MARINE MAMMAL COMMISSION

27 June 2013

Ms. Donna Wieting, Director
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway, Room 13705
Silver Spring, MD 20910-6233

Dear Ms. Wieting:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed (1) the supplemental draft environmental impact statement prepared by the National Marine Fisheries Service, in cooperation with the Bureau of Ocean Energy Management, on the effects of oil and gas activities in the Arctic Ocean and (2) the associated 29 March and 10 April 2013 *Federal Register* notices (78 Fed. Reg. 19212 and 21347, respectively). The Commission reviewed the earlier draft environmental impact statement and provided extensive comments on that document (see enclosed 28 February 2012 letter). However, many of the comments and recommendations in that letter were not reflected in the supplemental draft statement. The Commission provides the following recommendations and rationale for issues of remaining concern.

RECOMMENDATIONS

The Marine Mammal Commission recommends that the National Marine Fisheries Service—

- work with the Bureau of Ocean Energy Management to adopt a phased approach to oil and gas exploration activities in the U.S. Arctic, with increased levels of activities contingent on and supported by (1) adequate baseline information on the marine wildlife, habitats, and communities at risk from such operations, (2) a better understanding of the long-term and cumulative impacts of oil and gas exploration and other human activities on marine mammal populations in combination with impacts due to climate change, (3) mitigation measures that are proven to be effective at reducing injury and disturbance of marine mammals and avoiding adverse impacts on subsistence communities, and (4) enhanced capabilities for responding to oil spills in ice conditions;
- (1) choose its preferred alternative such that the total authorized taking of each species for all proposed activities would not exceed "small numbers," as specified in the incidental take provisions of the Marine Mammal Protection Act, (2) provide a basis for that conclusion, and (3) work with the Fish and Wildlife Service and the Commission to develop a policy that sets forth the criteria and/or thresholds for determining what constitutes "small numbers," "negligible impact," and "unmitigable adverse impact" when authorizing the incidental taking of marine mammals;
- include in its preferred alternative the areas subject to time-area restrictions identified under Alternative 5 and include Camden Bay in the list of those areas;

- work with the Bureau of Ocean Energy Management to (1) increase efforts to maximize the use of existing seismic data while minimizing the number and impacts of new seismic studies and (2) explore the possibility of requiring applicants to coordinate activities and/or share data under the Marine Mammal Protection Act;
- include as standard the enclosed list of mitigation, monitoring, and reporting measures for all Arctic oil and gas exploration activities;
- work with the Bureau of Ocean Energy Management, the oil and gas industry, and other relevant entities to improve the quality and usefulness of the data collected through the implementation of mitigation and monitoring measures, achieved through the specific actions identified in the narrative; and
- work with the Fish and Wildlife Service and other entities, as appropriate, to co-lead the development of a comprehensive, long-term monitoring program for the Arctic marine ecosystem, with marine mammals as a specific element of that program.

RATIONALE

A phased approach to oil and gas exploration activities

The Bureau of Ocean Energy Management is moving forward to develop offshore oil and gas reserves in the Arctic as part of the Administration's "all-of-the-above" energy strategy. The development of oil and gas reserves is expected to result in the taking of marine mammals and other marine resources. Accordingly, the National Marine Fisheries Service is using the analysis in its environmental impact statement to support the issuance of incidental take authorizations under the Marine Mammal Protection Act. The analysis provides a comprehensive description of the proposed exploration activities and associated activity levels, the affected environment, and the potential environmental impacts associated with each activity type and level. It also proposes a suite of standard and additional mitigation and monitoring measures that would serve to minimize potential impacts on marine mammals.

Despite the extensive information provided in the draft environmental impact statement and the supplemental draft statement, considerable uncertainty remains regarding the potential long-term and cumulative impacts of oil and gas exploration on marine mammal populations and the effectiveness of the proposed mitigation measures. Other factors, in addition to those associated with oil and gas exploration, have the potential to affect marine mammals, their prey, and habitats, including variations in ice cover, sea surface temperature, and generally increasing levels of human activity (Clement et al. 2013). The degree to which these factors, either individually or collectively, will affect the long-term health and survival of Arctic marine mammals remains to be seen.

To address this uncertainty, and in view of the potential for proposed oil and gas exploration activities to have more than a negligible impact on marine mammals and an adverse impact on the availability of marine mammals to Alaska Natives for subsistence uses, the Commission recommended in its 28 February 2012 letter that the Service consider a phased approach for authorizing increasing oil and gas activities. Such an approach would allow the responsible agencies to balance exploration of oil and gas reserves against associated environmental risks as they proceed cautiously in an adaptive management framework.

From the Commission's perspective, the four main concerns associated with oil and gas development in the Arctic are: (1) the lack of adequate baseline information on the abundance (including density), trends in abundance, distribution, and other life history parameters for several marine mammal species and stocks, (2) the potential for long-term, cumulative degradation of marine ecosystems to the extent that marine mammals and other species (including many that are listed as threatened or endangered under the Endangered Species Act) are forced to abandon their preferred habitat or are otherwise adversely affected, (3) the exposure of the Chukchi and Beaufort Sea ecosystems to large amounts of crude oil and other contaminants that could result from a spill and the lack of proven response capabilities in ice conditions, and (4) the potential for disturbance and resulting shifts in the distribution and/or abundance of marine mammals such that they are less readily available to Alaska Natives for subsistence use. Whether and to what extent these concerns occur in the Arctic will depend on how the Bureau, the Service, and the state of Alaska balance the pace of oil and gas development with the need to understand and minimize the impacts.

Significant investments have been made in oceanographic and biological data collection in the Arctic in the last several years. However, important data gaps still exist on the abundance and distribution of certain marine species and stocks and on the impacts of anthropogenic sound on marine mammals (Hutchinson and Ferrero 2011). Two recently initiated projects that will help identify important data gaps and direct further research and monitoring efforts are the National Oceanic and Atmospheric Administration's recently launched Synthesis of Arctic Research 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.

