



MARINE MAMMAL COMMISSION

21 June 2010

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

Dear Mr. Payne:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the application submitted by Shell Offshore Inc. under section 101(a)(5)(D) of the Marine Mammal Protection Act. The applicant is seeking authorization to take marine mammals by harassment incidental to a proposed open-water marine survey program in the Beaufort and Chukchi Seas, Alaska, between July and October 2010. The Commission also has reviewed the National Marine Fisheries Service's 18 May 2010 *Federal Register* notice (75 Fed. Reg. 27708) announcing receipt of the application and proposing to issue an authorization to Shell to take eight species of marine mammals by Level B harassment during the specified activity.

The application from Shell Offshore and the Service's *Federal Register* notice reveal commendable efforts to assess the potential effects of seismic surveys on marine mammals in preparation for oil and gas production in the Beaufort and Chukchi Seas. The Marine Mammal Commission provides the following recommendations and rationale to enhance those efforts and to ensure that the seismic surveys are conducted with no more than negligible effects.

RECOMMENDATIONS

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

- require this and other operators to collect information necessary to evaluate the effectiveness of the mitigation measures adopted and to review and modify mitigation measures accordingly;
- review the proposed monitoring measures to ensure that they require the gathering of information on all the potentially important sources of noise and the complex sound field that the seismic survey activities create;
- work with Shell and its contractors to engage acknowledged survey experts to review the survey design and planned analyses to ensure that they will provide relatively unbiased and reliable results;
- work with Shell to coordinate a comparative analysis of the results of vessel-based, aerial, and passive acoustic monitoring methods to evaluate their relative strengths and weaknesses and determine if and how they could be improved for use with future surveys;

- require that Shell complement its vessel-based monitoring plan with towed passive acoustics to provide a more reliable estimate of the number of marine mammals taken during the course of the proposed seismic survey;
- develop a plan for collecting meaningful baseline information—that is, information that provides a reliable basis for evaluating long-term effects on the marine mammal species and stocks that may be affected by oil and gas development and production in the Beaufort Sea area;
- work with Shell to determine how the data collected during the proposed activities can be made available for other scientific purposes;
- require Shell to engage in consultations with those Alaska Native communities that may be affected by the company's activities and, to the extent feasible, seek to resolve any Alaska Native concerns through negotiation of a conflict avoidance agreement; and
- require Shell to halt its seismic survey and consult with the Service regarding any seriously injured or dead marine mammal when the injury or death may have resulted from Shell's activities.

RATIONALE

The proposed surveys are designed to gather data on site clearance, shallow hazards, ice gouge, and strudel scour in the Beaufort Sea and ice gouge in the Chukchi Sea. Various technologies will be used including a 40-in³ airgun array, dual-frequency side scanner, single-beam echo sounder, shallow sub-bottom profiler, dual-frequency sub-bottom profiler, multi-beam echo sounder, and single-beam bathymetric sonar. Sound frequencies emitted by these sources vary from 400 Hz to 340 kHz, the upper frequencies being beyond the hearing range of marine mammals. Modeled source sound levels range from 167.2 to 225 dB re 1 μ Pa.

Mitigation and Monitoring

Shell has proposed a mitigation strategy based on (1) sound source measurements to determine safety zones more accurately, (2) establishment of safety and disturbance zones to be monitored by marine mammal observers on the seismic vessel, (3) a power-down when a marine mammal is detected approaching a safety zone and a shutdown when a marine mammal is observed within a zone, and (4) ramp-up of the airgun array. The National Marine Fisheries Service indicates that it will require additional mitigation measures including (a) establishment of a 120-dB safety zone and prohibition of seismic studies within that zone whenever it encompasses four or more bowhead whale mother-calf pairs, (b) establishment of a 160-dB safety zone that would prohibit firing of the seismic airguns within the zone whenever it encompasses 12 or more bowhead or gray whales involved in non-migratory behavior (e.g., feeding), (c) a requirement that vessels reduce speed when within 274 meters (300 yards) of whales and steer around those whales if possible, (d) a requirement that vessels avoid multiple changes in direction and speed when within 274 meters (300 yards) of whales, and (e) a requirement that vessels adjust speeds accordingly when weather or other conditions reduce visibility.

