subsistence Economies, the Human Health Adverse and Cumulative and Aggregate Impacts; and Climate Change Impacts to the economies of the Coastal Communities of Alaska.

SEI 5 The State of Alaska and the entire nation benefit economically from offshore oil and gas development through job creation and generation of local, state, and federal revenues. Related economic issues identified include:

- Oil companies provide employment and donations to charities and nonprofits;
- Oil and gas developments has already had an impact on a number of important sectors of the economy;
- Exploration and development in the area covered by the DEIS will help keep the Trans-Alaska Pipeline system a viable part of the nation's energy infrastructure;
- There is a need for more oil and gas development to increase economic opportunity;
- Indirect hiring, such as for Marine Mammal Observers, is beneficial to the economy; and
- When the benefits of the oil and gas activities that were considered as part of this analysis are weighed against the temporary environmental effects (and lack of adverse long term impacts), the benefits outweigh the effects.

Subsistence Resource Protection (SRP)

SRP Comments on need to protect subsistence resources and potential impacts to these resources. Can include ocean resources as our garden, contamination (SUBSISTENCE ANIMALS, HABITAT).

SRP 1 The DEIS is lacking in an in-depth analysis of impacts to subsistence. NMFS should analyze the following in more detail:

- Effects of oil and gas activities on subsistence resources and how climate change could make species even more vulnerable to those effects;
- The discussion of subsistence in the section on oil spills;
- Long-term impacts to communities from loss of our whale hunting tradition;
- Impacts on subsistence hunting that occur outside the project area, for example, in the Canadian portion of the Beaufort Sea; and
- Impacts associated with multiple authorizations taking place over multiple years.

SRP 2 Subsistence hunters are affected by industrial activities in ways that do not strictly correlate to the health of marine mammal populations, such as when marine mammals deflect away from exploration activities, hunting opportunities may be lost regardless of whether or not the deflection harms the species as a whole.

SRP 3 NMFS should include consultation with other groups of subsistence hunters in the affected area, including the Village of Noatak and indigenous peoples in Canada.

SRP 4 Many people depend on the Beaufort and Chukchi seas for subsistence resources. Protection of these resources is important to sustaining food sources, nutrition, athletics, and the culture of Alaskan Natives for future generations.

SRP 5 Industrial activities adversely affect subsistence resources; resulting in negative impacts that could decrease food security, and encourage consumption of store-bought foods with less nutritional value.

SRP 6 NMFS should use the information acquired on subsistence hunting grounds and provide real information about what will happen in these areas and when, and then disclose what the impacts will be to coastal villages.

SRP 7 Exploratory activities occurring during September and October could potentially clash with the migratory period of the Beluga and bowhead whales perhaps requiring hunters to travel further to hunt and potentially reducing the feasibility of the hunt. Even minor disruptions to the whale's migration pathway can seriously affect subsistence hunts.

SRP 8 NMFS must ensure oil and gas activities do not reduce the availability of any affected population or species to a level insufficient to meet subsistence needs.

SRP 9 If an oil spill the size of the one in the Gulf of Mexico were to happen in the Arctic, subsistence resources would be in jeopardy, harming communities' primary sources of nutrition and culture.

SRP 10 NMFS need to consider not only subsistence resources, but the food, prey, and habitat of those resources.

SRP 11 Subsistence resources could be negatively impacted by exploratory activities. Specific comments include:

- Concerns about the health and welfare of the animals, with results such as that the blubber is getting too hard, as a result of seismic activity;
- Reduction of animals;
- Noise from seismic operations, exploration drilling, and/or development and production activities may make bowhead whales skittish and more difficult to hunt;
- Aircraft associated with oil and gas operations may negatively affect other subsistence resources, including polar bears, walrus, seals, caribou, and coastal and marine birds, making it more difficult for Alaska Native hunters to obtain these resources;
- Water pollution could release toxins that bioaccumulate in top predators, including humans; and
- Increased shipping traffic and the associated noise are going to impact whaling and other marine mammal subsistence activities.

SRP 12 The draft EIS must also do more to address the potential for harm to coastal communities due to the perceived contamination of subsistence resources. The draft EIS cites to studies demonstrating that perceived contamination is a very real issue for local residents, and industrialization at the levels contemplated by the draft EIS would undoubtedly contribute to that belief.

Use of Traditional Knowledge (UTK)

UTK Comments regarding how traditional knowledge (TK) is used in the document or decision making process, need to incorporate TK, or processes for documenting TK.

UTK 1 Applying the traditional knowledge is not only observing the animals, but also seeing the big picture, big picture meaning the Arctic environment.

UTK 2 There hasn't been enough contracting with our local expertise. Contracting has been involved with Barrow Village Corporation and Wainwright, but not with smaller village corporations in regards to biological studies and work. Communities feel they are being left out of the decision making process, and others come up with decisions that are impacting them.

