

programs for further processing and archiving.

A draft report will be submitted to NMFS within 90 days after the end of the seismic program in the Bermuda Rise area. The report will describe the operations that were conducted and the marine mammals that were detected. The report will be submitted to NMFS, providing full documentation of methods, results, and interpretation pertaining to all monitoring tasks. The draft report will summarize the dates and locations of seismic operations, marine mammal sightings (dates, times, locations, activities, associated seismic survey activities), and estimates of the amount and nature of potential take of marine mammals by harassment or in other ways. The draft report will be considered the final report unless comments and suggestions are provided by NMFS within 60 days of its receipt of the draft report.

Estimates of Take by Harassment for the Bermuda Cruise

As described previously (68 FR 17909, April 14, 2003) and in the LDEO application, animals subjected to sound levels ≤ 160 dB may alter their behavior or distribution, and therefore might be considered taken by Level B harassment under NMFS' current criteria.

The estimates of takes by harassment are based on the number of marine mammals that might be exposed to seismic sounds ≥ 160 dB re 1 μ Pa (rms) by operations with the 20-airgun array planned for the project. Taken from year-round marine mammal density aerial survey data that has been summarized by geographic location and calendar season (CETAP 1982), LDEO used densities for the "Entire Atlantic Stratum" during the autumn period to estimate the numbers of marine mammals that are likely to be present in the proposed survey area near Bermuda. These densities are probably overestimates of the numbers that are likely to be present, because much of the proposed seismic survey area is farther from shore, in greater water depths, and in generally much less productive waters. Because the CETAP (1982) surveys were conducted from an airplane, few beaked whales were seen or identified, and densities of beaked whales were estimated to be zero during the autumn surveys. More than likely there are small numbers of beaked whales in the proposed survey area throughout the year, so LDEO used the mean density for the entire year to estimate the densities of beaked whales that might be present.

Except for beaked whales, LDEO used its best estimate of density to compute

a best estimate of the number of marine mammals that may be exposed to seismic sounds ≥ 160 dB re 1 μ Pa (rms). The best density estimates were multiplied by the linear extent of the proposed survey (1200 km or 648 n.mi. for each of the 8575 and approximately 11,000 in³ arrays) and by twice the 160-dB safety radius around the applicable 20-airgun arrays to estimate the "best estimate" of the numbers of animals of each species that might be exposed to sound levels ≥ 160 dB re 1 μ Pa (rms) during the proposed seismic survey program.

Based on this method, table 3 in the LDEO application gives the best estimates, as well as maximum estimates, of densities for each species or species group of marine mammal that might be exposed to received levels ≥ 160 dB re 1 P~a (rms), and thus potentially taken by Level B harassment during seismic surveys in the proposed study area of the Northwest Atlantic Ocean near Bermuda. It is assumed that the 20-airgun array would be used for all surveys but that air volume would be 8575 in³ for half of the survey and approximately 11,000 in³ for half of the survey. Delphinidae would account for 94 percent of the overall estimate for potential taking by harassment (i.e., 10,292 of 10,910), with short-beaked common dolphins (3941) and pilot whales (3345) believed to account for about 71 percent of all delphinids in the area of the proposed seismic survey, and with smaller numbers of bottlenose dolphins (1871), Risso's dolphins (858), and striped dolphins (277) accounting for most of the remaining 29 percent. While there is no agreement regarding any alternative "take" criterion for dolphins exposed to airgun pulses, if only those dolphins exposed to ≥ 170 dB re 1 μ Pa (rms) were to be affected sufficiently to be considered taken by Level B harassment, then the best estimate for common dolphins would be 1191 rather than 3941 during the Bermuda Rise cruise, and for pilot whales it would be 1011 instead of 3345. These are based on the predicted 170-dB radius around the 20-airgun arrays (2600 m or 8530 ft for the 8575 in³ array and 2900 m or 9514 ft for the approximately 11,000 in³ array), and are considered to be more realistic estimates of the number of these species that may be harassed. Therefore, the total number of animals likely to be harassed is considerably lower than the 10,910 animals that LDEO has estimated.

Conclusions

Effects on Cetaceans

The proposed airgun array configurations are larger than those used in many seismic projects; however, shot intervals are longer than during many surveys and so marine mammals will be exposed to fewer seismic pulses than during many other similar seismic surveys. The pulse interval for the 8575 in³ gun array is 20 seconds and is 240 seconds for the approximately 11,000 in³ array.

Strong avoidance reactions by several species of mysticetes to seismic vessels have been observed at ranges up to 6 to 8 km (3.2 to 4.3 nm) and occasionally as far as 20–30 km (10.8–16.2 nm) from the source vessel. Some bowhead whales in Arctic waters avoided waters within 30 km (16.2 nm) of the seismic operation. However, reactions at such long distances appear to be atypical of other species of mysticetes, and even for bowheads may only apply during migration.

Odontocete reactions to seismic pulses, or at least those of dolphins, are expected to extend to lesser distances than are those of mysticetes. Odontocete low-frequency hearing is less sensitive than that of mysticetes, and dolphins are often seen from seismic vessels. There are documented instances of dolphins approaching active seismic vessels. However, dolphins as well as some other types of odontocetes sometimes show avoidance and/or other changes in behavior when near operating seismic vessels.

Taking account of the mitigation measures that are planned, effects on cetaceans are generally expected to be limited to avoidance of the area around the seismic operation and short-term changes in behavior, falling within the MMPA definition of "Level B harassment." Reactions by mysticetes are expected to involve small numbers of individual cetaceans because few mysticetes occur in the area where seismic surveys are proposed. Reactions by mysticetes are expected to involve small numbers of individual cetaceans. For fin whales, LDEO's best estimate is that 501 fin whales, or 1.1 percent of the estimated North Atlantic population for this species (IWC 2003) will be exposed to sound levels ≥ 160 dB re 1 μ Pa (rms) during the proposed cruise near Bermuda. Therefore, based on the relatively low numbers of marine mammals that will be exposed at levels ≥ 160 dB and the expected impacts at these levels, NMFS has determined that this action will have a negligible impact on the affected species or stocks.