SPERM WHALE (*Physeter macrocephalus*): Northern Gulf of Mexico Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Sperm whales are found throughout the world's oceans in deep waters from between about 60° N and 60° S latitudes (Leatherwood and Reeves 1983; Rice 1989). There has been speculation, based on year round occurrence of strandings, opportunistic sightings, and whaling catches, that sperm whales in the Gulf of Mexico may constitute a distinct stock (Schmidly 1981), but there is no information on stock differentiation. Seasonal aerial surveys confirm that sperm whales are present in the northern Gulf of Mexico in all seasons, but sightings are more common during the summer months (Mullin et al. 1991; Davis et al., in preparation).

POPULATION SIZE

Estimates of abundance were derived through the application of distance sampling analysis (Buckland et al. 1993) and the computer program DISTANCE (Laake et al. 1993) to sighting data collected during 1991-1994 spring-summer, visual sampling, line-transect vessel surveys of the northern Gulf of Mexico (Hansen et al. 1995) (Fig. 1), which includes data collected as part of the GulfCet program (Davis et al., in preparation). These surveys were conducted throughout the area from approximately the 200 m isobath along the U.S. coast to the seaward extent of the U.S. Exclusive Economic Zone.

The seasonal GulfCet aerial surveys included only a small portion of the stock range and these data were not used for abundance estimation. Estimated abundance of sperm whales by survey year [coefficient of variation (CV) in parentheses] was 143 in 1991 (0.58), 931 in 1992 (0.48), 229 in 1993 (0.52), and 771 in 1994 (0.42) (Hansen et al. 1995). Survey effort-weighted estimated average abundance of sperm whales for all surveys combined was 530 (CV = 0.31) (Hansen et al. 1995).

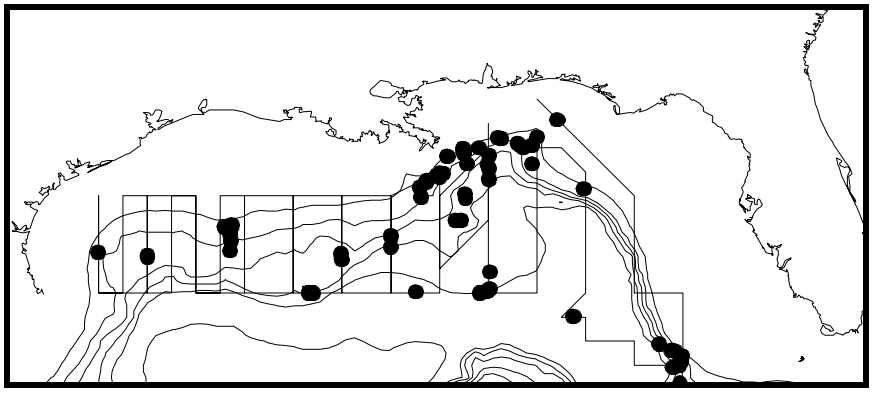

Figure 1. *Distribution of sperm whale sightings during NOAA Ship Oregon II marine mammal surveys during 1991-1994. The straight lines show transects during two ship surveys and are examples of typical ship survey transects. Isobaths are in 183 m (100 fm) intervals.*

Minimum Population Estimate

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normal distributed abundance estimate, which is equivalent to the 20th percentile of the log-normal distributed abundance estimate as specified by NMFS (Anon. 1994). The minimum population estimate was calculated from the 1991-1994 average abundance estimate of 530 sperm whales (CV = 0.31) (Hansen et al. 1995) and is 411 sperm whales.

Current Population Trend

No trend was discernable in the average annual abundance estimates. All of the log-normal 95% confidence intervals of the annual estimates overlap, indicating that the estimates were not significantly different at that level. The variation in abundance estimates may represent inter-annual variation in distribution, rather than a change in abundance.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are not known for this stock; therefore, the default maximum net productivity rate of 0.04 (Anon. 1994) was used for purposes of this assessment.

POTENTIAL BIOLOGICAL REMOVAL

Potential biological removal level (PBR) was specified as the product of the minimum population size, one half the maximum net productivity rate, and a recovery factor for endangered, threatened, or depleted stocks, or stocks of unknown status relative to optimum sustainable population (OSP) (Anon. 1994). The recovery factor was 0.10 because sperm whales are an endangered species. The resulting PBR for this stock is 0.8 sperm whales.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

A commercial fishery for sperm whales operated in the Gulf of Mexico during the late 1700's to the early 1900's, but the exact number of whales taken is not known (Townsend 1935).

The level of current, direct, human-caused mortality and serious injury of sperm whales in the northern Gulf of Mexico is unknown, but available information indicates there likely is little, if any, fisheries interaction with sperm whales in the northern Gulf of Mexico.

There were no documented strandings of sperm whales in the northern Gulf of Mexico during 1987-1994 which were classified as likely caused by fishery interactions or other human-related causes. Stranding data probably underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals which die or are seriously injured may wash ashore, nor will all of those that do wash ashore necessarily show signs of entanglement or other fishery-interaction. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interaction.

The total known fishery-related mortality and serious injury for this stock is less than 10% of the calculated PBR and, therefore, can be considered insignificant and approaching zero mortality and serious injury rate. This determination cannot be made for specific fisheries until the implementing regulations for Section 118 of the MMPA have been reviewed by the public and finalized.

Fisheries Information

Pelagic swordfish, tunas, and billfish are the targets of the longline fishery operating in the U.S. Gulf of Mexico. Total longline effort for the Gulf of Mexico pelagic fishery, including OCS edge, continental slope, and Mexican territorial waters, based on mandatory logbook reporting, was 4,400 sets in 1991, 4,850 sets in 1992, and 3,260 sets in 1993 (Cramer 1994). This fishery has been monitored with about 5% observer coverage, in terms of trips observed, since 1992. There were no reports of mortality or serious injury to sperm whales by this fishery.

Pair trawl fishing gear has the potential to capture marine mammals, but there have been no reports of mortality or serious injury to marine mammals in the Gulf of Mexico. This fishery has not been observed by NMFS observers, and there are no other data available as to the extent of this fishery in the Gulf of Mexico. It is assumed that it is very limited in scope and duration.

Other Mortality

A total of nine sperm whale strandings were documented in the northern Gulf of Mexico during 1987-1994. One of the whales had deep, parallel cuts posterior to the dorsal ridge that were believed to be caused by the propeller of a large vessel. This trauma was assumed to be the proximate cause of this stranding.

Stranding data probably underestimate the extent of fishery-related mortality and serious injury because not all of the marine mammals which die or are seriously injured may wash ashore, nor will all of those that do wash ashore necessarily show signs of entanglement or other fishery-interaction. Finally, the level of technical expertise among stranding network personnel varies widely as does the ability to recognize signs of fishery interaction.

STATUS OF STOCK

Stock size is considered to be low relative to OSP and the species is therefore listed as endangered under the Endangered Species Act (ESA). There are insufficient data to determine population trends. The total level of human-caused mortality and serious injury is unknown, but it is believed to be insignificant; however, because this species is

listed as endangered and there is presently no recovery plan in place, any fishery-related mortality would be unlawful. This is a strategic stock because the sperm whale is listed as an endangered species under the ESA.

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