

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 Mid-Atlantic Cruises

As described previously (*see* 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 to be taken by Level B harassment.

The estimates of takes by harassment are based on the number of marine mammals that may be exposed to seismic sounds ≥ 160 dB re 1 μ Pa (rms) by operations with the 20-airgun array and the 2 GI-guns, during the TAG and ADWBC cruises, respectively. Based on marine mammal density sightings and effort data collected during a survey of offshore waters northeast of the Azores by Lens (1991), LDEO used their estimates of marine mammal density to compute the best (and maximum) estimates of the number of marine mammals that may be exposed to received levels ≥ 160 -dB re 1 μ Pa (rms) (NMFS' current criterion for onset of Level B harassment). The best estimates of densities were then multiplied by the linear extent of the proposed survey effort and by twice the 160-dB radius around the applicable airgun array. The proposed survey effort is 185 km (100 n.mi.) for the TAG cruise, and 4329 km (2340 n.mi.) for the ADWBC cruise. The 160-dB radius for the TAG cruise (20-gun array) is 9000 m (29,529 ft), whereas that for the ADWBC cruise (2 GI-guns) is 510 m (1673 ft). For large cetaceans, LDEO used 0.5x the densities seen during the Lens (1991) survey to calculate the numbers that might be exposed to seismic sounds, but even this reduced number is likely a high estimate, because the proposed survey areas are likely less productive, so feeding aggregations similar to those seen by Lens (1991) are not likely to be seen. In particular, the two areas where the proposed surveys will be conducted are farther offshore and likely in less productive waters than the area surveys northeast of the Azores (Lens 1991). Thus, densities are likely to be much lower in the two survey areas than in the Lens (1991) survey area.

Based on this method, tables 3 and 4 of LDEO's application give the best estimates, as well as maximum estimates, of densities for each species or species group of cetacean in the two

seismic survey areas during the TAG and ADWBC cruises, respectively, that might be exposed to received levels ≥ 160 dB re 1 μ Pa (rms), and thus potentially taken by Level B harassment, during seismic surveys in the proposed study areas of the Mid-Atlantic Ocean. During the TAG cruise, 38 of the marine mammals exposed to sounds ≥ 160 dB re 1 μ Pa (rms) would be endangered species, primarily fin (18) and sperm whales (15). During the ADWBC cruise, 49 of the marine mammals exposed to sounds ≥ 160 dB re 1 μ Pa (rms) would be endangered species, primarily fin (24) and sperm whales (20). During both research cruises, Delphinidae would account for 92 percent of the overall estimate for potential taking by harassment during each of the two seismic surveys (*i.e.*, 709 of 772 (TAG) and 943 of 1028 (ADWBC)). While there is no agreement regarding any alternative to the 160-dB "take" criterion for dolphins exposed to airgun pulses, if only those dolphins exposed to ≥ 170 dB re 1 μ Pa (rms) were considered taken by Level B harassment, then the best estimate for common dolphins (the most abundant dolphin in the area) would be 91 rather than 316 during the TAG cruise, and 144 rather than 419 during the ADWBC cruise. These are based on the predicted 170-dB radius around the 20- and 2-airgun arrays (2600 and 175 m (8530 and 574 ft), respectively), and are considered to be more realistic estimates of the number of each species of delphinid that may be harassed, given their apparently higher tolerance of low frequency sound. Therefore, the total number of animals likely to be harassed is considerably lower than the estimated 772 (TAG cruise) animals or 1028 (ADWBC cruise) animals.

Conclusions

Effects on Cetaceans

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. For Bryde's whales, LDEO's best estimate is that 1 animal during each of the cruises, which translates to 3 percent of the North Atlantic population for this species in the area of the TAG survey, and 1.5 percent of the North Atlantic population for this species in the area of the ADWBC survey, has the potential to be exposed to sound levels ≥ 160 dB re 1 μ Pa (rms) and potentially affected. LDEO's best estimate is that 18 (TAG) and 24 (ADWBC) fin whales, both of which are < 0.1 percent of the estimated North Atlantic fin whale population (IWC 2003), will be exposed to sound levels ≥ 160 dB re 1 μ Pa (rms) and potentially affected. Similarly, only 15 (TAG) and 20 (ADWBC) sperm whales, or approximately 0.1 and 0.2 percent of the estimated North Atlantic sperm whale population, would receive seismic sounds ≥ 160 dB. 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.

Large numbers of odontocetes may be affected by the seismic activities, but the populations sizes of most of the species are large and the numbers potentially affected are small relative to the population sizes. The best estimate of the total number of odontocetes that might be exposed to ≥ 160 dB re 1 μ Pa (rms) in the proposed survey areas in the Mid-Atlantic Ocean is 746 for the TAG cruise, and 991 for the ADWBC cruise. Of these, 709 (TAG cruise) and 943 (ADWBC cruise) are Delphinidae, and of these about 204 (TAG cruise) and 322 (ADWBC cruise) might be exposed to ≥ 170 dB. Approximately 316 and 419 common dolphins (the most abundant delphinid in the proposed survey areas) are expected to be exposed to seismic sounds ≥ 160 dB in the TAG and