MARINE MAMMAL COMMISSION
4340 East-West Highway, Room 700
Bethesda, MD 20814-4447

8 June 2009

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 Lamont-Doherty Earth Observatory under section 101(a)(5)(D) of the Marine Mammal Protection Act. The applicant is seeking authorization to take small numbers of marine mammals by harassment incidental to conducting a marine seismic survey in the northeast Pacific Ocean during 2009. The Commission also has reviewed the National Marine Fisheries Service's 8 May 2009 *Federal Register* notice (74 Fed. Reg. 21631) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

The proposed survey is scheduled to take place from 17 August to 22 September 2009. Its purpose is to obtain information on the 3-D seismic structure of the crust and topmost mantle along an 80-km-long section of the Endeavor segment of the Juan de Fuca Ridge. The applicant would conduct the survey in the Exclusive Economic Zone of Canada, approximately 250 km southwest of Vancouver Island, British Columbia, within the Canadian Endeavour Marine Protected Area.

The applicant would use the R/V *Marcus G. Langseth* to tow a 36-airgun array (6,600 in^3) as an energy source. The sound source output of the array is 265 dB re 1µ Pa-m (peak-to-peak). The receiving system for the returning acoustic signals would consist of 64 ocean-bottom seismometers. In addition, the applicant would operate an 11.25–12.6-kHz multibeam echo sounder on a continuous basis and a sub-bottom profiler at selected times during the survey.

RECOMMENDATION

The Marine Mammal Commission recommends that, before issuing 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 safety 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 and those species for which it is relying on the effectiveness of passive acoustic monitoring, (2) describe detection probability as a function of distance from the observer, (3) describe changes in detection probability at night, and (4) explain how close

to the vessel marine mammals must be for observers to achieve the anticipated high nighttime detection rate;

- clarify the qualifier "when feasible" with respect to (1) using two marine mammal visual observers to monitor the exclusion zone for marine mammals during daytime operations and nighttime start-ups of the airguns and (2) using marine mammal visual observers during daytime periods to compare sighting rates and animal behavior during times when the seismic airguns are operating and times when they are not;
- extend the monitoring period to at least one hour before initiation of seismic activities or the resumption of airgun activities after a power-down because of a marine mammal sighting within the safety zone; and
- require that observations be made during all ramp-up procedures to gather the data needed to analyze and provide a report on the effectiveness of this method as a mitigation measure.

RATIONALE

The Service has preliminarily determined that the proposed activities would result, at most, in temporary modification in the behavior of small numbers of up to 24 cetacean species and 1 pinniped species and that any impact on the affected species is expected to be negligible. The Service also has preliminarily 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 avoided through the incorporation of the proposed mitigation measures. The Service believes that these determinations are reasonable because, among other things, (1) given sufficient notice by means of slow ship speeds and ramp-up of the seismic array, marine mammals are expected to move away from an annoying sound source prior to its becoming potentially injurious; (2) temporary threshold shift is unlikely to occur, especially in odontocetes, until they are exposed to sound levels greater than 180 dB re 1μ Pa (rms); (3) injurious levels of sound are only likely very close to the vessel; and (4) the monitoring program developed to avoid injury will be sufficient to detect (using visual detection and passive acoustic monitoring) with reasonable certainty all marine mammals within or entering the identified safety zones.

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 safety 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 and those species for which it is relying on the effectiveness of passive acoustic monitoring, (2) describe detection probability as a function of distance from the observer, (3) describe changes in detection probability 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 should undertake the studies needed to verify that the proposed monitoring program is likely to detect most marine mammals in or near those zones and/or to encourage development of alternative means of detecting marine mammals within the specified safety zones. Specifically, we note the following concerns.

Visual and passive acoustic monitoring

As discussed in previous letters commenting on similar activities by this and other applicants, the Commission continues to be concerned about the adequacy of visual monitoring alone to detect all marine mammals within the specified safety area. As recognized by the Service in the *Federal Register* notice concerning this application and in previous notices on similar requests, "[v]isual monitoring typically is not effective during periods of bad weather or at night and, even with good visibility, is unable to detect marine mammals when they are below the surface or beyond visual range." A study by Barlow 1999 supports this conclusion. That study found that "[a]ccounting for both submerged animals and animals that are otherwise missed by the observers in excellent survey conditions, only 23 percent of Cuvier's beaked whales and 45 percent of *Mesoplodon* beaked whales are estimated to be seen on ship surveys if they are located directly on the survey trackline." The *Federal Register* notice states that the applicant will conduct vessel-based passive acoustic monitoring to augment visual monitoring during daytime operations and at night to help detect, locate, and identify marine mammals that may be present. However, as the Service acknowledges, such monitoring is useful only when marine mammals vocalize, and its value is limited by water depth and other environmental factors. The effectiveness of passive acoustic monitoring will depend on the acoustic system and the ability of its operators to locate vocalizing cetaceans and to determine whether an acoustically detected cetacean is within the shutdown radius or in a position such that the ship's movement will place it within the shutdown radius. Cetaceans that are on the trackline of the ship may be particularly difficult to detect but are of relatively greater concern because of their location.