UTK 3 There needs to be a clear definition of what that traditional knowledge is.

UTK 4 Specific Traditional Knowledge that NMFS should be included in the DEIS. Comments include:

- The selection of specific deferral areas should be informed by the traditional knowledge of our whaling captains and should be developed with specific input of each community;
- NMFS must incorporate the traditional knowledge of our whaling captains about bowhead whales. Their ability to smell, their sensitivity to water pollution, and the potential interference with our subsistence activity and/or tainting of our food; and
- Primary hunting season is usually from April until about August, for all animals. It starts in January for seals. Most times it is also year-round, too, with climate change, depending on the migration of the animals. Bowhead hunts start in April, and beluga hunts are whenever they migrate; usually starting in April and continuing until the end of summer.

UTK 5 To be meaningful, NMFS must obtain and incorporate traditional knowledge before it commits to management decisions that may adversely affect subsistence resources.

UTK 6 Gathering and using traditional knowledge will require both a precautionary and adaptive approach. NMFS should make a better effort to ensure that traditional knowledge truly informs the final EIS and preferred alternative.

UTK 7 There needs to be some protection against the incidental sharing of Traditional Knowledge, with written consent and accountability for use.

Vessel Operations and Movements (VOM)

VOM Comments regarding vessel operations and movements.

VOM 1 Vessel transit to lease holding areas are not included in regulatory jurisdiction so requirements provide unwarranted restrictions.

VOM 2 Vessel transit speeds need to include AEWC's conflict avoidance agreements which includes speed restrictions.

VOM 3 Consider development of Arctic shipping routes and increased ship traffic and resulting impacts.

VOM 4 North Slope communities are concerned about the increase in vessel traffic and the impact this will have on marine mammals.

Water and Air Quality (WAQ)

WAQ Comments regarding water and air quality, including potential to impact or degrade these resources.

WAQ 1 The effects of greenhouse gases are of concern, with regards to sea level rise and ocean acidification that occurs with fossil fuel combustion

WAQ 2 Increases in oil and gas exploration would inevitably bring higher levels of pollution and emissions. Discharges, oil spills, increases in air traffic and drill cuttings could all cause both water and air damage causing potential effects on human health and the overall environment.

WAQ 3 The air quality analysis on impacts is flawed and needs more information. Reliance on recent draft air permits is not accurate especially for the increases in vessel traffic due to oil and gas exploration. All emissions associated with oil and gas development need to be considered not just those that are subject to direct regulation or permit conditions. Emissions calculations need to include vessels outside the 25 mile radius not just inside. Actual icebreaker emissions need to be included also. This will allow more accurate emissions calculations. The use of stack testing results and other emissions calculations for Arctic operations are recommended.

WAQ 4 Many operators have agreed to use ultra low sulfur fuel or low sulfur fuel in their operations, but those that do not agree have to be accounted for. The use of projected air emissions for NOx and SOz need to be included to account for those that do not use the lower fuel grades.

WAQ 5 Since air permits have not yet been applied for by oil companies engaging in seismic or geological and geophysical surveys, control factors should not be applied to them without knowing the actual information.

WAQ 6 Concerns about the potential for diversion of bowhead whales and other subsistence species due to water and air discharges. The location of these discharges, and waste streams, and where they will overlap between the air and water needs to be compared to the whale migrations and discern the potential areas of impact.

WAQ 7 The evaluation of potential air impacts is now outdated. The air quality in Alaska is no longer regulated by EPA and the Alaska DEC, and is no longer subject to EPA's OCS regulations and air permitting requirements. The new regulatory authority is the Department of the Interior. This shows that at least some sources will not be subject to EPA regulations or air permitting

WAQ 8 Other pollutants are a cause of concern besides just CO and PM. What about NOX, and PM2.5 emissions? All of these are of concern in the Alaska OCS.

WAQ 9 The use of exclusion zones around oil and gas activities will not prevent pollutant levels above regulatory standards. Air pollution is expected to be the highest within the exclusion zones and likely to exceed applicable standards. A full and transparent accounting of these impacts needs to be assessed.

WAQ 10 The DEIS needs to analyze the full size of the emissions potential of the equipment that the oil companies are intending to operate in these areas

WAQ 11 Identify the total number of oil and gas projects that may be expected to operate during a single season in each sea, the potential proximity of such operations, and the impacts of multiple and/or clustered operations upon local and regional air quality.

WAQ 12 Native Alaskans expressed concerned about the long term effects of dispersants, air pollution, and water pollution. All emissions must be considered including drilling ships, vessels, aircraft, and secondary pollution like ozone and secondary particulate matters. Impacts of water quality and discharges tainting subsistence foods which is considered likely to occur.