All of the above measures should be useful to a degree, but in some cases they are not sufficiently specific. For example, it is not clear what “power-down” actually means. An airgun array is usually powered down by reducing the number of guns that are firing. If a marine mammal is approaching a safety zone, what constitutes a useful reduction in the power of the airgun array: 5 percent, 25 percent, 50 percent, other? Similarly, if a support vessel is traveling at 15 knots and whales are observed within 274 meters (300 yards), what constitutes a meaningful reduction in speed: 1 knot, 2 knots, 5 knots, other? Is a reduction in speed from 15 knots to 13 knots of equal utility to a reduction from 10 knots to 8 knots, or should the mitigation measure impose specific speed limits rather than just a slowing of speed? The existing evidence supports the idea that it is not just a reduction in speed that matters but the actual vessel speed. If that is the case, then would it not be more useful to impose a vessel speed limit. Regarding ramp-up procedures, the Commission has long recommended that the Service require analysis and reporting of the data collected during ramp-up procedures to verify or refute the notion that those procedures are a useful mitigation measure.

Because existing mitigation measures often are unproven, the Commission considers it vital that the Service and the industry make every reasonable effort to evaluate those measures whenever possible. Such evaluation provides a basis for (1) distinguishing between measures that do and do not have protective value, (2) improving those that are useful, and (3) finding alternatives for those that are not. Without such efforts, at least some mitigation measures may give false reassurance that marine mammals are being adequately protected and/or they may impose costs on the oil and gas industry with little or no benefit to marine mammals. With these concerns in mind, the Marine Mammal Commission recommends that the National Marine Fisheries Service require this and other operators to collect information necessary to evaluate the effectiveness of the mitigation measures adopted and to review and modify mitigation measures accordingly.

In that regard, the peer-review panel convened by the Service after its March 2010 open-water meeting made several recommendations for improving mitigation and monitoring measures. One of those was that Shell monitor not only the effects of its primary sound sources (e.g., airgun arrays) but also the sounds introduced into the marine environment by various support activities, such as the ship used to pull the array, active sonar used in ship navigation, support vessels and helicopters, and autonomous underwater vehicles, should they be used. The panel correctly pointed out that the marine mammals in the area will not just hear and react to the noise from the seismic instruments but to the entire suite of sounds from the various sources associated with the activities and the complex sound field they create in combination.—what the panel referred to as a “soundscape.” To understand the animals’ responses to that sound field requires that all major sources of noise are monitored and taken into account. The Marine Mammal Commission concurs with the panel’s assessment and recommends that the National Marine Fisheries Service review the proposed monitoring measures and ensure that operators (or their contractors) are required to collect and analyze information on all of the potentially important sources of noise and the complex sound field that the seismic survey activities create.

The peer-review panel also questioned whether the use of a single sound threshold, such as 160 dB, constitutes an adequate basis for determining when certain effects will or will not occur. At issue in this case is whether disturbance of biologically significant behavior occurs. The Service’s

Federal Register notice cites a summary of information on disturbance in Southall et al. (2007) as the basis for using that level to delineate the potential for disturbance. However, that summary acknowledges that disturbance may occur at a wide range of sound levels. Furthermore, the intent of the Marine Mammal Protection Act is not just to avoid disturbance that occurs in response to a stimulus over a certain threshold. Rather, the Act requires any such disturbance to be minimized to the extent practicable, irrespective of any presumed threshold. With that in mind, it may be reasonable to start with an assumption that disturbance is not likely to occur at sound levels below 160 dB, but that assumption can and should be tested using measurements of sound fields (which Shell is planning to do at the beginning of the season) and records of responses documented by marine mammal observers. Such tests should be conducted using species-specific data, and test results should be used to inform decision makers regarding the applicability of the 160-dB threshold for the species involved and to improve future mitigation measures. The Service's *Federal Register* notice indicates that Shell will conduct such tests, and the Marine Mammal Commission encourages it to do so.

In the Beaufort Sea, Shell will be using three different but complementary forms of monitoring—vessel-based marine mammal observers, aerial surveys, and passive acoustic monitoring. Again, Shell should be commended for such comprehensive efforts to evaluate the effects of its seismic surveys. Vessel-based and aerial surveys can be used to monitor for two different purposes, the first being to determine the effectiveness of the mitigation measures being implemented and the second to estimate the number of takes and the nature of the responses (e.g., deflections in migratory path). The panel recognized that aerial surveys could be used to accomplish both objectives but also indicated that to do so, methods for analyzing the data would have to be modified to avoid certain biases. The Marine Mammal Commission concurs with that conclusion and recommends that the National Marine Fisheries Service work with Shell and its contractors to engage acknowledged survey experts to review the survey design and planned analyses to ensure that the results will be as unbiased and reliable as possible.

