

seismic operations in the GOM over the next 5 years.

### Description of Marine Mammals Affected by the Activity

There are 29 species of marine mammals documented as occurring in Federal waters of the GOM. General information on these species can be found in NMFS Stock Assessment Reports (Waring, 2001, 2002). These documents are available at: [http://www.nmfs.noaa.gov/prot\\_res/PR2/Stock\\_Assessment\\_Program/sars.html](http://www.nmfs.noaa.gov/prot_res/PR2/Stock_Assessment_Program/sars.html)/ Stock Assessment Reports.

Any of these 29 marine mammal species may be exposed to acoustic energies introduced into Federal waters by seismic survey operations. At this time, the MMS is requesting authorization of take for only GOM sperm whales under this petition; therefore, the remainder of this section addresses this species only. Additional information on sperm whales in the GOM is available in NMFS (2002a), which is available for viewing or downloading at: [http://www.nmfs.noaa.gov/prot\\_res/overview/publicat.html](http://www.nmfs.noaa.gov/prot_res/overview/publicat.html)/ section.

Sperm whales are the most abundant large cetacean in the GOM, and are the most important Gulf cetacean in terms of collective biomass. The GOM sperm whales are comprised of mostly female and juvenile animals, although a few large bulls have been sighted in the northern Gulf. Some large males have been observed in the Gulf in recent summer surveys, particularly in the DeSoto Canyon region. Calves are frequently sighted. The GOM sperm whale abundance has recently been estimated by NMFS at 1,213 (CV 0.35) whales with a minimum population estimate of 911 whales. The presence of cow/calf pairs indicates that the northern GOM is a biologically important nursery area for sperm whales. Based on seasonal aerial surveys, sperm whales are present in the northern GOM in all seasons, but sightings in the northern GOM are more common during the summer months. Based on recent survey efforts, areas of concentration appear to be off the Mississippi River Delta, off Southern Florida, and off South Texas.

Sperm whales have been observed throughout the GOM from the upper continental slope near the 100-m (328.1-ft) isobath to the seaward extent of the U.S. Exclusive Economic Zone (EEZ) and beyond. It should be noted that both the apparent seasonality and the areas of concentration could be affected by, or the result of, geographic and seasonal patterns of existing

surveys and, as such, should be considered tentative findings.

### Potential Effects of Seismic Activities on Marine Mammals

The Federal waters of the GOM are inhabited by a diverse assemblage of marine mammal species, including the sperm whale. Seismic surveys are conducted in these waters, and acoustic energies introduced into Gulf waters may adversely impact marine mammals in the vicinity of the activity. The potential adverse impacts to Gulf sperm whales are detailed in NMFS (2002a). Additional information describing potential impacts is documented in MMS (2002b). Because loud underwater noise has the potential to harass, injure, and possibly cause the mortality of marine mammals, MMS is seeking an authorization, under the MMPA, for the harassment, injury, and/or mortality of sperm whales in GOM that may occur as a result of seismic surveys as described in this document and in MMS (2002a and 2002b). While the serious injury or mortality of sperm whales or other marine mammals is believed to be unlikely, especially due to the implementation of effective mitigation measures to protect marine mammals (see Mitigation), MMS has requested authorization for takings by incidental mortality at least until additional impact assessments are completed under NEPA and any rulemaking. This authorization is being sought by the MMS on the behalf of the offshore oil and gas industry and seismic contractors operating within the GOM.

As outlined in several previous NMFS documents, the effects of noise on marine mammals are highly variable, and can be categorized as follows (based on Richardson et al., 1995):

- (1) The noise may be too weak to be heard at the location of the animal (i.e., lower than the prevailing ambient noise level, the hearing threshold of the animal at relevant frequencies, or both);
- (2) The noise may be audible but not strong enough to elicit any overt behavioral response;
- (3) The noise may elicit reactions of variable conspicuousness and variable relevance to the well being of the marine mammal; these can range from temporary alert responses to active avoidance reactions such as vacating an area at least until the noise event ceases;
- (4) Upon repeated exposure, a cetacean may exhibit diminishing responsiveness (habituation), or disturbance effects may persist; the latter is most likely with sounds that are highly variable in characteristics, infrequent and unpredictable in occurrence (as are vehicle launches),

and associated with situations that a marine mammal perceives as a threat;

(5) Any anthropogenic noise that is strong enough to be heard has the potential to reduce (mask) the ability of a cetacean to hear natural sounds at similar frequencies, including calls from conspecifics, and underwater environmental sounds such as surf noise;

(6) If mammals remain in an area because it is important for feeding, breeding or some other biologically important purpose even though there is chronic exposure to noise, it is possible that there could be noise-induced physiological stress; this might (in turn) have negative effects on the well-being or reproduction of the animals involved; and

(7) Very strong sounds have the potential to cause temporary or permanent reduction in hearing sensitivity. In terrestrial mammals, and presumably marine mammals, received sound levels must far exceed the animal's hearing threshold for there to be any temporary threshold shift (TTS). For transient sounds, the sound level necessary to cause TTS is inversely related to the duration of the sound. Received sound levels must be even higher for there to be risk of permanent hearing impairment. In addition, intense acoustic or explosive events may cause trauma to tissues associated with organs vital for hearing, sound production, respiration and other functions. This trauma may include minor to severe hemorrhage.

Sperm whales spend large amounts of time at depth and use low frequency sound to communicate and navigate. Therefore, they are considered sensitive to the marine acoustic environment and may respond to sound emissions in many ways. Reactions to acoustic emissions may include, but are not limited to, cessation of vocalizations, disruption of feeding and dive behaviors, and physical avoidance. Seismic operations can introduce noise into the sea that may cause temporary or permanent hearing impairment in marine mammals if the noise is strong enough and/or if the animal is in close proximity to the sound source when transmitting. Such impairment could have the potential to diminish the individual's chance for survival. Tolerance of noise is often demonstrated, but this does not prove that the animals are unaffected by noise; adverse levels of noise might interrupt or decrease feeding activity, social interactions, or parenting (e.g. nursing calves, if the interruption is extended). Therefore, behavioral responses causing adverse effect to individuals and cow/