

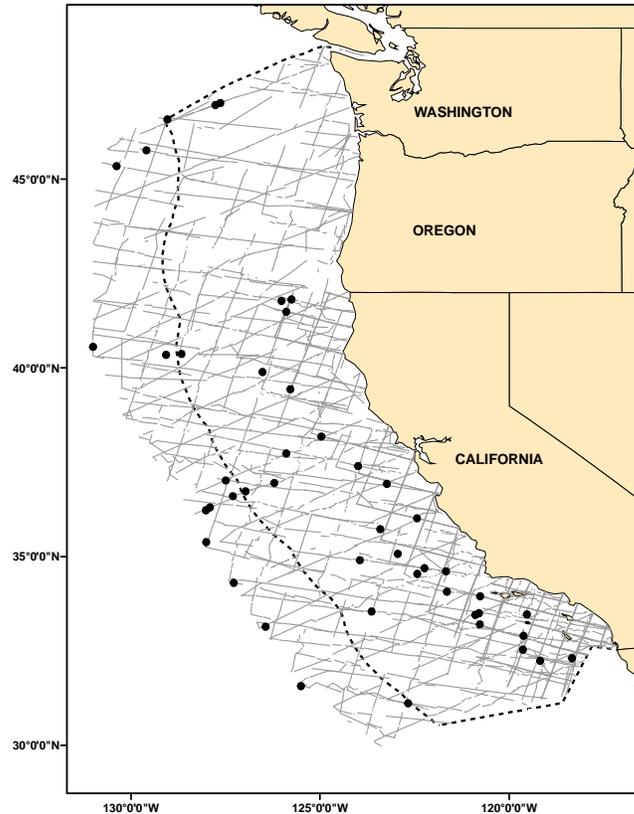
## CUVIER'S BEAKED WHALE (*Ziphius cavirostris*): California/Oregon/Washington Stock

### STOCK DEFINITION AND GEOGRAPHIC RANGE

Cuvier's beaked whales are distributed widely throughout deep waters of all oceans (Heyning 1989). Off the U.S. west coast, this species is the most commonly encountered beaked whale (Figure 1). No seasonal changes in distribution are apparent from stranding records, and morphological evidence is consistent with the existence of a single eastern North Pacific population from Alaska to Baja California, Mexico (Mitchell 1968). However, there are currently no international agreements for cooperative management of this species. For the Marine Mammal Protection Act (MMPA) stock assessment reports, Cuvier's beaked whales within the Pacific U.S. Exclusive Economic Zone are divided into three discrete, non-contiguous areas: 1) waters off California, Oregon and Washington (this report), 2) Alaskan waters, and 3) Hawaiian waters.

### POPULATION SIZE

Although Cuvier's beaked 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. Previous abundance estimates have been imprecise and biased downward by an unknown amount because of the large proportion of time this species spends submerged, and because the ship surveys on which they were based covered only California waters, and thus could not observe animals off Oregon/Washington. Furthermore, there were a large number of unidentified beaked whale sightings, which were probably either *Mesoplodon* sp. or Cuvier's beaked whales (*Ziphius cavirostris*). Updated analyses are based on 1) combining data from two surveys conducted within 300 nmi of the coasts of California, Oregon and Washington in 2001 (Barlow and Forney 2007) and 2005 (Forney 2007), 2) whenever possible, assigning unidentified beaked whale sightings to *Mesoplodon* spp. or *Ziphius cavirostris* based on written descriptions, size estimates, and 'most probable identifications' made by the observers at the time of the sightings, and 3) estimating a correction factor for animals missed, based on a model of their diving behavior, detection distances, and the searching behavior of observers (Barlow 1999). An estimated 23% of trackline groups are estimated to be seen. . Because animals probably spend time outside the U.S. Exclusive Economic Zone, a multi-year average abundance estimate is the



**Figure 1.** Cuvier's beaked whale 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). Dashed line represents the U.S. EEZ, thin lines indicate completed transect effort of all surveys combined.

most appropriate for management within U.S. waters. The 2001-2005 geometric mean abundance estimate for California, Oregon and Washington waters based on the above analyses is 2,830 (CV=0.73) Cuvier's beaked whales.

**Minimum Population Estimate**

Based on the above abundance estimate and CV, the minimum population estimate (defined as the log-normal 20th percentile of the abundance estimate) for Cuvier's beaked whales in California, Oregon, and Washington is 1,629 animals.

**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**

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (1,629) times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.40 (for a species of unknown status with an unknown fishery mortality CV; Wade and Angliss 1997), resulting in a PBR of 13 Cuvier's beaked whales per year.

**HUMAN-CAUSED MORTALITY AND SERIOUS INJURY**

**Fishery Information**

A summary of recent fishery mortality and injury for Cuvier's beaked whales in this region is shown in Table 1. More detailed information on these fisheries is provided in Appendix 1. Mortality estimates for the California drift gillnet fishery are included for the five most recent years of monitoring, 2002-2006 (Carretta and Chivers 2004, Carretta et al. 2005a, 2005b, Carretta and Enriquez 2006, 2007). 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). There have been no Cuvier's beaked whales observed entangled in over 4,000 drift gillnet fishery sets since pingers were first used in this fishery in 1996. Prior to 1996, there were a total of 21 Cuvier's beaked whales entangled in approximately 3,300 drift gillnet fishery sets: 1992 (six animals), 1993 (three), 1994 (six) and 1995 (six). Mean annual takes in Table 1 are based only on 2002-2006 data. This results in an average estimated annual mortality of zero Cuvier's beaked whales.

**Table 1.** Summary of available information on the incidental mortality and injury of Cuvier's beaked whales (California/ Oregon/Washington Stock) in commercial fisheries that might take this species. Mean annual takes are based on 2002-2006 data unless noted otherwise. n/a = not available.

Fishery Name	Data Type	Year(s)	Percent Observer Coverage	Observed Mortality + Released/Alive	Estimated Annual Mortality / Mortality + Entanglements	Mean Annual Takes (CV in parentheses)
CA/OR thresher shark/swordfish drift gillnet fishery	observer data	2002	22.1%	0	0	0
		2003	20.2%	0	0	
		2004	20.6%	0	0	
		2005	20.9%	0	0	
		2006	18.5%	0	0	
<b>Minimum total annual takes</b>						0

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).

#### **Other mortality**

Additional, unknown levels of injuries and mortality of Cuvier's beaked 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 beaked whale would strand.

#### **STATUS OF STOCK**

The status of Cuvier's beaked whales in California, Oregon and Washington waters relative to OSP is not known, and there are insufficient data to evaluate 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 Cuvier's beaked 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 in 2002-2006 is zero. Because recent human-caused mortality is less than the PBR, Cuvier's beaked whales are not classified as a "strategic" stock under the MMPA. The total fishery mortality and serious injury for this stock is less than 10% of the PBR and thus can be considered to be insignificant and approaching zero.

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