

Recent surveys and abundance estimates

An abundance estimate of 358 (CV= 0.44) *Kogia* sp. was obtained from a line-transect sighting survey conducted during June 12 to August 4, 2004 by a ship and plane that surveyed 10,761 km of track line in waters north of Maryland (38° N) to the Bay of Fundy (45° N) (Table 1; Palka 2006). Shipboard data were collected using the two independent team line-transect method and analyzed using the modified direct duplicate method (Palka 1995) accounting for biases due to school size and other potential covariates, reactive movements (Palka and Hammond 2001), and $g(0)$, the probability of detecting a group on the track line. Aerial data were collected using the Hiby circle-back line-transect method (Hiby 1999) and analyzed accounting for $g(0)$ and biases due to school size and other potential covariates (Palka 2005).

A survey of the U.S. Atlantic outer continental shelf and continental slope (water depths ≥ 50 m) between 27.5 and 38 °N latitude was conducted during June-August, 2004. The survey employed two independent visual teams searching with 50x bigeye binoculars. Survey effort was stratified to include increased effort along the continental shelf break and Gulf Stream front in the Mid-Atlantic. The survey included 5,659 km of trackline, and accomplished a total of 473 cetacean sightings. Sightings were most frequent in waters north of Cape Hatteras, North Carolina along the shelf break. Data were corrected for visibility bias $g(0)$ and group-size bias and analyzed using line-transect distance analysis (Palka 1995; Buckland *et al.* 2001). The resulting abundance estimate for *Kogia* sp. between Florida and Maryland was 37 animals (CV=0.75).

| Month/Year | Area | N_{best} | CV |
|--------------|------------------------------------|------------|------|
| Jun-Aug 2004 | Maryland to Bay of Fundy | 358 | 0.44 |
| Jun-Aug 2004 | Florida to Maryland | 37 | 0.75 |
| Jun-Aug 2004 | Florida to Bay of Fundy (COMBINED) | 395 | 0.40 |

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* sp. is 395 animals (CV=0.40). The minimum population estimate for *Kogia* sp. is 285 animals.

Current Population Trend

The available information is insufficient to evaluate population trends 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 (MMPA Sec. 3. 16 U.S.C. 1362; Wade and Angliss 1997). The minimum population size for *Kogia* sp. is 285. 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* sp. is 2.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

Detailed fishery information is reported in Appendix III. Total annual estimated average fishery-related mortality and serious injury to these stocks during 2001-2005 was zero for *Kogia* sp., as there were no reports of mortality or serious injury to these species.

Earlier Interactions

No *Kogia* sp. mortalities were observed in 1977-1991 foreign fishing activities.

Pelagic Longline

Between 1992 and 2005, 1 *Kogia* sp. was hooked, released alive and considered seriously injured in 2000 (Yeung 2001).

Other Mortality

No pygmy sperm whales were reported to strand in Nova Scotia from 1990-2005 (T. Wimmer, Nova Scotia Marine Animal Response Society, pers. comm.). From 2001-2005, 51 pygmy sperm whales were reported stranded along the U.S. Atlantic coast (Table 2).

Table 2. Dwarf and pygmy sperm whale (*Kogia sima* (Ks), *Kogia breviceps* (Kb) and *Kogia* sp. (Sp)) strandings along the Atlantic coast, 2001-2005. Strandings which were not reported to species have been reported as *Kogia* sp. The level of technical expertise among stranding network personnel varies, and given the potential difficulty in correctly identifying stranded *Kogia* whales to species, reports to specific species should be viewed with caution.

| STATE | 2001 | | | 2002 | | | 2003 | | | 2004 | | | 2005 | | | TOTALS | | | |
|----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---|
| | K s | K b | S p | K s | K b | S p | K s | K b | S p | K s | K b | S p | K s | K b | S p | K s | K b | S p | |
| Massachusetts | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| New York | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Jersey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | |
| Delaware | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Maryland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Virginia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| North Carolina | 1 | 0 | 1 | 0 | 0 | 1 | 4 | 0 | 0 | 2 | 5 | 0 | 4 | 5 | 0 | 11 | 10 | 2 | |
| South Carolina | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 8 | 0 | 0 | 8 | 0 | 3 | 16 | 0 | |
| Georgia | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 1 | 10 | 0 | 2 | 3 | 0 | 5 | 13 | 2 | |
| Florida | 2 | 0 | 0 | 3 | 0 | 2 | 2 | 0 | 3 | 3 | 8 | 1 | 0 | 3 | 1 | 10 | 11 | 7 | |
| Puerto Rico | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | |
| TOTALS | 4 | 0 | 1 | 5 | 0 | 4 | 10 | 0 | 4 | 6 | 31 | 1 | 7 | 20 | 1 | 32 | 51 | 11 | |

A Mid-Atlantic Offshore Small Cetacean UME, was declared when 33 small cetaceans stranded from Maryland to Georgia between July 2004 and September 2004. The species involved are generally found offshore and are not expected to strand along the coast. Fifteen pygmy sperm whales (*Kogia breviceps*) and one dwarf sperm whale (*Kogia sima*) were involved in this UME. Two pygmy sperm whales were involved in a multispecies UME in North Carolina in January of 2005 (Hohn *et al.* 2006). Although anthropogenic noise was not definitively implicated, the January 2005 event was associated in time and space with naval sonar activity. Potential risk to this species and others from anthropogenic noise is of concern.

There were 4 documented strandings of pygmy sperm whales along the U.S. Atlantic coast during 1999- 2005 which were classified as involving fishery or human interactions - 1 in Florida in 1999, 1 in Puerto Rico in 2000, 1 in North Carolina in 2001, and 1 in Massachusetts in 2005. In one of the strandings in 2002 of a pygmy sperm whale, red plastic debris was found in the stomach along with squid beaks.

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* sp. 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.

Stranding data probably underestimate the extent of fishery-related mortality and serious injury because all of the marine mammals that die or are seriously injured may not 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.

Rehabilitation challenges for *Kogia* sp. are numerous due to limited knowledge regarding even the basic biology of these species. Advances in recent rehabilitation success has potential implications for future release and tracking of animals at sea to potentially provide information on distribution, movements and habitat use of these species (Manire *et al.* 2004).

STATUS OF STOCK

The status of *Kogia* sp. relative to OSP in the western U.S. Atlantic EEZ is unknown. These species are not listed as endangered or threatened under the Endangered Species Act. There is insufficient information with which to assess population trends. Total U.S. fishery-related mortality and serious injury for these stocks is less than 10% of the calculated PBR and therefore, can be considered to be insignificant and approaching zero mortality and serious injury rate. Average annual human-related mortality and serious injury rate does not exceed the PBR, therefore *Kogia* sp. are not strategic stocks.

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