



MARINE MAMMAL COMMISSION

2 August 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 the U.S. Geological Survey seeking authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act to take small numbers of marine mammals by harassment. The taking would be incidental to a marine seismic survey in the northern Beaufort Sea and Arctic Ocean during approximately 30 days in August and September 2010. The Commission also has reviewed the National Marine Fisheries Service's 8 July 2010 *Federal Register* notice (75 Fed. Reg. 39336) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

The U.S. Geological Survey and the Geological Survey of Canada plan to conduct a marine geophysical and bathymetric survey to investigate the continental shelf from 71 to 84°N latitude, 145 to 151°E longitude in U.S., Canadian, and international waters of the northern Beaufort Sea and Arctic Ocean. The survey would occur in waters 1,900 to 4,000 m (6,230 to 13,120 ft) in depth and consist of approximately 1,803 km (1,120 mi) of tracklines of interest to the United States, 809 km (501 mi) of which are within the U.S. Exclusive Economic Zone (i.e., waters out to 200 nmi from shore). The U.S. Geological Survey would use the U.S. Coast Guard Cutter *Healy* for ice-breaking activities associated with the survey, and the Geological Survey of Canada would use the Canadian Coast Guard vessel *Louis S. St. Laurent* for deployment and operation of a 3-airgun array (1,150 in³; with a nominal source level 236.7 dB re 1 μPa (0-to-peak)). The *St. Laurent* also would operate a 12-kHz chirp echo sounder and a 3 to 5-kHz sub-bottom profiler. It would deploy sonobuoys and tow a single hydrophone streamer approximately 300 m in length. The *Healy* continuously would operate a 12-kHz bathymetric multi-beam echo sounder, a 3.5-kHz chirp sub-bottom profiler, a piloting echosounder, and two acoustic Doppler current profilers.

RECOMMENDATIONS

The Marine Mammal Commission recommends that the National Marine Fisheries Service approve the requested incidental harassment authorization, provided that the Service—

- ascertain who will be responsible for operating the Canadian vessel and the airguns and other instruments deployed from the *St. Laurent* and issue an incidental harassment authorization for these activities only if a U.S. agency or U.S. citizen(s) will be conducting those operations;

- work with the applicant to re-estimate exposures for ice-breaking activities based upon the total area that may be exposed to sound levels greater than or equal to 120 dB re 1 μ Pa (rms);
- advise the applicant to consult with the Fish and Wildlife Service regarding the need for a separate incidental taking authorization for walrus and polar bears;
- provide additional justification for its preliminary determination that the planned monitoring program will be sufficient to detect, with a high level of confidence, all marine mammals within or entering the identified exclusion zones;
- clarify the meaning of the qualifiers “when practical,” “if practical,” and “when feasible” to indicate how often and under what specific conditions the applicant expects to use (1) two marine mammal observers to monitor the exclusion zone for marine mammals during daytime operations and nighttime start-ups of the airguns, (2) crew members to assist observers in detecting marine mammals and implementing mitigation requirements, and (3) marine mammal observers during daytime periods to compare sighting rates and animal behavior during times when seismic airguns are and are not operating
- propose to the U.S. Geological Survey that it revise its study design to collect meaningful baseline data on sighting rates for marine mammals;
- require the applicant to collect information to evaluate the assumption that 160 dB re 1 μ Pa (rms) is the appropriate threshold at which harassment occurs for all marine mammals in the survey area; and
- require the applicant to make observations during all ramp-up procedures to gather the data needed to analyze and report on their effectiveness as mitigation.

RATIONALE

The Service preliminarily has determined that, at most, the proposed activities would result in a temporary modification in the behavior of small numbers of up to 13 species of marine mammals and that any impact on the affected species is expected to be negligible. The Service also preliminarily has determined that no take of marine mammals by death or serious injury is anticipated and that the potential for temporary or permanent hearing impairment will be at the lowest level practicable based on the proposed mitigation measures.