A more thorough understanding of cumulative impacts also would help inform decisions regarding the pace of oil and gas exploration in the Arctic. The Commission recognizes the difficulty of monitoring and evaluating the individual impacts of specific activities on marine ecosystems, let alone the combined impacts of multiple activities in a constantly changing environment. This is especially true for marine mammals, for which impacts resulting from the proposed action likely will involve behavioral changes in the affected marine mammals and/or impacts on prey species and habitats, the long-term biological significance of which are harder to assess than acute impacts such as injuries or deaths. Development of conceptual frameworks to analyze the cumulative impacts of varying sound sources and other stressors on Arctic marine mammals is the focus of ongoing research and modeling efforts (Lawson and Lesage 2012, Moore et al. 2012, NOAA 2012, Streever et al. 2012). Such frameworks would support a more quantitative approach to determine if, when, and where marine resources, including marine mammals, are being exposed to cumulative impacts that affect their conservation status or hinder their potential to grow and recover. An improved understanding and consideration of the cumulative impacts of human activities in the Arctic was also a key principle of developing a more holistic, integrated approach to management of the Arctic cited by the Interagency Working Group on Coordination of Domestic Energy Development and Permitting in Alaska (Clement et al. 2013).

The Department of the Interior recently reviewed Shell's 2012 Alaska offshore drilling program and concluded that Shell was not adequately prepared in terms of "fabricating and testing certain critical systems and establishing the scope of its operational plans" (DOI 2013). Notably, Shell was not able to deploy its Arctic Containment System, which the Department required to be

on site in the event of the loss of well control. The lack of a certified containment system prevented the company from fully executing its drilling plans. A phased approach would allow industry more time to enhance its ability to operate safely and responsibly in the challenging and unpredictable conditions found in the Arctic, and avoid the difficulties that Shell encountered during its 2012 summer drilling program.

Subsistence-based Alaska Native communities in the Arctic are concerned about the risks posed to the marine and coastal environments from oil and gas activities (see comments submitted by the Alaska Eskimo Whaling Commission, Alaska Inter-Tribal Council, and the Iñupiat Community of the Arctic Slope on the draft environmental impact statement[1]). The Alaska Eskimo Whaling Commission, in particular, has requested that the Service and the Bureau not proceed with the proposed levels of activity until a comprehensive management plan has been developed for the Arctic, in consultation with affected communities. Subsistence-based communities have emphasized consistently the importance of incorporating traditional knowledge and limiting exploration activities until the impacts of oil and gas exploration are fully understood and mitigated such that authorized activities do not adversely affect the availability of marine mammals for subsistence uses.

For all of these reasons, the Marine Mammal Commission recommends that the National Marine Fisheries Service work with the Bureau of Ocean Energy Management to adopt a phased approach to oil and gas exploration activities in the U.S. Arctic, with increased levels of activities contingent on and supported by (1) adequate baseline information on the marine wildlife, habitats, and communities at risk from such operations, (2) a better understanding of the long-term and cumulative impacts of oil and gas exploration and other human activities on marine mammal populations in combination with impacts due to climate disruption, (3) mitigation measures that are proven to be effective at reducing injury and disturbance of marine mammals and avoiding adverse impacts on subsistence communities, and (4) enhanced capabilities for responding to oil spills in ice conditions.

Proposed activity levels and associated take estimates

The Commission noted in its previous letter that, with the exception of the no action alternative, the range of action alternatives considered only two levels of activities, with the lower level of proposed activities resulting in a total acoustic footprint that would be significantly greater than at any time since the 1980s. As such, the Commission recommended that the Service expand the draft environmental impact statement to include a broader range of action alternatives that would ensure that oil and gas exploration activities have no more than a negligible impact on marine mammal species and stocks and not have adverse impacts on the Alaska Native communities that depend on marine mammals for subsistence, as required under the Marine Mammal Protection Act. Instead, the Service included in the supplemental draft statement action alternatives that had an even greater level of exploration activities (Level 3) than previously considered (see Table 1 for the number of exploration activities proposed for each action alternative).

To analyze the impacts of various projected activity levels, the Commission recommended in its previous letter that the Service estimate the site-specific acoustic footprints for all types of sound

[1] www.nmfs.noaa.gov/pr/pdfs/permits/arctic_deis_comments.pdf

sources at each sound threshold associated with the taking of marine mammals (i.e., 190, 180, 160, and 120 dB re 1 μPa), the estimated numbers of marine mammal takes, and their cumulative impacts. In the supplemental draft statement, the Service did not calculate acoustic footprints for specific activities, nor did it estimate takes from all sound sources (i.e., vertical seismic profilers and vertical cable surveys used as part of the drilling program, as recommended in the Commission's previous letter). However, it did estimate acoustic footprints for a range of source levels associated with different airgun array configurations at different depths, based on the current acoustic criteria and thresholds (Table 4.5-12). It also estimated the numbers of takes for each action alternative based on maximum proposed activity levels and average in-situ sound measurements from past seismic surveys and drilling programs and associated distances to the various received level thresholds (Table 4.2-7).

Table 1. Numbers of exploration activities proposed per year for each activity level and corresponding action alternative (adapted from Tables 4.2-1, 2, and 3). Note: Alternative 1 would have no actions authorized; Alternative 5 also includes time-area closures and Alternative 6 also includes the use of alternative technologies.

Proposed exploration activities	Activity Level 1 (Alternative 2)		Activity Level 2 (Alternative 3)		Activity Level 3 (Alternatives 4,5,6)	
	Beaufort	**Chukchi**	**Beaufort**	**Chukchi**	**Beaufort**	**Chukchi**
2D/3D deep penetration towed streamer seismic survey	2 surveys	2 surveys	3 surveys	4 surveys	3 surveys	4 surveys
In-ice 2D towed streamer seismic survey (using icebreaker)	1 survey	1 survey	1 survey	1 survey	1 survey	1 survey
Ocean bottom cable seismic survey	1 survey	No surveys	2 surveys	No surveys	2 surveys	No surveys
On-ice vibroseis seismic survey	1 survey	No surveys	1 survey	No survey	1 survey	No survey
Site clearance and high-resolution shallow hazards survey program*	3 programs	3 programs	5 programs	5 programs	5 programs	5 programs
Exploratory drilling program*	1 program	1 program	2 programs	2 programs	4 programs	4 programs

* The term "program" refers in the supplemental draft environmental impact statement to the number of surveys or exploratory drilling wells a particular company is planning to conduct in a given year.

The Commission is concerned that the estimated numbers of takes of bowhead whales in both the Chukchi and Beaufort seas represent a sizable increase from the numbers of takes associated with the current level of exploration activities. Estimated takes range from 3,895 whales for maximum activity levels associated with Alternative 2, to 6,805 whales for Alternative 3, to 9,965 whales for Alternative 4 (estimated takes were not provided for Alternatives 5 and 6). Even at the lowest activity level (Alternative 2), the estimated takes represent 23 percent of the current

population estimate of 16,892 whales (95% CI: 15,704 – 18,928) (International Whaling Commission Scientific Committee Report 2013). The highest activity level proposed in the supplemental draft environmental impact (Alternative 4) could expose 59 percent of that population to Level B harassment from oil and gas activities.

