

11, 2003). One of the alternatives addressed in that EA was for alternative seasons of the year, which would include the time of the subject SIO survey. In addition, the acoustic survey described in this document by SIO will use acoustic instruments that are significantly less intense (total volume of 90 in<sup>3</sup>) and will therefore have a significantly lower impact on the marine environment than acoustic sources used by the *R/V Maurice Ewing* addressed in the EA. Furthermore, under NAO 216-6, this is an action of limited size or magnitude. Therefore, based on that EA, and a review of the information contained in the IHA application from Scripps, NMFS determined that this action will not have a significant effect, individually or cumulatively, on the human environment. Accordingly, the action is categorically excluded from the need to prepare another EA or environmental impact statement. A copy of the categorical exclusion documentation has been sent to the CBD as requested.

**Comment 8:** Direct impacts of SIO's project on the environment include but are not limited to its effects on marine mammals, fish species, and other sea creatures, such as the giant squid, an important food source for sperm whales that has recently suffered injury linked to acoustic testing. NMFS has failed to assess the cumulative impacts of SIO's project in conjunction with other actions on the environment. A proper cumulative impacts analysis in this case should include past, present, and reasonably foreseeable seismic and other actions in the area.

**Response:** The EA relied upon here describes impacts, both individual and cumulative on marine mammals, sea turtles, and other marine life. Scientific information providing a link between low frequency seismic research and squid is limited (see McCauley *et al.*, 2000). A recent news-wire article noting the possible linkage between Spanish naval exercises and a stranding of several large squid does not establish a causal link until (or if) necropsies can be conducted on those animals.

### Mitigation

For the proposed seismic operations in the ETP, SIO will use 2-GI guns with a total volume of 90 in<sup>3</sup> (1475 cc). These airguns will be spread out horizontally, so that the energy from the array will be directed mostly downward. The following mitigation measures, as well as marine mammal monitoring, will be adopted during the proposed ETP seismic survey program.

### Safety Radii

SIO has adopted conservative methods in defining safety zone calculations using (i) a 9-dB difference between peak-to-peak (p-p) and rms, and (ii) spherical spreading of the sound, even though it is clear that at the low acoustic frequencies which dominate SIO's airgun output, the generated sound pulses have considerable directivity, favoring downward propagation over horizontal propagation. This is because in the near-horizontal direction the direct gun pulse is closely followed by the opposite-phased bounce off the sea surface, if the source is within an acoustic wavelength of the surface. This effect can reduce the effective near-horizontal output by as much as 10 dB. Because the actual seismic source is a distributed sound source rather than a single point source, the highest sound levels measurable at any location in the water will be less than the nominal source level.

The pair of simultaneously fired airguns would have a p-p amplitude of 236 dB re 1  $\mu$ Pa. Converting to rms using the 9 dB difference between p-p and rms for a sine wave yields an output level of 227 dB rms. Therefore, SIO's modeled results for the 2-gun array indicate that, assuming spherical spreading, the paired guns would produce sound levels of 180 dB re 1  $\mu$ Pa (rms) at a range of about 225 m (738 ft); i.e., the radius around the 2-gun array where the received level would be 180 dB re 1  $\mu$ Pa (rms), is estimated to be 225 m (738 ft). The effect of using a conservative calculation, which yields this safety zone for 180 dB rms sound, is to build a safety factor into the airgun shut-down radius; this is desirable because mammals may not be observed while submerged, and might move towards the acoustic sources during dives.

### Shutdown Procedures

SIO proposes to shut down seismic sources whenever marine mammals are observed close enough to the vessel that they are at risk of exposure to sound levels greater than 180 dB (rms), where there is a possibility of Level A harassment. Airgun operations will be suspended immediately when marine mammals are observed within, or about to enter, this designated safety zone.

### Ramp-up Procedures

SIO will not proceed with powering up the seismic airgun array unless the safety zone is visible and no marine mammals are detected within the appropriate safety zones or until 15 minutes (for small odontocetes and

pinnipeds) or 30 minutes (for mysticetes/large odontocetes) after there has been no further visual detection of the mammal(s) within the safety zone and the trained marine mammal observer on duty is confident that no marine mammals or sea turtles remain within the appropriate safety zone. Once the safety zone is clear of marine mammals, the observer will advise that seismic surveys can re-commence.

A standard "ramp-up" (soft start) procedure will be followed when the airgun array begins operating after a period without any airgun operations as specified in this paragraph. From shut-down, ramp-up will commence such that the source level of the array will increase in steps not exceeding approximately 6 dB per 5-minute period. Prior to ramp-up, SIO will conduct a 30-minute period of observation by at least one trained marine mammal observer at the commencement of seismic operations and at any time electrical power to the airgun array is discontinued for a period of 1 hour or more. SIO will not commence with ramping-up of the airguns unless the complete safety radii are visible for at least 30 minutes prior in either daylight or nighttime. SIO will not initiate seismic profiling during darkness.

### Course Alteration

If a marine mammal is detected at any range beyond the 225 m (738 ft) safety radius but, based on its position and the relative motion, appears to be on a converging course with the ship while profiling is underway, the vessel will be maneuvered in an attempt to maintain a range greater than the shut-down radius. The marine mammal activities and movements relative to the seismic vessel will be closely monitored to ensure that the marine mammal does not approach within the safety radius. If the mammal appears likely to enter the safety radius, further mitigative actions will be taken, i.e., either further course alterations or shutdown of the airguns.

Because of the relative ineffectiveness of mammal observers during darkness (even though the vessel is equipped with night-vision binoculars), seismic reflection profiling will be concentrated during daylight hours.

### Monitoring and Reporting

Effective implementation of these procedures requires surveillance by appropriately equipped skilled observers, who will monitor for marine mammals in the vicinity of the array. Each leg of the cruise will be staffed with two observers who have previously worked for the Southwest Fisheries