WAQ 13 The final EIS should include updated data sources including:

- Preliminary results from the Kotzebue Air Toxics Monitoring Study which should be available from the DEC shortly.
- Data collected from the Red Dog Mine lead monitoring program in Noatak and Kivalina.

WAQ 14 Page 4-21, paragraph three should reference the recently issued Ocean Discharge Criteria Evaluation (ODCE) that accompanies the draft Beaufort Sea and Chukchi Sea NPDES General Permits, which has more recent dispersal modeling.

WAQ 15 The recently released Ocean Discharge Criteria Evaluations (ODCEs) for the Beaufort and Chukchi Sea were developed by the EPA and released for public comment. These evaluations should be referenced in the Final EA to clarify the “increased concentration” language used on page 4-56.

APPENDIX A

Submission and Comment Index

Commenter	Submission ID	Comments
Abramaitis, Loretta	2827	CEF 9, OSR 5
AEWC Aiken, Johnny	3778	ALT 22, ALT 23, ALT 33, CEF 2, CEF 5, CEF 7, CEF 8, CEF 12, COR 7, COR 14, COR 18, DATA 2, DATA 5, EDI 3, MIT 21, MIT 57, MIT 105, MIT 106, MIT 107, MIT 108, MIT 109, MIT 110, MIT 111, MIT 112, MMI 13, MMI 34, NEP 1, NEP 11, NEP 35, NEP 52, REG 2, REG 3, REG 4, REG 6, REG 19, REG 20, REG 21, REG 22, RME 6, UTK 4
Anchorage Public Meeting	13142	ALT 2, ALT 4, ALT 5, ALT 7, ALT 8, ALT 9, ALT 14, CEF 2, CEF 5, CEF 6, CEF 7, CEF 8, CEF 9, CEF 10, COR 8, COR 10, COR 11, DCH 2, GPE 1, GSE 1, GSE 5, MIT 3, MIT 4, MIT 21, MIT 23, MIT 24, MIT 38, MIT 78, MMI 6, MIT 132, MIT 133, MIT 134, NED 1, NED 2, NED 3, NEP 1, NEP 4, NEP 5, NEP 7, NEP 10, NEP 11, NEP 13, NEP 14, NEP 15, NEP 16, NEP 17, NEP 51, OSR 1, OSR 5, REG 3, REG 7, REG 24, RME 1, RME 23, RME 33, RME 35, RME 39, SEI 5, SRP 4, SRP 7, SRP 11, UTK 5, WAQ 12
Barrow Public Meeting	13144	ACK 1, CEF 4, CEF 7, CEF 8, CEF 10, COR 1, COR 3, COR 7, DCH 4, GPE 7, GSE 3, ICL 1, ICL 3, MIT 21, MIT 57, MIT 103, MIT 133, MIT 136, MMI 41, NEP 48, OSR 1, OSR 5, OSR 19, OSR 20, PER 3, REG 2, RME 2, RME 35, RME 40, SRP 4, SRP 10, UTK 1, UTK 2, UTK 3, UTK 4, UTK 5, UTK 7, WAQ 12
Bednar, Marek	3002	ACK 1
Black, Lester (Skeet)	2095	MIT 6, NED 2, SEI 3, SEI 5
Boone, James	2394	CEF 9, MIT 1, OSR 1, REG 3
Bouwmeester, Hanneke	82	MMI 1, REG 1
North Slope Borough Brower, Charlotte	3779	ALT 19, ALT 23, ALT 24, CEF 5, CEF 9, DATA 3, DATA 17, DATA 21, DATA 22, EDI 1, EDI 4, EDI 5, EDI 9, EDI 11, EDI 12, EDI 14, GSE 4, MIT 21, MMI 1, MMI 2, MIT 103, MMI 5, MIT 113, MIT 114, MIT 115, MMI 26, MMI 27, MMI 28, MMI 29, MMI 32, NEP 36, OSR 1, OSR 3, OSR 11, OSR 14, OSR 15, OSR 16, OSR 17, OSR 23, OSR 24, RME 1, RME 14, RME 20, RME 21, RME 22, RME 23, RME 24, RME 25, RME 26, RME 37, RME 39
Conocophillips Brown, David	3775	ALT 5, ALT 7, ALT 9, ALT 12, ALT 14, ALT 32, COR 11, COR 22, MIT 3, MIT 4, MIT 10, MIT 23, MIT 24, MIT 25, MIT 28, MIT 78, MMI 1, MIT 102, MMI 10, NEP 1, NEP 4, NEP 5, NEP 7, NEP 11, NEP 12, NEP 14, NEP 16, NEP 17, NEP 21, REG 7
Burnell Gutsell, Anneke-Reeve	1964	CEF 9, MIT 1, OSR 5, REG 3, RME 1
Cagle, Andy	81	ALT 1, OSR 5, WAQ 1