The Commission recognizes that the estimated numbers of takes of animals is but one component used by the Service to determine whether those takes are considered "small numbers" and in its analysis of "negligible impact" and "unmitigable adverse impact," as required under the Marine Mammal Protection Act. The Service also must consider the biological significance of the impacts (i.e., whether the takes will result in adverse impacts on the fitness or health of the individuals taken or cumulatively will have population-level effects), as well as required measures to mitigate such taking. However, even without detailed spatial and temporal information on the proposed activities and associated mitigation requirements, the numbers of estimated takes alone raise significant concerns for the affected populations.

The analysis of impacts appears to downplay the effect of increasing activity levels. For example, the agencies assert that Alternative 4 would have the same overall impact as Alternative 2 despite a substantial increase in the projected level of activities. The Commission does not understand the scientific justification for that conclusion given the increased numbers of estimated takes and uncertainty regarding how long-term, population-level effects on marine mammals will change with different levels of seismic and drilling activities. It also is not clear how the agencies support the determination that the proposed numbers of exploration activities would, individually or in combination, have no more than a negligible impact on marine mammals. For example, how did the Service conclude that taking from 23 to 59 percent of the bowhead whale population each year would be considered "small numbers," and that what the Service has determined to be "moderate to major impacts" on bowhead whales would be deemed negligible under the Marine Mammal Protection Act?

To ensure compliance with the incidental take provisions of the Marine Mammal Protection Act, the Marine Mammal Commission recommends that the National Marine Fisheries Service (1) choose its preferred alternative such that the total authorized taking of each species for all proposed activities would not exceed "small numbers," as specified in the incidental take provisions of the Marine Mammal Protection Act, (2) provide a basis for that conclusion, and (3) work with the Fish and Wildlife Service and the Commission to develop a policy that sets forth the criteria and/or thresholds for determining what constitutes "small numbers," "negligible impact," and "unmitigable adverse impact" when authorizing the incidental taking of marine mammals.

Time-area restrictions

One of the most effective ways to implement a phased approach to oil and gas exploration in the Arctic is to limit exploration activities to periods when and areas where marine mammals are less likely to be affected. The Service and the Bureau have included time-area restrictions in Alternative 5, based on information regarding important breeding, calving, resting, or foraging areas for bowhead whales and other species. The Service also has identified restrictions on exploration activities in certain areas in its proposed "additional mitigation measures" that would minimize conflicts with subsistence hunters. The Commission strongly supports the inclusion of the proposed

time-area restrictions as part of the preferred alternative adopted in the final environmental impact statement. However, the Commission has the specific concern that, in the supplemental draft statement, the Service no longer identified Camden Bay as an area that would be subject to time-area restrictions. Camden Bay is an important feeding and resting area for bowhead whales, including juveniles and females with calves (Koski et al. 2009). To reduce potential impacts of oil and gas activities in environmentally sensitive areas, the Marine Mammal Commission recommends that the National Marine Fisheries Service include in its preferred alternative the areas subject to time-area restrictions identified under Alternative 5 and include Camden Bay in the list of those areas.

Minimizing duplicative seismic surveys

The Service and the Bureau are considering activity levels that are greater than those initially proposed in the draft environmental impact statement. Although the exact location and timing of the additional activities were not identified, the activity levels associated with the action alternatives and the conceptual examples provided in Figures 4.3-1 through 4.5-3 of the supplemental draft statement indicate a significant increase in both seismic survey and drilling activities as compared to current levels. With those increased activity levels is the potential for significant duplication of survey effort.

The Commission repeatedly has expressed concern over the practice of allowing different companies or industry groups to conduct separate seismic surveys of the same area and thus duplicate effort in order to retain proprietary control of the data. That practice increases considerably underwater sound levels and associated risks to marine mammals. Authorizing such unnecessarily duplicative work is contrary to the Bureau's charge of balancing orderly resource development with protection of the human, marine, and coastal environments, as directed by the Outer Continental Shelf Lands Act (43 U.S.C. § 1331 et seq.), and the requirements of the incidental take provisions of the Marine Mammal Protection Act that such authorizations be structured to effect the least practicable impact on marine mammal species or stocks and their habitats (16 U.S.C. § 1371(a)(5)(A) and (D)). Regulations implementing the National Environmental Policy Act also require that, in their selection of preferred alternatives, agencies ensure that all practicable means to avoid or minimize environmental harm of each alternative have been adopted, and if they have not, explain why (40 C.F.R. Part 1505.2(c)).

Despite the fact that the supplemental draft statement indicates that both the Service and the Bureau are committed to supporting the reduction of unnecessary sound in the water, it goes on to explain that, based on the Outer Continental Shelf Lands Act and applicable regulations (30 C.F.R. Parts 550 and 551), the Bureau does not have the discretion to require companies to share proprietary data or combine seismic programs, to change lease terms, or to prevent companies from acquiring data separately in the same geographic area. The statement also notes that the Bureau does not have the authority to deny seismic permits simply on the grounds that they are duplicative—meaning that multiple surveys may be conducted to acquire the exact same data, using the exact same equipment and technology, in the exact same location. The statement further indicates that Section 101(a)(5) of the Marine Mammal Protection Act does not allow the Service to deny an incidental take authorization for a particular action prior to the case-specific analysis. Citing the apparent lack of regulatory authority under the Outer Continental Shelf Lands Act and the Marine Mammal Protection Act to limit duplicative surveys, the Service dismissed restrictions on seismic

surveys as a potential alternative and concluded also that it would not be practicable as a mitigation measure.

The Commission disagrees with the Service's conclusion and believes that other mechanisms are available to both the Service and the Bureau to eliminate or limit the potential for duplicative surveys, particularly area-wide 2D surveys. For example, both agencies should encourage the oil and gas industry to make the best use of existing, publicly available seismic data rather than re-surveying large areas of the Arctic for which seismic survey data already exist or conducting multiple overlapping surveys of the same areas. The Service and the Bureau also should encourage industry to provide broader access to seismic data that have been collected but that may not yet be in the public domain. This could help industry restrict the scope of future surveys to areas that show the most promise for oil and gas development. In addition, the agencies should encourage companies that are engaged in or interested in acquiring seismic data in the same areas to collaborate on data collection to limit the number of surveys that take place. Companies typically give notice of their intent to conduct seismic surveys well in advance of the open-water season, providing the Service and the Bureau with sufficient lead time to encourage such collaboration.

