PYGMY SPERM WHALE (*Kogia breviceps*): Western North Atlantic Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

The pygmy sperm whale (*Kogia breviceps*) appears to be distributed worldwide in temperate to tropical waters (Caldwell and Caldwell 1989). Sightings of these animals in the Western North Atlantic occur in oceanic waters (Mullin and Fulling 2003; SEFSC unpublished data). Pygmy sperm whales and dwarf sperm whales (*K. sima*) are difficult to distinguish and sightings of either species are often categorized as *Kogia* spp. There is no information on stock differentiation for the Atlantic population. In a recent study using hematological and stable-isotope data, Barros *et al.* (1998) speculated that dwarf sperm whales may have a more pelagic distribution than pygmy sperm whales, and/or dive deeper during feeding bouts.

POPULATION SIZE

An abundance of 115 (CV=0.61) for *Kogia* spp. was estimated from a line-transect survey conducted from July 6 to September 6, 1998, by a ship and plane that surveyed 15,900 km of track line in waters north of Maryland (38° N) (Fig. 1; Palka *et al.,* in review). Shipboard data were analyzed using the modified direct duplicate method (Palka 1995) that accounts for school size bias and *g(0)*, the probability of detecting a group on the track line. Aerial data were not corrected for *g(0)*.

An abundance of 580 (CV=0.57) for *Kogia* spp. was estimated from a shipboard line-transect sighting survey conducted between 8 July and 17 August 1998 that surveyed 4,163 km of track line in waters south of Maryland (38°N) (Fig. 1; Mullin and Fulling 2003). Abundance estimates were made using the program DISTANCE (Buckland *et al.* 2001; Thomas *et al.* 1998).

The best available abundance estimate for *Kogia* spp. is the sum of the estimates from the two 1998 U.S. Atlantic surveys, 695 (CV=0.49), where the estimate from the northern U.S. Atlantic is 115 (CV=0.61) and from the southern U.S. Atlantic is 580 (CV=0.57). This joint estimate is considered best because together these two surveys have the most complete coverage of the species' habitat.

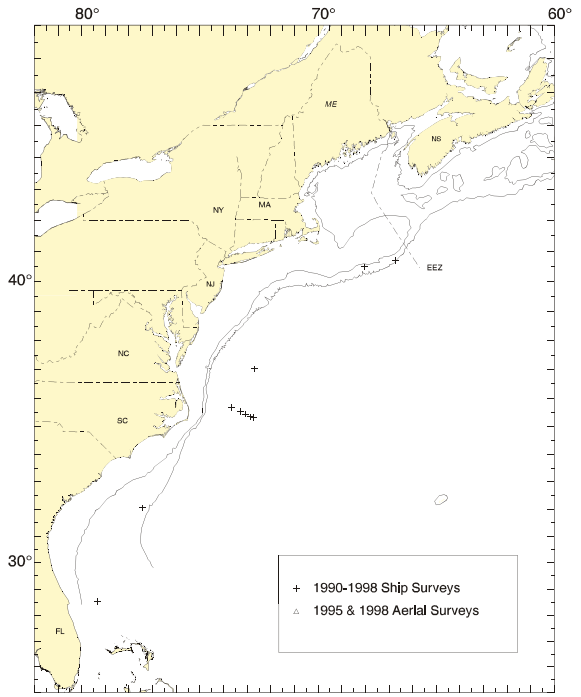

Figure 1. Distribution of *Kogia* spp. whale sightings from NEFSC and SEFSC vessel and aerial summer surveys during 1990-1998. Isobaths are at 100 m and 1,000 m.

Minimum Population Estimate

The minimum population estimate is the lower limit of the two-tailed 60% confidence interval of the log-normally distributed best abundance estimate. This is equivalent to the 20th percentile of the log-normal distribution as specified by Wade and Angliss (1997). The best estimate of abundance for *Kogia* spp. is 695 (CV=0.49). The minimum population estimate for *Kogia* spp. is 470.

Current Population Trend

The available information is insufficient to evaluate trends in population size for this species in the western North Atlantic.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Current and maximum net productivity rates are unknown for this stock. For purposes of this assessment, the maximum net productivity rate was assumed to be 0.04. This value is based on theoretical modeling showing that cetacean populations may not grow at rates much greater than 4% given the constraints of their reproductive life history (Barlow *et al*. 1995).