Commenter	Submission ID	Comments
Alaska Inter-Tribal Council Calcote, Delice	2093	ALT 1, ALT 2, CEF 4, CEF 5, CEF 7, COR 1, EDI 3, ICL 2, MIT 1, NEP 2, NEP 13, OSR 7, RME 2, RME 35, SEI 4
Childs, Jefferson	3781	ALT 10, DATA 3, EDI 15, GPE 5, GPE 6, HAB 3, MIT 103, MMI 8, MMI 38, MMI 39, MMI 40, NEP 13, NEP 16, NEP 47, REG 9, RME 8, RME 28, RME 32, RME 39
Christiansen , Shane B.	80	ACK 1
Cornell University Clark, Christopher	3772	CEF 5, CEF 9, CEF 10, DATA 2, MIT 91, MIT 92, MIT 93, MMI 22, RME 2, RME 18, RME 19
Clarke, Chris	76	ALT 1, NED 4
Cummings, Terry	87	ALT 1, MMI 45, OSR 1, OSR 22, SRP 4
Danger, Nick	77	SEI 5
Davis, William	2884	CEF 9, MIT 1, OSR 5, REG 3, RME 1
International Fund for Animal Welfare Flocken, Jeffrey	3762	ALT 2, CEF 4, CEF 9, CEF 11, COR 9, MIT 21, MIT 50, MIT 51, MIT 52, MIT 53, MIT 54, MIT 55, OSR 1, OSR 11, RME 6, RME 9, RME 38
Foster, Dolly	89	SRP 3
ION Geophysical Corporation Gagliardi, Joe	3761	ALT 7, ALT 13, ALT 18, CEF 6, COR 11, EDI 1, EDI 2, EDI 3, EDI 8, EDI 9, EDI 13, HAB 4, MIT 23, MIT 24, MIT 32, MIT 33, MIT 37, MIT 38, MIT 39, MIT 40, MIT 41, MIT 42, MIT 43, MIT 44, MIT 45, MIT 46, MIT 47, MIT 48, MIT 49, MMI 10, NEP 8, NEP 9, NEP 11, REG 7, SEI 1
Giessel, Sen., Cathy	2090	NEP 7, REG 7
Arctic Slope Regional Corporation Glenn, Richard	3760	CEF 5, EDI 10, EDI 12, MIT 34, MIT 35, MIT 36, NED 1, NED 2, NEP 7, NEP 11, NEP 12, OSR 5, OSR 21, SEI 2, SEI 3, SEI 5
Harbour, Dave	3773	REG 7, SEI 2
Ocean Conservancy Hartsig, Andrew	3752	ALT 5, ALT 23, CEF 1, CEF 2, CEF 8, CEF 9, CEF 12, DATA 2, DATA 9, DATA 10, EDI 3, EDI 4, EDI 7, EDI 10, GPE 2, MIT 20, MIT 21, MIT 22, MIT 57, MMI 2, MMI 14, MMI 15, NEP 14, NEP 15, OSR 3, OSR 8, REG 10, RME 1, RME 2, RME 9, RME 35, RME 43, SRP 5, SRP 8, SRP 11, UTK 5, UTK 6

Commenter	Submission ID	Comments
The Pew Environmental Group Heiman, Marilyn	3752	ALT 5, ALT 23, CEF 1, CEF 2, CEF 8, CEF 9, CEF 12, DATA 2, DATA 9, DATA 10, EDI 3, EDI 4, EDI 7, EDI 10, GPE 2, MIT 20, MIT 21, MIT 22, MIT 57, MMI 2, MMI 14, MMI 15, NEP 14, NEP 15, OSR 3, OSR 8, REG 10, RME 1, RME 2, RME 9, RME 35, RME 43, SRP 5, SRP 8, SRP 11, UTK 5, UTK 6
Hicks, Katherine	2261	COR 13, NED 1, NED 3, NEP 11, SEI 5
Hof, Justin	83	ALT 2
Greenpeace Howells, Dan	3753	ALT 2, ALT 5, ALT 7, CEF 2, COR 4, DATA 11, EDI 1, GSE 1, GSE 6, GSE 8, GSE 9, OSR 5, OSR 9, REG 2, REG 11, SRP 1, SRP 7
World Wildlife Fund Hughes, Layla	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
Natural Resources Defense Council Jasny, Michael	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44,