More needs to be done to reduce the level of seismic sound in the Arctic environment. To that end, the Marine Mammal Commission recommends that the National Marine Fisheries Service work with the Bureau of Ocean Energy Management to (1) increase efforts to maximize the use of existing seismic data while minimizing the number and impacts of new seismic studies and (2) explore the possibility of requiring applicants to coordinate activities and/or share data under the Marine Mammal Protection Act.

Mitigation, monitoring, and reporting measures

The Service has identified standard mitigation measures that would be applied to each type of authorized activity and additional, specific measures that would be required only for certain activities or operators, as appropriate. The Commission agrees that the list of standard mitigation measures should be incorporated in all incidental take authorizations issued by the Service and also should be included under the terms and conditions for the Bureau's issuance of geological and geophysical permits and ancillary activity and exploratory drilling approvals. However, some of the standard mitigation measures need to be clarified and/or expanded. In addition, the Service should exercise caution by including many of the "additional" mitigation, monitoring, and reporting measures as standard for Arctic oil and gas activities that are known or likely to produce underwater sound at frequencies and levels of concern for marine mammals, or that otherwise have the potential to disturb marine mammals. The rationale for including those measures can be found in past letters to the Service and are not repeated here. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service include as standard the enclosed list of mitigation, monitoring, and reporting measures for all Arctic oil and gas exploration activities.

The Marine Mammal Commission further recommends that the National Marine Fisheries Service work with the Bureau of Ocean Energy Management, the oil and gas industry, and other relevant entities to improve the quality and usefulness of the data collected through the implementation of mitigation and monitoring measures. This can be achieved through the following specific actions:

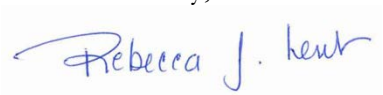
- provide guidance to operators regarding the appropriate method for estimating the numbers of marine mammals taken during the course of an activity (e.g., a seismic survey)—that guidance should be specific to ensure that take estimates are accurate and account for applicable g(0) and f(0) values;
- justify the determination that the mitigation and monitoring measures that rely on visual observations are sufficient to detect, with a high level of confidence, all marine mammals within or entering identified harassment zones;
- work with protected species observers, observer service providers, the Fish and Wildlife Service, the Commission, industry, and other stakeholders to establish and implement standards for protected species observer eligibility, training, debriefing/quality control, and conflict of interest;
- require or encourage operators to deploy a sufficient number of protected species observers on the source vessel and other vessels as appropriate to 1) increase the probability of detecting all marine mammals in or approaching the Level A and B harassment zones and 2) assist in the collection of data on activities, behavior, and movements of marine mammals around the source;
- establish requirements for analysis of data collected by protected species observers to ensure that those data are used both to estimate numbers of takes of marine mammals and to inform the continuing evaluation, development, and improvement of mitigation and monitoring measures;
- require operators to make the data associated with monitoring programs publicly available for evaluation by independent researchers; and
- continue to work with the Bureau and industry to assess the effectiveness of ramp-up as a mitigation measure.

Comprehensive long-term monitoring

In addition to project-specific monitoring measures, the Commission believes that, given the Arctic's rapidly changing marine environment, a comprehensive, long-term monitoring program is needed for this area to ensure that marine mammals and other valuable marine resources are adequately protected from potential adverse impacts of oil and gas exploration and development and other human activities. The program should include (1) a multidisciplinary approach to population-level assessments of environmental impacts on marine mammals and subsistence communities from oil and gas activities (such as exposure to oil and/or dispersants, underwater sound, increased vessel traffic, etc.), (2) an identified set of goals for eliminating, reducing, or mitigating the impacts of oil and gas activities, with metrics for evaluating the effectiveness of those measures, and (3) a 10-year monitoring strategy, with oversight and regular evaluation of progress by a science-based steering committee comprised of representatives from the National Marine Fisheries Service, Fish and Wildlife Service, Bureau of Ocean Energy Management, U.S. Geological Survey, Marine Mammal Commission, state of Alaska, North Slope Borough, Alaska Native organizations, academia, non-governmental organizations, and industry. The Marine Mammal Commission recommends that the National Marine Fisheries Service work with the Fish and Wildlife Service and other entities, as appropriate, to co-lead the development of a comprehensive, long-term monitoring program for the Arctic marine ecosystem, with marine mammals as a specific element of that program.

The Commission would welcome an opportunity to meet with the Service and the Bureau to address issues that are fundamental to the long-term health of the Arctic and to find solutions that would ensure a balanced approach to oil and gas exploration in this unique and dynamic environment. I look forward to hearing from you.

Sincerely,



Rebecca J. Lent, Ph.D.
Executive Director

cc: Dr. James Kendall, Bureau of Ocean Energy Management, Alaska Region, Anchorage, AK
Jill Lewandowski, Bureau of Ocean Energy Management, Herndon, VA
Jon Kurland, National Marine Fisheries Service, Alaska Regional Office, Juneau, AK
Deborah Pierce Williams, Fish and Wildlife Service, Anchorage, AK

Enclosures (2)

References

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Enclosure

Marine Mammal Commission-recommended standard mitigation, monitoring, and reporting measures for Arctic oil and gas exploration activities

Measures required for all activities:

- use in-situ measurements to verify the size of the Level A and B harassment zones for all sound sources (including seismic surveys, sub-bottom profilers, vertical seismic profiling, vertical cable surveys, drilling, icebreaking, support aircraft and vessels, etc.);
- authorize an in-season adjustment in the size of the Level A and B harassment zones only if they are determined to be inadequate in size (i.e., in-situ adjustments that would reduce the size of the zone(s) should not be authorized);
- establish and implement delay, power-down, and shut-down procedures to be followed when a marine mammal either approaches or is observed within the Level A harassment zones (i.e., 180 and 190 dB re 1 μPa for cetaceans and pinnipeds, respectively);
- establish and monitor the respective Level B harassment zones (i.e., 160 and 120 dB re 1 μPa for impulsive and continuous sources, respectively);
- require trained, Service-approved protected species observers on all seismic source vessels, drill ships and rigs, icebreaking vessels, and other designated vessels and aircraft to monitor the Level A and B harassment zones;
- require observers to monitor continuously for marine mammals for at least 30 minutes before, during, and for at least 30 minutes after seismic and other geophysical survey operations;
- cease operations when the Level A harassment zone is obscured by poor sighting conditions (i.e., during periods of fog, high sea states, or inclement weather and at night);
- use passive (or active) acoustic monitoring, in addition to visual monitoring, to increase detection capabilities;
- use Big Eyes and reticulated and/or laser range finding binoculars to 1) detect and estimate the location of marine mammals within the Level A and B harassment zones and 2) document activities, behavior, and movements of marine mammals within the Level A and B harassment zones;
- use night-vision devices for enhancing detection capabilities in low visibility conditions or darkness, such as forward-looking infrared or 360° thermal imaging;
- specify that aircraft overflights be limited 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);
- specify that vessels (1) reduce their speeds to 9 knots or less when transiting the Beaufort Sea, when within 274 m of whales, or when weather conditions or darkness reduce visibility; (2) reduce their speeds to 5 knots or less in the Beaufort Sea when weather conditions or darkness reduces visibility; (3) avoid changes in direction within 274 m of whales; and (4) use shipping or transit routes that avoid areas where marine mammals may occur in high densities, such as offshore ice leads;
- specify that aircraft and vessels avoid groups of ice seals by 0.8 km;

- report injured and dead marine mammals to the Service and local stranding network using the Service's phased approach and suspending activities, if appropriate; and
- submit field and technical reports and a final comprehensive report to the Service.

Measures required for 2D or 3D seismic surveys, including in-ice surveys, site clearance, and shallow hazards surveys:

- specify ramp-up procedures;
- restrict seismic surveys from operating within 145 km of one another;
- restrict the number of surveys to eliminate or limit the potential for duplicative seismic surveys;
- refrain from initiating or continuing seismic activities if (1) 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 the 160-dB re 1 μPa harassment zone or (2) a female-calf pair of either species is observed within the 120-dB re 1 μPa harassment zone.

Additional measures required for on-ice seismic surveys:

- conduct activities at least 152 m from any observed ringed seal lair;
- prohibit the placement of any energy source over, on, or near a ringed seal lair;
- use trained seal-lair sniffing dogs in areas where water depths exceed 3 m to locate seal structures in work areas and camp sites before initiation of activities; and
- use trained seal-lair sniffing dogs to survey the ice road and establish a route where no seal structures are present.

Additional measures required for drilling activities:

- cease drilling operations in mid- to late-September to reduce the possibility of having to respond to a large oil spill in ice conditions;
- 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 appropriate non-governmental organizations; and
- collect all new and recycled drilling muds, cuttings, and other discharges and either re-inject them or transport them to an Environmental Protection Agency-licensed treatment/disposal site outside the Arctic.

Additional measures required to ensure no unmitigable adverse impact on the availability of marine mammals to subsistence hunters:

- encourage the development of conflict avoidance agreements and/or facilitate development of more comprehensive plans of cooperation that (1) involve all potentially affected communities and co-management organizations in two-way communications and (2) account

for potential adverse impacts on all marine mammal species taken for subsistence purposes including, but not limited to, bowhead whales;

- restrict the transit of vessels into the Chukchi Sea prior to July 15 or until the beluga hunt is completed at Point Lay;
- require vessels transiting east of Bullen Point to the Canadian border to remain at least 8 km offshore when along the coast, provided ice and sea conditions allow;
- require temporal and spatial restrictions for the proposed activities, including within Camden Bay and those areas identified for time-area closures under Alternative 5 (i.e., Kaktovik and Cross Island, Barrow Canyon/Western Beaufort Sea, Hanna Shoal, the Beaufort Sea shelf break, Kasegaluk Lagoon, and Ledyard Bay critical habitat);
- restrict transit, exploration, and drilling activities in whale hunting areas (Nuiqsut (Cross Island), Kaktovik, Barrow, Wainwright, Point Hope, and Point Lay) based on real-time reporting from community-based subsistence advisors on whale presence and hunting activities;
- allow offshore transit in the Chukchi Sea under certain conditions (e.g. 32 km from the coast) only if beluga whale, fall bowhead whale (Barrow and Wainwright), and other marine mammal hunts would not be affected; and
- allow movement of drilling equipment or related vessels for exploratory drilling operations outside the barrier islands west of Cross Island only after the annual close of the bowhead whale hunt in Barrow.

28 February 2012

Mr. James H. Lecky, Director
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway, Room 13705
Silver Spring, MD 20910-6233

Dear Mr. Lecky:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed (1) the draft environmental impact statement prepared by the National Marine Fisheries Service, in cooperation with the Bureau of Ocean Energy Management, on the effects of oil and gas activities in the Arctic Ocean and (2) the associated 30 December 2011 *Federal Register* notice (76 Fed. Reg. 82275). The Commission provides the following recommendations and rationale.

RECOMMENDATIONS

The Marine Mammal Commission recommends that the National Marine Fisheries Service—

- (1) work with the Bureau of Ocean Energy Management to conduct supplemental activity-specific environmental analyses under the National Environmental Policy Act that provide detailed information on proposed seismic surveys and drilling activities and the associated environmental effects, (2) work with the Bureau and industry to ensure that the necessary information is available to estimate the number of takes as accurately as possible given current methods and data, (3) encourage the Bureau to 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, and (4) encourage the Bureau to make those analyses available for public review and comment before the Service makes its final determination regarding applications for incidental take authorizations;
- work with the Bureau of Ocean Energy Management to expand the draft environmental impact statement to include a broader range of alternatives that ensure that oil and gas 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; additional alternatives should include a phased 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 the industry's activities are, indeed, negligible as required by the Act;
- identify its preferred alternative, including the rationale for its selection;
- work with the Bureau of Ocean Energy Management to estimate the site-specific acoustic footprints for each sound threshold (i.e., 190, 180, 160, and 120 dB re 1 µPa) and the

- expected number of marine mammal takes, accounting for all types of sound sources and their cumulative impacts;
- work with the Bureau of Ocean Energy Management 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;
- revise the draft environmental impact statement to include a fuller analysis of each alternative and discuss whether it meets the requirements of the Marine Mammal Protection Act for issuing incidental take authorizations; to the extent that the information needed to make the determinations required under the Marine Mammal Protection Act is lacking, the Service should take steps to ensure that this information is available before an authorization is issued and should acknowledge that supplemental environmental analyses under the National Environmental Policy Act may be necessary;
- 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 (as identified below);
- include additional measures to verify compliance with mitigation measures and work with the Bureau of Ocean Energy Management and industry to improve the quality and usefulness of mitigation and monitoring measures (as identified below); and
- work with the Bureau of Ocean Energy Management, Fish and Wildlife Service, U.S. Geological Survey, state of Alaska, North Slope Borough, Alaska Native organizations, academia, non-governmental organizations, and industry to develop a comprehensive, long-term monitoring program for the Arctic ecosystem, including its marine mammal populations.