The Commission also notes that the comprehensive monitoring proposed by Shell using vessel-based observers, aerial surveys, and passive acoustic monitoring provides a rare opportunity to compare the results from these three types of monitoring to evaluate their strengths and weaknesses and determine how they overlap or complement each other. A comparative analysis should provide insights into the utility of each of these approaches for detecting the marine mammal species in the area surveyed and determining the extent and causes of any observed changes in habitat use and behavior. Such a comparison also should provide insight into how these survey methods might be improved in the future. With those benefits in mind, the Marine Mammal Commission recommends that the National Marine Fisheries Service work with Shell to coordinate a comparative analysis of the results of vessel-based, aerial, and passive acoustic monitoring methods to evaluate their relative strengths and weaknesses and determine if and how they could be improved for use with future surveys.

In the Chukchi Sea, Shell will use only vessel-based marine mammal observers. Shell has argued that aerial surveys in this area are not safe because they would be conducted too far from land. The Service's peer-review panel recognized that safety is always the primary consideration but

also pointed out that surveys by others have been and are being flown safely in this region. The Commission recognizes the need for safety but believes that, if Shell declines to conduct aerial surveys, it still is responsible for monitoring its impacts and should be seeking alternative monitoring measures.

Even if Shell declines to fly aerial monitoring surveys over potential production sites in the Chukchi Sea, it can still supplement its vessel-based observations using towed acoustic sensors. As has now been clearly demonstrated, passive acoustics can be used to detect animals that otherwise spend little time or are inconspicuous at the surface. Passive acoustic records would not improve the implementation of mitigation measures but would provide a basis for generating a more accurate estimate of the total number of marine mammals taken in the course of the seismic survey. For these reasons, the Marine Mammal Commission recommends that the National Marine Fisheries Service require that Shell supplement its vessel-based monitoring plan with towed passive acoustics to provide a more reliable estimate of the number of marine mammals encountered and taken during the course of the proposed seismic surveys.

Data and Analysis Issues

Baseline data. The proposed activities raise two important data issues, both of which were recognized by the Service's peer-review panel. The first involved the collection of baseline data. If all goes according to industry plan, the proposed seismic surveys are just the beginning of oil and gas operations that will be accompanied by test drilling, construction, periodic seismic studies, long-term production, regular and frequent support activities, and a possibility of accidents, such as oil spills, with potentially serious consequences. The long-term concern is that the full spectrum of direct and indirect effects of oil and gas operations, in combination, will compromise the status of marine mammal stocks in this region. Assessing such effects requires adequate baseline information, and that information is more or less available for some species (e.g., bowheads) because of extensive efforts to count them, track their movements, and evaluate contaminants in their tissues. Adequate baseline information is not available for other species that may be affected (e.g., beluga whales and ringed, bearded, and spotted seals) as they have been studied much less in this area. Key types of baseline information that need to be collected include regional or local abundance and density, habitat preferences, animal health and condition, and vital rates (i.e., reproduction and survival).

The proposed approach for collecting baseline information is not adequate. In essence, Shell proposes to have its marine mammal observers collect sighting information at times when its seismic equipment is turned off. But this may be only for a matter of hours, as it has become industry practice to continue firing a "mitigation airgun" during turns or other breaks in surveys so that operators do not have to initiate ramp-up procedures when they are ready to resume the normal survey activities. In addition, marine mammals affected by seismic surveys may not revert to their natural distribution or resume natural behavior for some time following cessation of the airgun noise. This calls into question whether measurements taken immediately or soon after a seismic survey ends actually provide an appropriate baseline of natural conditions. The best way to assess baseline conditions and evaluate impacts would be to conduct observations before a seismic survey,

the results of which could be compared to data collected during and well after the survey to evaluate potential effects and recovery from those effects, respectively.

With those kinds of shortcomings in mind, the Marine Mammal Commission recommends that the National Marine Fisheries Service's Office of Protected Resources work with the Service's National Marine Mammal Laboratory to develop a plan for collecting meaningful baseline information—that is, information that provides a reliable basis for evaluating long-term effects on the marine mammal species and stocks that may be affected by oil and gas development and production in the Beaufort Sea area.

Data availability. The second issue involves the availability of the data collected by Shell and its contractors in preparation for oil and gas operations in this region. As just noted, the data that are presently available for certain marine mammal species and stocks in the Beaufort Sea are not sufficient to characterize their status and, therefore, to provide the needed baseline information for assessing the potential impact of oil and gas operations (and other activities in the region). To its credit, Shell will be collecting extensive information in the course of conducting its seismic surveys. If those data are shared or otherwise made available for scientific purposes, they may add significantly to the body of information on local or regional marine mammal populations. Sharing such data is or should be a normal part of the scientific process; the practice promotes transparency and allows other researchers and managers to maximize the information that can be gained from Shell's monitoring studies. The peer-review panel's report placed strong emphasis on the importance of making these kinds of data available for further study. Again, the Marine Mammal Commission agrees with the panel's report and recommends that the National Marine Fisheries Service work with Shell to determine how the data collected during the proposed activities can best be made available for other scientific purposes.