Commenter	Submission ID	Comments
		NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
National Ocean Industries Association Johnson, Luke	3766	ALT 3, ALT 4, ALT 5, ALT 7, ALT 9, ALT 14, ALT 15, ALT 16, ALT 25, ALT 26, ALT 27, ALT 28, CEF 5, CEF 6, DATA 14, DATA 15, DATA 16, EDI 1, EDI 2, EDI 3, EDI 4, MIT 3, MIT 10, MIT 23, MIT 24, MIT 28, MIT 32, MIT 35, MIT 43, MIT 46, MIT 60, MIT 61, MIT 62, MIT 63, MIT 64, MIT 65, MIT 66, MIT 67, MIT 68, MIT 69, MIT 70, MIT 71, MIT 72, MIT 76, MMI 1, MMI 10, MMI 16, MMI 17, MMI 18, MMI 19, MMI 20, NED 1, NEP 5, NEP 11, NEP 16, NEP 20, NEP 21, NEP 22, NEP 23, NEP 24, NEP 25, NEP 26, NEP 27, NEP 28, NEP 30, NEP 53, REG 7, REG 12, REG 13, REG 14, RME 10, SEI 1, SEI 2
Friends of the Earth Kaltenstein, John	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
Kivalina Public Meeting	13146	COR 1, COR 6, NEP 49, OSR 5, OSR 11
Kotzebue Public Meeting	13145	CEF 9, EDI 14, ICL 1, MIT 137, MIT 138, MIT 139, MMI 42, MMI 43, REG 25, RME 2, SRP 4
U.S. Chamber of Commerce Kovacs, William L.	3766	ALT 3, ALT 4, ALT 5, ALT 7, ALT 9, ALT 14, ALT 15, ALT 16, ALT 25, ALT 26, ALT 27, ALT 28, CEF 5, CEF 6, DATA 14, DATA 15, DATA 16, EDI 1, EDI 2, EDI 3, EDI 4, MIT 3, MIT 10, MIT 23, MIT 24, MIT 28, MIT 32, MIT 35, MIT 43, MIT 46, MIT 60, MIT 61, MIT 62, MIT 63, MIT 64, MIT 65, MIT 66, MIT 67, MIT 68, MIT 69, MIT

Commenter	Submission ID	Comments
		70, MIT 71, MIT 72, MIT 76, MMI 1, MMI 10, MMI 16, MMI 17, MMI 18, MMI 19, MMI 20, NED 1, NEP 5, NEP 11, NEP 16, NEP 20, NEP 21, NEP 22, NEP 23, NEP 24, NEP 25, NEP 26, NEP 27, NEP 28, NEP 30, NEP 53, REG 7, REG 12, REG 13, REG 14, RME 10, SEI 1, SEI 2
Krause, Danielle	3625	CEF 9, MIT 1, OSR 5, REG 3, RME 1
Lambertsen, Richard	2096	MIT 7
Pacific Environment Larson, Shawna	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
Lish, Chris	3763	ALT 2, CEF 9, MIT 1, NEP 16, OSR 5, REG 3, RME 1
Locascio, Julie	86	ACK 1
Lopez, Irene	88	ALT 2, HAB 1
Shell Alaska Venture Macrander, Michael	3768	ALT 3, ALT 4, ALT 5, ALT 7, ALT 9, ALT 11, ALT 14, ALT 18, ALT 19, ALT 31, CEF 5, CEF 9, CEF 12, COR 5, COR 8, COR 10, COR 11, COR 13, COR 16, COR 21, COR 22, DATA 5, DATA 12, DATA 17, DATA 18, DATA 19, DCH 2, DCH 3, EDI 1, EDI 2, EDI 3, EDI 4, EDI 5, EDI 7, EDI 8, EDI 9, EDI 10, EDI 11, EDI 12, EDI 13, EDI 16, GPE 3, GPE 9, GSE 1, GSE 7, MIT 3, MIT 10, MIT 21, MIT 23, MIT 24, MIT 28, MIT 29, MIT 32, MIT 33, MIT 39, MIT 43, MIT 46, MIT 48, MIT 49, MIT 69, MIT 71, MIT 72, MIT 77, MIT 78, MIT 79, MIT 80, MIT 81, MIT 82, MIT 83, MIT 84, MIT 85, MIT 86, MIT 87, MIT 88, MIT 89, MIT 90, MMI 10, MMI 44, MMI 45, MMI 46, NED 3, NEP 9, NEP 10, NEP 11, NEP 12, NEP 16, NEP 21, NEP 26, NEP 29, NEP 30, NEP 31, NEP 32, NEP 33, OSR 21, REG 7, REG 13, REG 15, REG 16, REG 17, RME 15,