RATIONALE

Programmatic approach and site-specific analyses

The exploration, development, and production of oil and gas reserves in the Beaufort and Chukchi Seas may significantly affect Arctic marine mammal populations and the ocean and coastal ecosystems on which they depend. Risks include exposure to sound from seismic surveys and drilling operations; disturbance from aircraft and vessel traffic; habitat degradation from discharges of oil, drilling wastes, or other materials (e.g., fuel); and exposure to oil and other chemicals from an oil spill or other major discharge. Oil and gas activities also can reduce the availability of marine mammals to Alaska Native communities for subsistence purposes.

Federal agencies are required to comply with the National Environmental Policy Act before they make final decisions about proposed federal actions that could impact the human environment. Under that Act, the Bureau conducts analyses at various stages of the leasing, exploration, and development process to evaluate the environmental and socioeconomic effects of oil and gas activities authorized under the Outer Continental Shelf Lands Act and to issue related permits. The Service is responsible for issuing incidental take authorizations under section 101(a)(5) of the Marine

Mammal Protection Act. Prior to issuance, the Service typically prepares environmental assessments to evaluate the effects of issuing authorizations to take marine mammals incidental to proposed oil and gas activities and any proposed mitigation and monitoring measures.

The National Marine Fisheries Service and the Bureau of Ocean Energy Management jointly prepared the subject draft environmental impact statement to evaluate (1) the Service's issuance of incidental take authorizations for exploration activities that include deep penetration (two-dimensional and three-dimensional) geophysical surveys, high resolution site clearance and shallow hazards surveys, and exploratory drilling, and (2) the Bureau's issuance of permits under the Outer Continental Shelf Lands Act for geological and geophysical surveys and ancillary activities. The document is intended to provide a programmatic evaluation of pre-production oil and gas activities planned in the U.S. Arctic during a five-year period and their cumulative effects.

The Marine Mammal Commission agrees that a programmatic approach is warranted and timely considering the expected increases in oil and gas exploration activities in the U.S. Arctic coupled with the effects of climate disruption and increasing human activities in the region. A programmatic approach should help ensure that a systematic, interdisciplinary approach is used to determine the environmental impact of the proposed actions as required by the National Environmental Policy Act, and that the sum of all risk factors do not cause "undue or serious harm or damage to the human, marine, or coastal environment," as required by the Outer Continental Shelf Lands Act (30 C.F.R. § 250.202), and are not having more than a negligible impact on affected marine mammal stocks or an unmitigable adverse impact on the availability of marine mammals for subsistence uses, as required by the Marine Mammal Protection Act (50 C.F.R. § 216.104).

The Service has stated that it "intends to use this [environmental impact statement] as the required [National Environmental Policy Act] documentation for the issuance of [incidental take authorizations] for Arctic oil and gas exploration activities." However, the Service 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. In fact, 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 1 □ Pa 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.

For those and related reasons, the draft environmental impact statement does not provide an adequate basis for the issuance of the Service's incidental take authorizations. Absent important information on the number and nature of potential takes that may occur incidental to the proposed activities, 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 Marine Mammal Protection Act. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service (1) work with the Bureau of Ocean Energy Management to conduct supplemental activity-specific environmental analyses under the National Environmental Policy Act that provide detailed information on proposed seismic surveys and drilling activities and the associated environmental effects, (2) work with the Bureau and industry to ensure that the necessary information is available to estimate the number of takes as accurately as possible given current methods and data, (3) encourage the Bureau to 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, and (4) encourage the Bureau to make those analyses available for public review and comment before the Service makes its final determination regarding applications for incidental take authorizations.

Selection of alternatives

The Service and the Bureau have identified five alternatives, including (1) the no-action alternative; (2) authorization of "Level 1" exploration activities, (3) authorization of "Level 2" exploration activities, (4) authorization of Level 2 exploration activities with time/area closures; and (5) authorization of Level 2 exploration activities with the use of alternative technologies. Activities associated with Level 1 and Level 2 exploration activities are summarized in Table 1. With the exception of the no-action alternative, the Service has indicated that each of the action alternatives would require a suite of "standard" mitigation measures and also could require one or more "additional" mitigation measures as necessary.

Table 1. Summary of exploration activity levels considered in the draft environmental impact statement associated with alternatives 2, 3, 4, and 5 (adapted from page 4-6)

Level 1 Exploration Activities (alternative 2)	**Level 2 Exploration Activities (alternatives 3, 4, and 5)**
Two 2D/3D deep penetration towed-streamer seismic surveys in the Beaufort Sea and **two** of the same types of surveys in the Chukchi Sea, per year	**Three** 2D/3D deep penetration towed-streamer seismic surveys in the Beaufort Sea and **four** of the same types of surveys in the Chukchi Sea, per year
One in-ice towed streamer 2D survey (using icebreaker) in the Beaufort Sea and **one** of the same types of surveys in the Chukchi Sea, per year	**One** in-ice towed streamer 2D survey (using icebreaker) in the Beaufort Sea and **one** of the same types of surveys in the Chukchi Sea, per year
One ocean bottom cable survey in the Beaufort Sea, per year	**Two** ocean bottom cable surveys in the Beaufort Sea, per year
One on-ice vibroseis seismic survey in the Beaufort Sea, per year	**One** on-ice vibroseis seismic survey in the Beaufort Sea, per year
Three site clearance and high-resolution shallow hazards survey programs in the Beaufort Sea and **three** of the same types of surveys in the	**Five** site clearance and high-resolution shallow hazards survey programs in the Beaufort Sea and **five** of the same types of surveys in the Chukchi

Level 1 Exploration Activities (alternative 2)	Level 2 Exploration Activities (alternatives 3, 4, and 5)
Chukchi Sea, per year	Sea, per year
One exploratory drilling program in the Beaufort Sea and one exploratory drilling program in the Chukchi Sea, per year	Two exploratory drilling programs in the Beaufort Sea and two exploratory drilling programs in the Chukchi Sea, per year

The draft environmental impact statement indicates that the Service's objectives are to "evaluate a broad range of reasonably foreseeable levels of exploration activities, … including the use of alternative technologies and methodologies intended to reduce the amount and/or intensity of sound output, in state and federal waters in the U.S. Beaufort and Chukchi seas" (page 1-9). However, the range of action alternatives considers only two levels of activity, with the lower level of activity (i.e., alternative 2) resulting in a total acoustic footprint that would be significantly greater than at any time since the 1980s (pages 4-44 to 4-47). In addition, the narrow range of alternatives 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. Providing a broader range of activity levels (i.e., alternatives) with more specificity regarding the spatial, temporal, and operational characteristics of associated activity levels seems essential to ensure the least practicable impact to marine mammal species and stocks and their habitats, as required under the Marine Mammal Protection Act.