Availability of an Incidental Harassment Authorization

The Marine Mammal Commission supports international cooperation in marine research and management, including activities such as those proposed by the U.S. Geological Survey and its Canadian counterpart, the Geological Survey of Canada. However, the Marine Mammal Protection Act imposes a limitation on incidental harassment authorizations for such activities. Section 101(a)(5)(D)(i) of the Act specifies that incidental harassment authorizations only are available to citizens of the United States. Implementing regulations at 50 C.F.R. § 216.103 define “citizens of the United States” to mean “individual citizens or any corporation or similar entity if it is organized under the laws of the United States or any governmental unit defined in 16 U.S.C. [§] 1362(13). U.S. Federal, state and local government agencies shall also constitute citizens of the United States....”

The activities of the Geological Survey of Canada and the crew of the *St. Laurent* are not subject to the Marine Mammal Protection Act when they occur outside the U.S. EEZ. Inside the U.S. EEZ, their activities do not qualify for an incidental harassment authorization because they do not meet the definition of U.S. citizens. Thus, it appears that the activities of the *St. Laurent* cannot be authorized under section 101(a)(5)(D) if the vessel is under the control of the Geological Survey of Canada and a Canadian crew. If, however, the U.S. Geological Survey controls the operation of the *St. Laurent* and associated airguns and instruments, the portion of the survey in U.S. waters can be authorized under the Act. If the U.S. Geological Survey would continue to control the operations of the *St. Laurent* beyond the U.S. EEZ, then any incidental harassment authorization also must cover those operations. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service ascertain who will be responsible for operating the Canadian vessel and the airguns and other instruments deployed from the *St. Laurent* and issue an incidental harassment authorization for these activities only if a U.S. agency or U.S. citizen(s) will be conducting those operations.

In contrast to the Canadian vessel and crew, the *Healy* is a U.S. vessel with a U.S. crew. In the case of the *Healy*, the Act's taking prohibition not only applies in waters subject to U.S. jurisdiction but also on the high seas beyond the U.S. EEZ. Therefore, the activities of the *Healy* require an incidental harassment authorization when it is operating within U.S. territorial waters, the U.S. EEZ, in international waters, and within the Canadian EEZ (i.e., beyond Canada's 12-nmi territorial sea). The U.S. Geological Survey appropriately has applied for an authorization for its activities in all of these areas.

The discussions of monitoring and mitigation measures assume that U.S. citizens will be conducting the activities that are expected to result in the incidental taking of marine mammals within waters subject to U.S. jurisdiction (e.g., vessel operations and airgun firing). If this is not the case, then a waiver of the Marine Mammal Protection Act's moratorium on taking under sections 101(a)(3) and 103 of the Act appears to be the only option that would allow incidental take within U.S. waters. Beyond the U.S. EEZ, such a waiver would not be necessary if operations were being conducted by a Canadian crew.

Exposure Estimates

The Service's *Federal Register* notice and the U.S. Geological Survey's application state that, for ice-breaking activities, 4,109 km² (1,587 mi²) of water will be exposed to sound levels greater than or equal to 120 dB re 1 μPa (rms) but that 5,137 km² (1,983 mi²) will be used to estimate the number of marine mammals exposed. The greater area allows for turns, repetition of certain track lines because of poor data quality, or minor changes in survey design. The Service's notice indicates that exposures due to ice-breaking activities (a continuous rather than impulsive sound source) will be estimated based on the total area that may be exposed to sound levels greater than or equal to 120 dB re 1 μPa (rms). However, it appears that the estimated exposures for ice-breaking activities were determined using the lesser area (i.e., 4,109 km²); thus exposures due to ice-breaking activities may have been underestimated. The Marine Mammal Commission recommends that the National Marine Fisheries Service work with the applicant to re-estimate exposures for ice-breaking activities based

upon the total area that may be exposed to sound levels greater than or equal to 120 dB re 1 μ Pa (rms).