Commenter	Submission ID	Comments
		RME 16, RME 17, RME 37, RME 45, SEI 1, SEI 2, SEI 5, VOM 1
Loggerhead Instruments Mann, David	3772	CEF 5, CEF 9, CEF 10, DATA 2, MIT 91, MIT 92, MIT 93, MMI 22, RME 2, RME 18, RME 19
Earthjustice Mayer, Michael	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
Oceana Mecum, Brianne	3774	ALT 1, ALT 2, CEF 5, COR 12, DATA 20, EDI 5, MIT 34, MIT 57, MIT 94, MIT 95, MIT 96, MIT 97, MIT 98, MIT 99, MIT 100, MIT 101, MIT 106, MMI 11, MMI 23, OSR 1, RME 4, RME 27, RME 36, RME 39, WAQ 2
Northern Alaska Environmental Center Miller, Pamela A.	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31,

Commenter	Submission ID	Comments
		RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
University of St. Andrews Miller, Patrick	3772	CEF 5, CEF 9, CEF 10, DATA 2, MIT 91, MIT 92, MIT 93, MMI 22, RME 2, RME 18, RME 19
Miller, Peter	2151	CEF 9, MIT 1, OSR 5, REG 3, RME 1
U.S. Oil & Gas Association Modiano, Alby	3766	ALT 3, ALT 4, ALT 5, ALT 7, ALT 9, ALT 14, ALT 15, ALT 16, ALT 25, ALT 26, ALT 27, ALT 28, CEF 5, CEF 6, DATA 14, DATA 15, DATA 16, EDI 1, EDI 2, EDI 3, EDI 4, MIT 3, MIT 10, MIT 23, MIT 24, MIT 28, MIT 32, MIT 35, MIT 43, MIT 46, MIT 60, MIT 61, MIT 62, MIT 63, MIT 64, MIT 65, MIT 66, MIT 67, MIT 68, MIT 69, MIT 70, MIT 71, MIT 72, MIT 76, MMI 1, MMI 10, MMI 16, MMI 17, MMI 18, MMI 19, MMI 20, NED 1, NEP 5, NEP 11, NEP 16, NEP 20, NEP 21, NEP 22, NEP 23, NEP 24, NEP 25, NEP 26, NEP 27, NEP 28, NEP 30, NEP 53, REG 7, REG 12, REG 13, REG 14, RME 10, SEI 1, SEI 2
Statoil USA E&P Inc. Moore, Bill	3758	ALT 9, ALT 14, DATA 38, EDI 3, EDI 4, EDI 5, EDI 8, EDI 9, MIT 3, MIT 33, MMI 2, NEP 4, NEP 7, NEP 11, NEP 12, NEP 14, REG 3
Alaska Oil and Gas Association Moriarty, Kara	3754	ALT 4, ALT 9, ALT 12, ALT 14, ALT 32, COR 22, EDI 7, MIT 10, MIT 23, MIT 24, MIT 25, MMI 1, MMI 10, NEP 1, NEP 4, NEP 5, NEP 7, NEP 11, NEP 12, NEP 17, REG 3, REG 7
Mottishaw, Petra	3782	CEF 7, NED 1, REG 3, RME 1
Oceana Murray, Susan	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11

Commenter	Submission ID	Comments
Audubon Alaska Myers, Eric F.	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
National Resources Defense Council (form letter containing 36,445 signatures)	3784	ALT 1, MMI 1, OSR 5
Center for Biological Diversity Noblin, Rebecca	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11