Subsistence

Before issuing the requested incidental harassment authorization, the National Marine Fisheries Service is required to determine that the proposed activities will not have an unmitigable adverse effect on the availability of marine mammals for subsistence purposes. To avoid any such effects, Shell has undertaken or proposes to undertake a range of activities involving potentially affected Alaska Native communities that depend on marine mammals for subsistence. Those activities include support for communication centers in the communities to keep them informed of oil and gas operations, meetings to discuss oil and gas development plans, employment of Alaska Native representatives to monitor the communities and convey their concerns to the company, and dissemination of information to the communities. These are all good and useful measures and, once again, Shell should be commended for taking such steps.

However, informing subsistence communities of oil and gas activities is not the same as welcoming and incorporating input from them or responding to their concerns. From a business perspective, Shell faces certain pressure to establish and maintain a production schedule that may limit its flexibility to accommodate the concerns of Native communities. On the other hand, members of the subsistence communities may feel disenfranchised if they are informed of activities

but do not feel that they have a meaningful say in matters affecting them or that their concerns have been given full and adequate consideration. At least two approaches have been developed to address these issues. One involves conflict avoidance agreements in which both sides act as more or less equal participants in a negotiation that is intended to identify both company and Alaska Native concerns and find mutually acceptable resolutions. The other involves development of company plans for cooperation in which the company describes the actions it will take and the means of soliciting community input. However, it is not clear that this second approach ensures that the company will give sufficient weight to the concerns of the Alaska Native communities. In that regard, conflict avoidance agreements appear to put both sides on a more nearly equal footing, which is more likely to lead to meaningful negotiations and compromises acceptable to both parties.

Among the duties of the Marine Mammal Commission set forth in Title II of the Marine Mammal Protection Act (section 202), is to—

recommend to the Secretary [of Commerce or the Interior], other appropriate Federal officials, and Congress such additional measures as it deems necessary or desirable to further the policies of this Act, including provisions for the protection of the Indians, Eskimos, and Aleuts whose livelihood may be adversely affected by actions taken pursuant to this Act.

In this regard, the livelihood and culture of Alaska Natives are at considerable risk because of the effects of climate change and the development that will accompany the loss of sea ice in the Arctic. Development activities include, but are not limited to, oil and gas operations. On 5 November 2009 President Obama signed a Memorandum on Tribal Consultation that reinforced Executive Order 13175 signed by President Clinton on 6 November 2000. The executive order and memorandum charge executive departments and agencies with “engaging in regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications.” To that end, the Marine Mammal Commission recommends that the National Marine Fisheries require Shell to engage in consultations with those Alaska Native communities that may be affected by the company’s activities and, to the extent feasible, seek to resolve any Alaska Native concerns through negotiation of a conflict avoidance agreement. The Commission would be pleased to participate with the Service in efforts to solicit input from Native communities and pursue meaningful consultations between those communities and the oil and gas industry.

Level A or Level B Harassment

Shell has decided to apply for an incidental harassment authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act. Such authorization spans only a single year, does not require the promulgation of regulations, and cannot authorize taking by serious injury or death of a marine mammal. The alternative authorization available under section 101(a)(5)(A) would span up to five years and require the issuance of regulations but could allow for a certain number of takings by serious injury or death. Shell has indicated its intent to investigate the cause of death of any marine mammal found dead near its operations, including any unauthorized deaths that may have resulted from its operations. Conducting such investigations and determining the cause of

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death will be difficult under some circumstances. For example, collecting a dead bowhead whale can be time consuming and logistically challenging. Nonetheless, investigations of this kind may be necessary for rigorous evaluation of the effects of the proposed activities and determining whether an authorization under section 101(a)(5)(A) is needed. Shell's willingness to investigate the causes of death should be commended. That being said, if a serious injury or death occurs that may have resulted from the proposed activities, then an authorization under section 101(a)(5)(D) may not be sufficient. With that in mind, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Shell to halt its seismic survey and consult with the Service regarding any seriously injured or dead marine mammal when the injury or death may have resulted from Shell's activities. The Service can then make a determination as to whether modifications to the activities are sufficient to avoid additional injuries or deaths or whether Shell should obtain an incidental take authorization under section 101(a)(5)(A).

Please contact me if you have questions regarding the Commission's recommendations or rationale.

Sincerely,



Timothy J. Ragen, Ph.D.
Executive Director