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PYGMY SPERM WHALE (*Kogia breviceps*): California/Oregon/Washington Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Pygmy sperm whales are distributed throughout deep waters and along the continental slopes of the North Pacific and other ocean basins (Ross 1984; Caldwell and Caldwell 1989). Along the U.S. west coast, sightings of this species and of animals identified only as *Kogia* sp. have been very rare (Figure 1). However, this probably reflects their pelagic distribution, small body size and cryptic behavior, rather than a measure of rarity. Strandings of pygmy sperm whales in this region are known from California, Oregon and Washington (Roest 1970; Caldwell and Caldwell 1989; NMFS, Northwest Region, unpublished data; NMFS, Southwest Region, unpublished data), while strandings of dwarf sperm whales (*Kogia sima*) are rare in this region. At-sea sightings in this region have all been either of pygmy sperm whales or unidentified *Kogia* sp. Available data are insufficient to identify any seasonality in the distribution of pygmy sperm whales, or to delineate possible stock boundaries. For the Marine Mammal Protection Act (MMPA) stock assessment reports, pygmy sperm whales within the Pacific U.S. Exclusive Economic Zone are divided into two discrete, non-contiguous areas: 1) waters off California, Oregon and Washington (this report), and 2) Hawaiian waters.

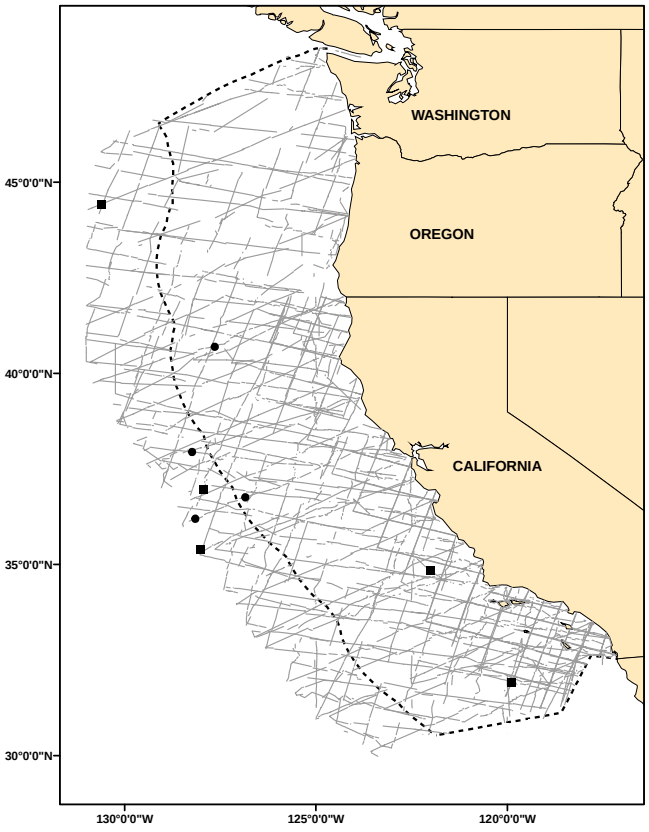

Figure 1. *Kogia* sightings based on aerial and shipboard surveys off California, Oregon and Washington, 1991-2005 (see Appendix 2 for data sources and information on timing and location of survey effort). Key: ■ = *Kogia breviceps*, ● = *Kogia* spp. Dashed line represents the U.S. EEZ, thin lines indicate completed transect effort of all surveys combined.

POPULATION SIZE

Although pygmy sperm whales have been sighted along the U.S. west coast on several line transect surveys utilizing both aerial and shipboard platforms, sightings have been too rare to produce reliable population estimates. The most recent abundance estimate of 899 (CV=1.00) animals was based on one sighting of an unidentified *Kogia* during a 1996 ship survey of California, Oregon, and Washington waters (Barlow and Forney 2007). Based on previous sighting surveys and historical stranding data, it is likely that these sightings were of pygmy sperm whales; *K. breviceps*. The 1996 estimate incorporates a correction factor for animals missed, based on a model of their diving behavior, detection distances, and the searching behavior of observers (Barlow 1999). About 35% of all trackline groups are estimated to be seen. Because no sightings of pygmy sperm whales have been recorded since 1996 and the most recent abundance estimates is >8 years old (Barlow and Forney 2007), there is no current estimate of abundance available. The lack of recent sightings likely reflects the cryptic nature of this species (they are detected almost exclusively in extremely calm sea conditions), rather than an absence of animals in the region.

Minimum Population Estimate

No current information on abundance is available to obtain a minimum population estimate for pygmy sperm whales.

Current Population Trend

Due to the rarity of sightings of this species on surveys along the U.S. West coast, no information exists regarding trends in abundance of this population.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No information on current or maximum net productivity rates is available for this species.