Commenter	Submission ID	Comments
Duke University Nowacek, Douglas P.	3772	CEF 5, CEF 9, CEF 10, DATA 2, MIT 91, MIT 92, MIT 93, MMI 22, RME 2, RME 18, RME 19
International Association of Drilling Contractors Petty, Brian	3766	ALT 3, ALT 4, ALT 5, ALT 7, ALT 9, ALT 14, ALT 15, ALT 16, ALT 25, ALT 26, ALT 27, ALT 28, CEF 5, CEF 6, DATA 14, DATA 15, DATA 16, EDI 1, EDI 2, EDI 3, EDI 4, MIT 3, MIT 10, MIT 23, MIT 24, MIT 28, MIT 32, MIT 35, MIT 43, MIT 46, MIT 60, MIT 61, MIT 62, MIT 63, MIT 64, MIT 65, MIT 66, MIT 67, MIT 68, MIT 69, MIT 70, MIT 71, MIT 72, MIT 76, MMI 1, MMI 10, MMI 16, MMI 17, MMI 18, MMI 19, MMI 20, NED 1, NEP 5, NEP 11, NEP 16, NEP 20, NEP 21, NEP 22, NEP 23, NEP 24, NEP 25, NEP 26, NEP 27, NEP 28, NEP 30, NEP 53, REG 7, REG 12, REG 13, REG 14, RME 10, SEI 1, SEI 2
World Wildlife Fund Pintabutr, America May	3765	ALT 2
Point Hope Public Meeting	13147	COR 10, GPE 8, GSE 6, ICL 1, MIT 105, NEP 51, OSR 1, RME 1, RME 41, SRP 4, SRP 11, UTK 2
Resource Development Council Portman, Carl	2303	ALT 4, ALT 7, DCH 2, MIT 3, MIT 10, NED 3, NEP 1, NEP 10, NEP 11, NEP 12, REG 7, SEI 5
American Petroleum Institute Radford, Andy	3766	ALT 3, ALT 4, ALT 5, ALT 7, ALT 9, ALT 14, ALT 15, ALT 16, ALT 25, ALT 26, ALT 27, ALT 28, CEF 5, CEF 6, DATA 14, DATA 15, DATA 16, EDI 1, EDI 2, EDI 3, EDI 4, MIT 3, MIT 10, MIT 23, MIT 24, MIT 28, MIT 32, MIT 35, MIT 43, MIT 46, MIT 60, MIT 61, MIT 62, MIT 63, MIT 64, MIT 65, MIT 66, MIT 67, MIT 68, MIT 69, MIT 70, MIT 71, MIT 72, MIT 76, MMI 1, MMI 10, MMI 16, MMI 17, MMI 18, MMI 19, MMI 20, NED 1, NEP 5, NEP 11, NEP 16, NEP 20, NEP 21, NEP 22, NEP 23, NEP 24, NEP 25, NEP 26, NEP 27, NEP 28, NEP 30, NEP 53, REG 7, REG 12, REG 13, REG 14, RME 10, SEI 1, SEI 2
Marine Mammal Commission Ragen, Timothy J.	3767	ALT 5, ALT 8, ALT 19, ALT 28, ALT 30, CEF 12, COR 8, COR 10, EDI 3, EDI 8, EDI 9, MIT 73, MIT 74, MIT 75, MIT 76, MIT 77, MMI 21, NEP 14, REG 2, REG 3, REG 4, REG 5, RME 6, RME 11, RME 13, RME 14, RME 43
Randelia, Cyrus	78	ACK 1, CEF 5, OSR 2, OSR 3
The Nature Conservancy Reed, Amanda	3764	CEF 10, COR 12, COR 20, DATA 13, EDI 5, EDI 11, EDI 12, GPE 3, MIT 56, MIT 57, MIT 58, MIT 59, NEP 15, OSR 1, OSR 11, OSR 12, OSR 22, RME 1, RME 2, RME 9, RME 35

Commenter	Submission ID	Comments
US EPA, Region 10 Reichgott, Christine	3783	DATA 34, MIT 131
Reiner, Erica	2098	NEP 16, PER 1, REG 11
Sierra Club Ritzman, Dan	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
Cultural REcyclists Robinson, Tina	3759	ALT 2, CEF 2, CEF 12, GPE 3, NEP 13, OSR 10
Rossin, Linda	3548	CEF 9, MIT 1, OSR 5, REG 3, RME 1
Schalavin, Laurel	79	NED 1, SEI 5
Alaska Wilderness League Shogan, Cindy	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG

Commenter	Submission ID	Comments
		23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
Sierra Club (form letter containing 12,991 signatures)	90	ALT 1, CEF 9, MIT 1, OSR 5, REG 3, RME 1
Simon, Lorali	2094	MIT 3, MIT 4, MIT 5, REG 7
Center for Regulatory Effectivness Slaughter, Scott	2306	DATA 6, DATA 7, DATA 8, DATA 13, EDI 2, EDI 3, MIT 3, MIT 11, MIT 12, MIT 30, MMI 10, RME 42
SEA Inc. Southall, Brandon	3772	CEF 5, CEF 9, CEF 10, DATA 2, MIT 91, MIT 92, MIT 93, MMI 22, RME 2, RME 18, RME 19
Ocean Conservation Research Stocker, Michael	2099	DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, GPE 1, GPE 2, MIT 8, MIT 9, MMI 5, MMI 6, MMI 7, MMI 8, MMI 9, NEP 2, NEP 3, OSR 2, PER 2, REG 8, RME 3, RME 4, RME 5, RME 43
Ocean Conservation Research Stocker, Michael	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
Stoutamyer, Carla	2465	CEF 9, MIT 1, REG 3