Walrus and Polar Bears

Walrus and polar bears occur in the proposed survey area but are under the jurisdiction of the U.S. Fish and Wildlife Service. As such, the Service indicated in its *Federal Register* notice that, although these species occur in the proposed survey area, they “are not considered further in the analysis.” The Commission believes that this is appropriate but questions why the Service included the level of detail that it did regarding these two species in its *Federal Register* notice. It is important to note that walrus and polar bears occur in the survey area and could be taken incidental to the proposed activities. To address that concern, the Marine Mammal Commission recommends that the National Marine Fisheries Service advise the applicant to consult with the Fish and Wildlife Service regarding the need for a separate incidental taking authorization for walrus and polar bears.

Monitoring

The Service’s preliminary determination is that taking will be by harassment only and will have a negligible impact on the affected species and stocks. That determination is based, in part, on the presumed efficacy of the proposed monitoring measures. However, the Service’s previous *Federal Register* notices regarding similar requests and the Commission’s related comments recognize that visual monitoring is not effective during periods of bad weather or at night. Furthermore, even with good visibility, observers are unable to detect marine mammals when they are below the surface or beyond visual range. Thus, visual monitoring alone will not detect all marine mammals within the exclusion zones—particularly when those zones include all areas within 2,500 m (8,202 ft) of the vessel. Therefore, the Marine Mammal Commission recommends that, prior to granting the requested authorization, the National Marine Fisheries Service provide additional justification for its preliminary determination that the planned monitoring program will be sufficient to detect, with a high level of confidence, all marine mammals within or entering the identified exclusion zones. At a minimum, such justification should (1) identify those species that it believes can be detected with a high degree of confidence using visual monitoring only, (2) describe detection probability as a function of distance from the vessel, (3) describe changes in detection probability under various sea state and weather conditions and at night, and (4) explain how close to the vessel marine mammals must be for observers to achieve the anticipated high nighttime detection rate. If such information is not available, the Service and the applicant should undertake the studies needed to verify that the proposed monitoring program is likely to detect all or nearly all marine mammals in or near exclusion zones and/or to encourage development of alternative means of detecting marine mammals in or near those zones.

The *Federal Register* notice states that five observers will be based aboard the *St. Laurent*, and at least one observer and “when practical two observers” will monitor marine mammals near the seismic vessel during daytime operations and nighttime start-ups of the airguns (noting that the use of two observers simultaneously will increase the effectiveness of detecting animals near the source vessel). It further states that the applicant also will instruct other crew to assist in detecting marine

mammals and implementing mitigation requirements, if practical. The terms “when practical” and “if practical” are not entirely clear in this instance and do not convey how frequently these enhanced monitoring practices will be implemented. Similarly, the notice states that, “when feasible,” marine mammal observers will make observations during daytime periods when the seismic system is not operating to compare sighting rates and animal behavior when airguns are operating versus when they are not. The term “when feasible” also is vague, and it is not clear how frequently such observations will be made. The Marine Mammal Commission recommends that, before issuing the requested authorization, the National Marine Fisheries Service clarify the meaning of the qualifiers “when practical,” “if practical,” and “when feasible” to indicate how often and under what specific conditions the applicant expects to use (1) two marine mammal observers to monitor the exclusion zone for marine mammals during daytime operations and nighttime start-ups of the airguns, (2) crew members to assist observers in detecting marine mammals and implementing mitigation requirements, and (3) marine mammal observers during daytime periods to compare sighting rates and animal behavior during times when seismic airguns are and are not operating.

In addition, the notion that informative comparisons can be made between marine mammal observations when airguns are and are not firing depends on the period of time that the airguns are silent. If firing of the airguns causes marine mammals to depart an area or alter their behavior, a comparison after the airguns are silenced would be meaningful only if sufficient time has elapsed for the marine mammals in the area to return to their normal distribution and behavior. Because such a return may take days, weeks, or longer, collecting baseline information based on brief, intermittent periods when airguns are not firing seems questionable at best and completely unreliable at worst. If the Service and the applicant intend to collect meaningful, reliable baseline information, then they should develop a research design that takes into account the species present, their behavioral patterns, seasonal movements, and—to the extent known—their responses to the types of sounds that will be generated by the proposed activities. Otherwise, the Service and the applicant will have no real scientific basis for describing baseline conditions in the survey area. With that in mind, the Marine Mammal Commission recommends that the National Marine Fisheries Service propose to the U.S. Geological Survey that it revise its study design to collect meaningful baseline data on sighting rates for marine mammals. Such information is essential for a realistic assessment of impacts from the proposed activities and recovery from those impacts.