POTENTIAL BIOLOGICAL REMOVAL

Because there is no current estimate of minimum abundance, a potential biological removal (PBR) cannot be calculated for this stock.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

A summary of recent fishery mortality and injury for pygmy sperm whales and unidentified *Kogia*, which may have been pygmy sperm whales, is shown in Table 1. More detailed information on the drift gillnet fishery is provided in Appendix 1. In the California drift gillnet fishery, no mortality of pygmy sperm whales or unidentified *Kogia* was observed during the most recent five years of monitoring, 2002-2006 (Carretta and Chivers 2004, Carretta et al. 2005a, 2005b, Carretta and Enriquez 2006, 2007). One pygmy sperm whale was observed killed in the drift gillnet fishery in 1992 and another in 1993. After the 1997 implementation of a Take Reduction Plan, which included skipper education workshops and required the use of pingers and minimum 6-fathom extenders, overall cetacean entanglement rates in the drift gillnet fishery dropped considerably (Barlow and Cameron 2003). However, because of interannual variability in entanglement rates and the rarity of *Kogia* entanglements, additional years of data will be required to fully evaluate the effectiveness of pingers for reducing mortality of pygmy sperm whales. Mean annual takes in Table 1 are based on 2002-2006 data. This results in an average estimated annual mortality of zero pygmy sperm whales.

Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may take animals from this population. Quantitative data are available only for the Mexican swordfish drift gillnet fishery, which uses vessels, gear, and operational procedures similar to those in the U.S. drift gillnet fishery, although nets may be up to 4.5 km long (Holts and Sosa-Nishizaki 1998). The fleet increased from two vessels in 1986 to 31 vessels in 1993 (Holts and Sosa-Nishizaki 1998). The total number of sets in this fishery in 1992 can be estimated from data provided by these authors to be approximately 2700, with an observed rate of marine mammal bycatch of 0.13 animals per set (10 marine mammals in 77 observed sets; Sosa-Nishizaki et al. 1993). This overall mortality rate is similar to that observed in California driftnet fisheries during 1990-95 (0.14 marine mammals per set; Julian and Beeson, 1998), but species-specific information is not available for the Mexican fisheries. Previous efforts to convert the Mexican swordfish driftnet fishery to a longline fishery have resulted in a mixed-fishery, with 20 vessels alternately using longlines or driftnets, 23 using driftnets only, 22 using longlines only, and seven with unknown gear type (Berdegué 2002).

One pygmy sperm whale stranded in California in 2002 with evidence that it died as a result of a shooting (positive metal detector scan). Due to the cryptic and pelagic nature of this species, it is likely that the shooting resulted from an interaction with an unknown entangling net fishery.

Other mortality

This results in an average annual human-caused mortality of 0.2 pygmy sperm whales per year. Additional, unknown levels of injuries and mortality of pygmy sperm whales may occur as a result of anthropogenic sound, such as military sonars (U.S. Dept. of Commerce and Secretary of the Navy 2001) or other commercial and scientific activities involving the use of air guns. Such injuries or mortality would rarely be documented, due to the remote nature of many of these activities and the low probability that an injured or dead pygmy sperm whale would strand.

STATUS OF STOCK

The status of pygmy sperm whales in California, Oregon and Washington waters relative to OSP is not known, and there are insufficient data to evaluate potential trends in abundance. No habitat issues are known to be

of concern for this species, but in recent years questions have been raised regarding potential effects of human-made sounds on deep-diving cetacean species, such as pygmy sperm whales (Richardson et al. 1995). In particular, active sonar has been implicated in the mass stranding of beaked whales in the Mediterranean Sea (Frantzis 1998) and more recently in the Caribbean (U.S. Dept. of Commerce and Secretary of the Navy 2001). They are not listed as "threatened" or "endangered" under the Endangered Species Act nor as "depleted" under the MMPA. The average annual human-caused mortality for 2002-2006 is 0.2 animals, based on one stranded animal in 2002 that had evidence of gunshot wounds. A PBR cannot be calculated for this stock because there is no current abundance estimate (Barlow and Forney 2007). The lack of recent sightings is probably due to a combination of rough sea conditions during recent cruises and the cryptic nature of this species. Previous estimates of PBR for this stock have ranged between 1 and 28 pygmy sperm whales (Barlow et al. 1995, Barlow et al. 1997, Forney et al. 2000, Carretta et al. 2003). Recent fishery mortality is ≥0.2 animals annually. Because a PBR cannot be calculated for this stock, recent fishery mortality relative to PBR is unknown. Given the rarity of sightings and fishery interactions in U.S. west coast waters, pygmy sperm whales are not classified as a "strategic" stock under the MMPA.

Table 1. Summary of available information on the incidental mortality and injury of pygmy sperm whales and unidentified *Kogia* sp. (California/Oregon/Washington Stock) in commercial fisheries that might take this species. Coefficients of variation for mortality estimates are provided in parentheses. Mean annual takes are based on 2002-2006 data unless noted otherwise.

Fishery Name	Data Type	Year(s)	Percent Observer Coverage	Observed Mortality *K. breviceps /Kogia* sp.	*Estimated Annual Mortality of K. breviceps/Kogia* sp.	*Mean Annual Takes (CV in parentheses)*
CA/OR thresher shark/swordfish drift gillnet fishery	observer data	2002 2003 2004 2005 2006	22.1% 20.2% 20.6% 20.9% 18.5%	0 / 0 0 / 0 0 / 0 0 / 0 0 / 0	0 / 0 0 / 0 0 / 0 0 / 0 0 / 0	0
Unknown fishery interaction	Stranding (positive metal detector scan)	2002	n/a	1	n/a	≥0.2
Minimum total annual takes						≥0.2

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