The Service and Bureau also should have considered a phased, adaptive approach to increasing the number of surveys in the region because the cumulative effects of seismic surveys are not clear. The Commission has previously recommended a go-slow approach to allow time for assessing the impacts of increasing activity levels. 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.

In addition, the Service and Bureau should have considered various strategies for avoiding unnecessarily redundant seismic surveys as a way of ensuring the least practicable impact on marine mammals and the environment. Because some companies conduct geophysical surveys for the purpose of selling the data, those data could be made available to multiple companies, avoiding the need for each company to commission separate surveys. Careful management of the number and timing of surveys will be particularly important in this region because the surveys will be limited in space and time to open waters, when multiple species of marine mammals use the same areas for feeding, reproduction, and migration. Rather than exclude the possibility of avoiding redundant seismic surveys outright, such options should have been included and evaluated in the draft environmental impact statement to ensure that decision makers are informed by consideration of a full suite of alternatives that sharply define the issues.

Other possible alternatives excluded from further consideration included caps on noise or activity levels. As rationale for this decision, the draft environmental impact statement maintains that the concept of a sound 'budget' "implies a quantitative management of total sound that cannot currently be supported by the science" (page 2-46). The Commission disagrees. The Arctic "soundscape" should be relatively easy to describe and manage compared to the soundscapes of other regions. 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 the seasonal variations in the soundscape to the movement patterns and natural histories of marine mammals and to subsistence hunting patterns.

Clearly, oil and gas companies are making an effort to avoid portions of the bowhead whale hunting grounds during the whales' migration, and similar efforts could be made to protect beluga whales, walruses, ice seals, and the hunters who depend on them. By carefully comparing the soundscape to marine mammal natural history and subsistence hunting patterns, the Bureau and industry would have a stronger scientific foundation from which to make reasoned judgments regarding which activities will result in the least practicable impact on these species. Using this information, the Service and Bureau should be able to place limits on the number, timing, and type of seismic activities permitted annually, at least until the long-term, population-level effects of seismic operations on marine mammals and other marine species are fully understood. The Arctic is, in fact, one region where limits on sound-generating activities can be implemented pro-actively, before other human activities (e.g., shipping and tourism) increase. Developing an inventory/ database of seismic sound sources used in the Arctic, as suggested by the U.S. Geological Survey, would be a good first step (Hutchinson and Ferrero 2011). Such a database "may ultimately reduce the need for expensive or redundant acoustic modeling and monitoring, especially in sensitive or biologically significant habitats, as well as contribute to developing more effective mitigation strategies."

The Service is proposing to authorize up to 12 seismic surveys and 2 drilling programs in the Beaufort Sea and 10 surveys and 2 drilling programs in the Chukchi Sea each year. The Service concludes that this level of activity will result in moderate impacts on bowhead whales; beluga whales; subsistence hunting; air quality; acoustics; visual resources; and land and water ownership, use, and management. The Commission does not understand the scientific justification for that conclusion given uncertainties regarding the long-term, population-level effects that may result from the proposed level of seismic and drilling activities on marine mammals. It also is not clear that the proposed number of surveys, individually or in combination, will have no more than a negligible impact on marine mammals, the threshold for issuing an incidental take authorization under the Marine Mammal Protection Act. How can moderate impacts be deemed negligible? To ensure that seismic survey activities and the associated impacts are, indeed, negligible and at the least practicable

level for purposes of the Marine Mammal Protection Act, the permitted activity level should not exceed what is absolutely essential for the industry to conduct.

In addition, the Service does not indicate which of the five identified alternatives is considered the "preferred" alternative. Presumably the selection of a preferred alternative would be based, at least in part, on an analysis of which alternative and associated effects have the least practicable impact on marine mammals. However, the Service does not provide any discussion of the criteria that will ultimately be used as the basis for its selection of a preferred alternative.

For these reasons, the Marine Mammal Commission recommends that the National Marine Fisheries Service work with the Bureau of Ocean Energy Management to expand the draft environmental impact statement to include a broader range of alternatives that ensure that oil and gas related 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. Additional alternatives should include 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 the industry's activities are, indeed, negligible as required by the Act. The Commission further recommends that the Service identify its preferred alternative, including the rationale for its selection.

Impacts on marine mammals and analytical gaps

The draft environmental impact statement describes the affected environment and expected impacts from the proposed activities. Again, the statement does not explain how decision makers can draw definitive conclusions regarding potential effects on marine mammals or other ecosystem components given the lack of details for the operations identified under each alternative. The uncertainty is evident in the Service's assessment of effects on bowhead whales resulting from alternative 2—"Oil and gas exploration activities in the Beaufort and Chukchi seas, as allowed under [a]lternative 2, would likely cause varying degrees of disturbance to feeding, resting, or migrating bowhead whales depending on actual level of effort, type of activity, time of year, and whether activities run concurrent in the Beaufort and Chukchi seas" (page 4-110). This type of vague, qualitative information is not sufficient to inform decision makers of the risks involved and the best means for managing or minimizing those risks.

For example, the Service's analysis of sound sources and associated acoustic footprints is based on the average distances from the sound sources to the various sound threshold levels used by the Service to delineate harassment, as measured during previous seismic surveys of various types, rather than actual modeling of propagation loss associated with the proposed types and numbers of sound sources. The Commission believes that decision makers need more specific information because these sound sources may ensonify large portions of the Chukchi and Beaufort Seas. For example, the Service has estimated that alternative 2 would ensonify 35 percent of the Chukchi Sea and 14 percent of the Beaufort Sea at the 120-dB re 1 μPa threshold (page 4-50); whereas,

alternative 3 would ensonify 58 percent of the Chukchi Sea and 19 percent of the Beaufort Sea at the 120-dB re 1 µPa threshold (page 4-245). The significance of these estimates is difficult to interpret and predict given the vague set of assumptions on which they are based.