Commenter	Submission ID	Comments
AK Dept Natural Resources Sullivan, Daniel	3756	ALT 4, ALT 9, ALT 12, ALT 14, COR 5, COR 8, COR 15, DCH 1, EDI 1, EDI 2, EDI 3, EDI 4, EDI 7, EDI 8, EDI 9, EDI 10, EDI 11, EDI 12, EDI 13, GPE 4, GSE 1, GSE 7, GSE 8, MIT 3, MIT 23, MIT 26, MIT 27, MIT 28, MIT 29, MIT 30, MIT 31, MIT 32, NED 1, NED 3, NEP 6, NEP 7, NEP 12, NEP 18, NEP 19, REG 7, REG 9, RME 7, SEI 1, SEI 3, SEI 5, WAQ 13, WAQ 14, WAQ 15
Thorson, Scott	2097	ALT 4, NED 2, NED 3, NEP 11
International Association of Geophysical Contractors Tsoflias, Sarah	3766	ALT 3, ALT 4, ALT 5, ALT 7, ALT 9, ALT 14, ALT 15, ALT 16, ALT 25, ALT 26, ALT 27, ALT 28, CEF 5, CEF 6, DATA 14, DATA 15, DATA 16, EDI 1, EDI 2, EDI 3, EDI 4, MIT 3, MIT 10, MIT 23, MIT 24, MIT 28, MIT 32, MIT 35, MIT 43, MIT 46, MIT 60, MIT 61, MIT 62, MIT 63, MIT 64, MIT 65, MIT 66, MIT 67, MIT 68, MIT 69, MIT 70, MIT 71, MIT 72, MIT 76, MMI 1, MMI 10, MMI 16, MMI 17, MMI 18, MMI 19, MMI 20, NED 1, NEP 5, NEP 11, NEP 16, NEP 20, NEP 21, NEP 22, NEP 23, NEP 24, NEP 25, NEP 26, NEP 27, NEP 28, NEP 30, NEP 53, REG 7, REG 12, REG 13, REG 14, RME 10, SEI 1, SEI 2
World Society for the Protection of Animals Vale, Karen	3749	ALT 2, MMI 4, MMI 11, MMI 12, MMI 13, NEP 14, OSR 1, OSR 5, REG 3
Vishanoff, Jonathan	84	OSR 4, SRP 9
Wainwright Public Meeting	13143	ACK 1, GSE 5, MIT 135, NEP 50, SEI 5
Walker, Willie	2049	CEF 9, MIT 1, OSR 5, REG 3, RME 1
Defenders of Wildlife Weaver, Sierra	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31,

Commenter	Submission ID	Comments
		RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
The Wilderness Society Whittington-Evans, Nicole	3780	ALT 2, ALT 6, ALT 7, ALT 12, ALT 14, ALT 17, ALT 19, ALT 20, ALT 21, ALT 23, ALT 34, ALT 35, CEF 4, CEF 5, CEF 9, CEF 10, CEF 11, CEF 12, COR 17, DATA 1, DATA 2, DATA 3, DATA 4, DATA 5, DATA 12, DATA 13, DATA 22, DATA 23, DATA 24, DATA 25, DATA 26, DATA 27, DATA 28, DATA 29, DATA 30, DATA 31, DATA 32, DATA 33, DATA 37, EDI 11, GPE 3, GPE 4, GSE 4, GSE 9, HAB 3, MIT 21, MIT 54, MIT 57, MMI 1, MMI 2, MIT 103, MMI 6, MMI 8, MMI 10, MMI 11, MIT 116, MIT 118, MIT 119, MIT 120, MIT 121, MIT 122, MIT 123, MIT 124, MIT 125, MMI 25, MIT 126, MIT 127, MMI 27, MIT 128, MIT 129, MIT 130, MMI 30, MMI 31, MMI 32, MMI 33, MMI 34, MMI 35, MMI 36, MMI 37, MMI 41, NEP 14, NEP 16, NEP 21, NEP 27, NEP 35, NEP 37, NEP 38, NEP 39, NEP 40, NEP 41, NEP 42, NEP 43, NEP 44, NEP 45, NEP 46, OSR 1, OSR 16, OSR 18, OSR 21, REG 23, REG 26, RME 1, RME 7, RME 8, RME 12, RME 19, RME 23, RME 27, RME 28, RME 29, RME 30, RME 31, RME 32, RME 33, RME 34, SRP 1, SRP 2, SRP 12, WAQ 2, WAQ 3, WAQ 7, WAQ 8, WAQ 9, WAQ 10, WAQ 11
AEWC Winter, Chris	3778	ALT 22, ALT 23, ALT 33, CEF 2, CEF 5, CEF 7, CEF 8, CEF 12, COR 7, COR 14, COR 18, DATA 2, DATA 5, EDI 3, MIT 21, MIT 57, MIT 105, MIT 106, MIT 107, MIT 108, MIT 109, MIT 110, MIT 111, MIT 112, MMI 13, MMI 34, NEP 1, NEP 11, NEP 35, NEP 52, REG 2, REG 3, REG 4, REG 6, REG 19, REG 20, REG 21, REG 22, RME 6, UTK 4
Wittmaack, Christiana	85	ALT 2, MMI 2, MMI 3, OSR 1, OSR 6, SRP 9

APPENDIX B

PLACEHOLDER

Government to Government Comment Analysis Report

[Appendix B to be placed here]