POTENTIAL BIOLOGICAL REMOVAL

Potential biological removal (PBR) is the product of minimum population size, one-half the maximum productivity rate, and a "recovery" factor (Wade and Angliss 1997). The minimum population size is 470. The maximum productivity rate is 0.04, the default value for cetaceans. The "recovery" factor, which accounts for endangered, depleted, threatened stocks, or stocks of unknown status relative to optimum sustainable population (OSP) is assumed to be 0.5 because this stock is of unknown status. PBR for the western North Atlantic *Kogia* spp. is 4.7.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

There has been one logbook report of fishery-related serious injury recorded off the east coast of Florida in 2000 (Table 1) (Yeung 2001). The resultant estimated mean annual mortality is 6 pygmy sperm whales (CV=1.00) for the years 1996-2000.

Fisheries Information

One observed serious injury was reported in 2000 in the pelagic longline fishery (Table 1).

Table 1. Summary of the incidental mortality of pygmy sperm whales (*Kogia breviceps*) by commercial fishery including the years sampled (Years), the number of vessels active within the fishery (Vessels), the type of data used (Data Type), the annual observer coverage (Observer Coverage), the observed mortalities and serious injuries recorded by on-board observers, the estimated annual mortality and serious injury, the combined annual estimates of mortality and serious injury (Estimated Combined Mortality), the estimated CV of the combined estimates (Estimated CVs) and the mean of the combined estimates (CV in parentheses).

Fishery	Years	Vessels [3]	Data Type [1]	Observer Coverage	Observed Serious Injury	Observed Mortality	Estimated Serious Injury	Estimated Mortality	Estimated Combined Mortality	Estimated CVs	Mean Annual Mortality
Pelagic Longline[2]	96-00	253, 245, 205, 193, 186	Obs. Data Logbook	.03, .03, .03, .04, .04	0, 0, 0, 0, 1	0, 0, 0, 0, 0	0, 0, 0, 0, 28	0, 0 ,0 ,0, 0	0, 0, 0, 0, 28 [2]	0, 0, 0, 0, 1.0	6 (1.0)
TOTAL											6 (1.0)

[1] Observer data (Obs. Data) are used to measure bycatch rates, and the data are collected within the Southeast Fisheries Science Center (SEFSC) Observer Program. NEFSC collects landings data (Weighout), and total landings are used as a measure of total effort for the coastal gillnet fishery. Observed bycatch rates are raised to total fishing effort reported to the SEFSC Atlantic Large Pelagic Logbook.

[2] The 2000 mortality estimates were taken from Table 10 in Yeung 2001(NMFS Miami Laboratory PRD 00/01-17), and exclude the Gulf of Mexico.

[3] Number of vessels in the fishery are based on vessels reporting effort to the pelagic longline logbook.

There were no documented strandings of pygmy sperm whales along the U.S. Atlantic coast during 1987-2002 which were classified as likely caused by fishery interactions. 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.

Other Mortality

Historical stranding records (1883-1988) of pygmy sperm whales in the southeastern U.S. (Credle 1988) and strandings recorded during 1988-1997 (Barros *et al.* 1998) indicate that this species accounts for about 83% of all *Kogia* strandings in this area. During the period 1990-October 1998, 21 pygmy sperm whale strandings occurred in the northeastern U.S. (Delaware, New Jersey, New York and Virginia), whereas 194 strandings were documented along the U.S. Atlantic coast between North Carolina and the Florida Keys in the same period. Remains of plastic bags and other marine debris have been retrieved from the stomachs of 13 stranded pygmy sperm whales in the southeastern U.S. (Barros *et al*. 1990, 1998), and at least on one occasion the ingestion of plastic debris is believed to have been the cause of death. During the period 1987-1994, 1 animal had possible propeller cuts on its flukes. In 2002, 28 pygmy sperm whales and 3 undifferentiated *Kogia* spp. stranded on the U.S. Atlantic. In one of the strandings of a pygmy sperm whale, red plastic debris was found in the stomach along with squid beaks. In the other 2002 strandings, signs of human interactions were not present or could not be assessed.

STATUS OF STOCK

The status of the pygmy sperm whale relative to OSP in the U.S. Atlantic EEZ is unknown. This species is not listed as endangered or threatened under the Endangered Species Act. There is insufficient information with which to assess population trends. Total fishery-related mortality and serious injury for this stock is not less than 10% of the calculated PBR and therefore, cannot be considered to be insignificant and approaching zero mortality

and serious injury rate. This is a strategic stock because the 1996-2000 estimated average annual fishery-related mortality to pygmy sperm whales exceeds PBR.

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