The Commission also has noted several omissions and inadequacies in the Service's analysis of impacts. For example, the Service states that the vertical seismic profilers and vertical cable surveys are used as part of the drilling program, yet the Service has not analyzed the effects of those sound sources as part of the proposed drilling operations. Vertical seismic profilers are airgun arrays with the potential to generate source levels at or above 238 dB re 1 µPa at 1 m (Shell 2011). In addition, the Service has not analyzed the combined effects of proposed new activities plus production drilling at BP's Liberty prospect, even though this drilling project is likely to go forward in the timeframe covered by the draft environmental impact statement. To assess the effects of the proposed oil and gas exploration activities under the Marine Mammal Protection Act, the Marine Mammal Commission recommends that the National Marine Fisheries Service work with the Bureau of Ocean Energy Management to estimate the site-specific acoustic footprints for each sound threshold (i.e., 190, 180, 160, and 120 dB re 1 µPa) and the expected number of marine mammal takes, accounting for all types of sound sources and their cumulative impacts.

To predict the expected effects of oil and gas and other activities more accurately, the Commission agrees with the U.S. Geological Survey that 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). As noted above, 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.

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. Therefore, the Marine Mammal Commission recommends that the Service work with the Bureau 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.

Marine Mammal Protection Act standards

The Service has developed "impact criteria" for the draft environmental impact statement to evaluate each of the alternatives and its potential impacts on biological and socioeconomic resources. These criteria range from negligible to major, using terms and thresholds that are quantitative for some components and qualitative for others. For alternative 2 (Level 1 activities), impacts are identified as moderate for subsistence, minor to moderate for bowhead and beluga whales, and minor for other marine mammal species. For alternatives 3 (Level 2 activities) and 5 (Level 2 activities with alternative technologies), impacts are identified as moderate for subsistence, bowheads, and belugas, and minor for other marine mammal species. For alternative 4 (Level 2 activities with time/area closures), impacts are identified as moderate for bowhead and beluga whales and minor for other marine mammal species and subsistence. The Service concludes that even at the higher level of activity (Level 2 activities) bowhead whales will be displaced only temporarily, but that long-term effects are unknown. It goes on to state that the extent of the impact would depend on the number of seismic activities and associated support vessels in an area, and that multiple seismic activities in one area or in several areas across the bowhead migratory corridor could lead to more widespread, regional impacts.

Although these criteria may be considered sufficient for purposes of the analyses required under the National Environmental Policy Act, they do not necessarily meet the standards applicable under the Marine Mammal Protection Act for issuing incidental take authorizations—that only small numbers of animals are taken, that such takes have no more than a negligible impact on the affected marine mammal species and stocks, and that the activities do not have an unmitigable adverse impact on the availability of marine mammals for subsistence uses. The Commission believes that 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, the Service will need such information to make the findings required under the Marine Mammal Protection Act. To ensure that is the case, the Marine Mammal Commission recommends that the National Marine Fisheries Service revise the draft environmental impact statement to include a fuller analysis of each alternative and discuss whether it meets the requirements of the Marine Mammal Protection Act for issuing incidental take authorizations. To the extent that the information needed to make the determinations required under the Marine Mammal Protection Act is lacking, the Service should take steps to ensure that this information is available before an authorization is issued and should acknowledge that supplemental environmental analyses under the National Environmental Policy Act may be necessary.

Mitigation and monitoring measures

The Service has identified a suite of standard mitigation measures that would be applied to all authorized activities and additional, specific measures that would be required only for certain activities or operators, as appropriate. The Commission agrees that the list of standard mitigation measures should be incorporated in all incidental take authorizations issued by the Service and also should be included under the terms and conditions for the Bureau's issuance of geological and

geophysical permits and ancillary activity and exploratory drilling approvals. However, the Commission believes that many of the "additional" mitigation measures should be expanded and included as standard conditions.

The following is a summary of mitigation measures that the Commission has recommended in incidental harassment authorizations for other proposed oil and gas activities. The various rationales for including those measures can be found in past letters to the Service and are not repeated here. 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, sub-bottom 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 360° 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

[1] Flight altitudes were included as an additional mitigation measure, but a specific minimum altitude was not identified.

- reduce vessel speed to 9 knots or less when transiting the Beaufort Sea[2];
- reduce vessel speed to 9 knots or less within 274 m of whales[2,3];
- avoid changes in vessel direction and speed within 274 m of whales[3];
- reduce speed to 9 knots or less in inclement weather or reduced visibility conditions[2];
- 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 re-inject 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 co-management organizations and account for potential adverse impacts on all marine mammal species taken for subsistence purposes.

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;

[2] Reduced vessel speeds were included as an additional mitigation measure, but a specific maximum vessel speed was not identified.
[3] The specific distance at which vessels should exercise caution when around whales was not identified.

- 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.

Comprehensive monitoring program

In addition to project-specific monitoring measures, the Commission believes that a comprehensive, long-term monitoring program is needed for the Arctic to ensure that its rapidly changing marine environment is adequately protected from the adverse effects of oil and gas exploration and development and other human activities. Clearly, the Bureau and the Service cannot be solely responsible for such a program—it must be coordinated with key partners, including the Fish and Wildlife Service, U.S. Geological Survey, the state of Alaska, the North Slope Borough, Alaska Native organizations, academia, non-governmental organizations, and industry. The program should include a strategy for assessing the status of marine mammal populations, characterizing important natural history traits including habitat use, determining vulnerability to risks from all human activities, and identifying and developing appropriate mitigation and monitoring measures. A number of research tools are available for collecting this information, including vessel and aircraft surveys, passive acoustics, photo-identification studies, biopsy sampling, telemetry tagging, and information obtained from stranded and subsistence-harvested animals. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service work with the Bureau of Ocean Energy Management, Fish and Wildlife Service, U.S. Geological Survey, state of Alaska, North Slope Borough, Alaska Native organizations, academia, non-governmental organizations, and industry to develop a comprehensive, long-term monitoring program for the Arctic ecosystem, including its marine mammal populations.

Please contact me if you have questions about the Commission's recommendations or comments.

Sincerely,

Timothy J. Ragen, Ph.D.
Executive Director

cc: Dr. James Kendall, Bureau of Ocean Energy Management, Alaska Outer Continental Shelf Region, Anchorage, AK
Dr. Kim Rivera, National Marine Fisheries Service, Alaska Regional Office, Juneau, AK
Jenifer Kohout, Marine Mammals Management Office, Anchorage, AK

References

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