The use of a single sound threshold, such as 160 dB re 1 μ Pa (rms), to provide an adequate basis for determining when certain effects (e.g., sufficient to constitute a taking by Level B harassment) will or will not occur (i.e., whether disturbance of marine mammal behavioral patterns occurs) has yet to be substantiated. The Service’s *Federal Register* notice acknowledges that disturbance (presumably including disturbance that would constitute Level B harassment) may occur at a wide range of sound levels. So, too, does the application, which states that—

Beluga whales have been documented swimming rapidly away from ships and icebreakers in the Canadian high arctic when a ship approaches to within 35-50 km, and they may travel up to 80 km from the vessel’s track (Richardson et al. 1995). It is expected that belugas avoid icebreakers as soon as they detect the ships (Cosens and Dueck 1993).

The application does not mention that the received levels at the whales were only 94-105 dB in the 20-1,000 Hz band, that they elicited strong avoidance reactions, or that the whales were displaced as much as 80 km. The application just cites Richardson et al. 1995, but the full reference for the study is—

Finley, K.J., Miller, G.W., Davis, R.A., and Greene, C.R. 1990. Reactions of belugas, *Delphinapterus leucas*, and narwhals, *Monodon monoceros*, to ice-breaking ships in the Canadian High Arctic. Pp. 97–117 in T.G. Smith, D.J. St. Aubin, and J.R. Geraci (eds.), *Advances in research on the beluga whale, Delphinapterus leucas*. Canadian Bulletin of Fisheries and Aquatic Sciences 224.

Furthermore, the directive of section 101(a)(5)(D) of the Marine Mammal Protection Act is not just to determine whether the disturbance resulting from a stimulus at a certain threshold might result in the taking of marine mammals and whether the impact of such takings is negligible. Rather, the Act requires the Service to prescribe means of “effecting the least practicable impact” to the affected marine mammal species and stocks by, for example, minimizing any such disturbance to the extent practicable, irrespective of any presumed threshold. Although it may be reasonable to start with an assumption that, for some species, harassment is not likely to occur at sound levels less than 160 dB re 1 μ Pa (rms), for other species (e.g., bowhead and beluga whales) the available information indicates behavioral responses at much lower sound levels. This being the case, the Marine Mammal Commission recommends that the National Marine Fisheries Service require the applicant to collect information to evaluate the assumption that 160 dB re 1 μ Pa (rms) is the appropriate threshold at which harassment occurs for all marine mammals in the survey area. This assumption can and should be tested using in-situ measurements of sound propagation concurrent with observations of the responses of marine mammals exposed to such sounds. 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 re 1 μ Pa (rms) threshold for specific species and to improve future mitigation measures.

Mitigation

As the Commission has noted in previous correspondence, the effectiveness of ramp-up has yet to be empirically verified. The Service should not continue to assume that ramp-up constitutes effective mitigation without empirical verification. Such verification not only may require collecting opportunistic data but also designing and conducting studies to test specific hypotheses regarding the utility of ramp-up and analysis of responses of the various species encountered. Had the Service implemented a policy five years ago that required sound producers to collect and report data regarding the efficacy of ramp-up procedures, the scientific community would have had ample information for determining the utility of this mitigation measure. The Service’s continued failure to add this requirement is contrary to the notion of implementing science-based management methods. For those reasons, the Marine Mammal Commission recommends that the National Marine Fisheries Service require the applicant to make observations during all ramp-up procedures to gather the data needed to analyze and report on their effectiveness as mitigation. Such analyses would provide a stronger scientific basis for this particular monitoring measure. As it has noted in past

Mr. P. Michael Payne
2 August 2010
Page 7

correspondence, the Commission would be pleased to discuss with the Service the collection and analysis of such data and the design of such experiments to promote a better understanding of the utility and shortcomings of ramp-up as a mitigation measure.

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

Sincerely,



Timothy J. Ragen, Ph.D.
Executive Director