The *Federal Register* notice states that at least three marine mammal observers will be onboard the *Langseth* and, "when feasible," two marine mammal visual observers will monitor the exclusion zone for marine mammals during ongoing daytime operations and nighttime start-ups of the airguns. The term "when feasible" is not clear in this instance. Similarly, the notice states that "when feasible" marine mammal visual observers also will make observations during daytime periods when the seismic system is not operating "for comparison of sighting rates and animal behavior with vs. without airgun operations." Here again, the term "when feasible" is not clear. The Marine Mammal Commission recommends that, before issuing the requested authorization, the Service clarify the meaning of qualifier "when feasible" with respect to (1) using two marine mammal visual observers to monitor the exclusion zone for marine mammals during daytime operations and nighttime start-ups of the airguns and (2) using marine mammal visual observers during daytime periods to compare sighting rates and animal behavior during times when seismic airguns are operating and times when they are not.

Duration of monitoring prior to initial start-up and resumption of airgun activity

The Service's *Federal Register* notice states that the applicant will monitor the area for at least 30 minutes prior to the planned initiation of airgun operations. The notice also states that when airguns have been powered down because a marine mammal has been detected near or within the proposed safety zone, airgun activity will not resume until the marine mammal is outside the safety zone. Several species of cetaceans for which the applicant is seeking incidental take authority remain

submerged on most dives for more than 30 minutes. The Service's *Federal Register* notice states that "[s]perm whales undertake some of the longest and deepest-known dives among cetaceans…as deep as ~2 km and possibly deeper on rare occasions, for periods of over 1 h[our] (Tyack et al. 2006:4246)."

The application recognizes that Baird's beaked whales and Cuvier's beaked whales can stay submerged for up to 67 minutes (Kasuya 2002) and 58 minutes (Tyack et al. 2006), respectively. Accordingly, the Commission does not believe that monitoring for 30 minutes prior to the planned start or resumption of airgun operations is sufficient to allow detection of those species. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service extend the monitoring period to at least one hour before initiation of seismic activities or one hour before the resumption of airgun activities after a power-down because of a marine mammal sighting within the safety zone.

The Commission also notes that although the effectiveness of ramp-up is plausible, it has yet to be verified empirically. For that reason, the Marine Mammal Commission recommends that observations be made during all such procedures to gather data on its effectiveness as a mitigation measure. In the Commission's opinion, the Service cannot continue to assume that ramp-up constitutes an effective mitigation without empirical verification.

In its 22 January 2009 letter (copy enclosed and incorporated by reference) regarding the applicant's survey in the South and East China Seas and the Philippines, the Commission noted that most of the issues raised here have been raised before, with apparently little having been done to resolve them. The Commission will be sending a letter of invitation to the National Marine Fisheries Service, the National Science Foundation, and the Lamont-Doherty Earth Observatory to meet to discuss (1) existing research plans and needs regarding monitoring and mitigation measures and mechanisms to ensure that the essential research is conducted and (2) possible procedural improvements (e.g., outreach) to ensure that potentially valuable comments from experts outside the United States are considered when research supported by the United States is conducted in foreign waters.

Please contact me if you or your staff has questions about the Commission's comments and recommendations.

Sincerely,

Timothy J. Ragen

Timothy J. Ragen, Ph.D.
Executive Director

Enclosure

Literature Cited

Barlow, J. 1999. Trackline detection probability for long-diving whales. Pages 209–221 *in* G. W. Garner, S. C. Amstrup, J. L. Laake, B. F. J. Manly, L. L. McDonald, and D. G. Robertson (eds.), Marine Mammal Survey and Assessment Methods. Balkema, Rotterdam, The Netherlands.

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Tyack, P. L., M. Johnson, N. Aguilar Soto, A. Sturlese, and P. T. Madsen. 2006. Extreme diving of beaked whales. Journal of Experimental Biology 209(21):4238–4253.