

MESOPLDONT BEAKED WHALES (*Mesoplodon* spp.): California/Oregon/Washington Stocks

STOCK DEFINITION AND GEOGRAPHIC RANGE

Mesoplodont beaked whales are distributed throughout deep waters and along the continental slopes of the North Pacific Ocean. At least 5 species in this genus have been recorded off the U.S. west coast, but due to the rarity of records and the difficulty in identifying these animals in the field, virtually no species-specific information is available (Mead 1989). The six species known to occur in this region are: Blainville's beaked whale (*M. densirostris*), Perrin's beaked whale (*M. perrini*), Lesser beaked whale (*M. peruvianus*), Stejneger's beaked whale (*M. stejnegeri*), Ginkgo-toothed beaked whale (*M. ginkgodens*), and Hubbs' beaked whale (*M. carlhubbsi*). Insufficient sighting records exist off the U.S. west coast (Figure 1) to determine any possible spatial or seasonal patterns in the distribution of mesoplodont beaked whales.

Until methods of distinguishing these six species are developed, the management unit must be defined to include all *Mesoplodon* stocks in this region. However, in the future, species-level management is desirable, and a high priority should be placed on finding means to obtain species-specific abundance information. For the Marine Mammal Protection Act (MMPA) stock assessment reports, three *Mesoplodon* stocks are defined: 1) all *Mesoplodon* species off California, Oregon and Washington (this report), 2) *M. stejnegeri* in Alaskan waters, and 3) *M. densirostris* in Hawaiian waters.

POPULATION SIZE

Although mesoplodont beaked whales have been sighted along the U.S. west coast on several line transect surveys utilizing both aerial and shipboard platforms, sightings have generally been too rare to produce reliable population estimates, and species identification has been problematic. Previous abundance estimates have been imprecise and biased downward by an unknown amount because of the large proportion of time mesoplodont beaked whales spend submerged, and because the surveys on which they were based covered only California waters, and thus could not include animals off Oregon/Washington. Furthermore, there were a large number of unidentified beaked whale sightings, which were either

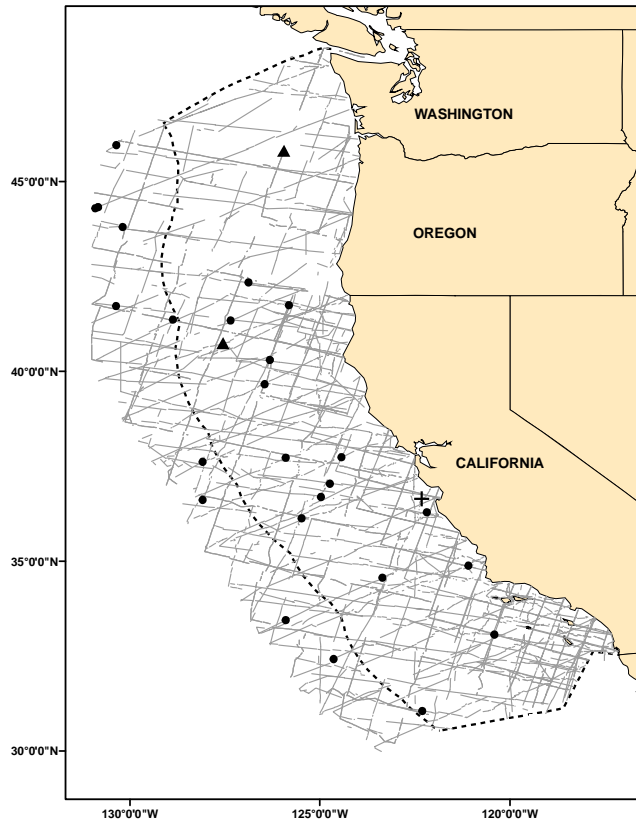


Figure 1. *Mesoplodon* beaked whale sightings based on aerial and shipboard surveys off California, Oregon and Washington, 1991-2005 (see Appendix 2 for data sources and information on timing and location of survey effort). Key: • = *Mesoplodon* spp.; filled triangles = probable and identified *Mesoplodon densirostris*; + = probable *Mesoplodon carlhubbsi*. Dashed line represents the U.S. EEZ, thin lines indicate completed transect effort of all surveys combined.

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 2003) 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 because they are submerged, based on dive-interval data collected for mesoplodont whales in 1993-95 (about 26% of all trackline groups are estimated to be seen). Of the 5 sightings of *Mesoplodon* made during 2001-2005 surveys two were identified to the 'probable' species level (one *Mesoplodon densirostris* and one *Mesoplodon carlhubbsi*; both seen in 2005). The current estimate of Blainville's beaked abundance is based on this one probable sighting, while the Hubb's beaked whale sighting was not recorded during standard survey effort, and thus, there is no estimate of abundance. An updated estimate of abundance for unidentified mesoplodont beaked whales is also presented, based on 2001-2005 sightings. Because their distribution varies and animals probably spend time outside the U.S. Exclusive Economic Zone, a multi-year average abundance estimate is the most appropriate for management within U.S. waters. The abundance of Blainville's beaked whales for California, Oregon, and Washington, based on the geometric mean of 2001-2005 surveys is 603 (CV=1.16). The abundance estimate for mesoplodont beaked whales of unknown species, based on the same 2001-2005 surveys is 421 (CV=0.88). The combined estimate of abundance for all species of *Mesoplodon* beaked whales in California, Oregon, and Washington waters out to 300 nmi is 1,024 (CV=0.77) animals.

Minimum Population Estimate

The minimum population estimate (defined as the log-normal 20th percentile of the abundance estimate) for mesoplodont beaked whales in California, Oregon, and Washington is 576 animals.

Current Population Trend

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

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No information on current or maximum net productivity rates is available for mesoplodont beaked whales.

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (576) times one half the default maximum net growth rate for cetaceans ($\frac{1}{2}$ of 4%) times a recovery factor of 0.50 (for a species of unknown status with no known recent fishery mortality; Wade and Angliss 1997), resulting in a PBR of 5.7 mesoplodont beaked whales per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

There have been no recent observed mortalities of mesoplodont beaked whales in the drift gillnet fishery for swordfish and thresher shark (Table 1). Between 1990-95, there were a total of five Hubb's beaked whales, one Stegner's beaked whale, two unidentified mesoplodont beaked whales, and three unidentified beaked whales killed in this fishery (Julian and Beeson 1998). Since 1996, there have been no mesoplodont beaked whales observed entangled or killed (Carretta et al. 2005), which coincides with the introduction and use of acoustic pingers into this fishery (Barlow and Cameron 2003). A summary of recent fishery mortality and injury for mesoplodont 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, 2000-2004 (Carretta and Chivers 2004, Carretta et al. 2005a, 2005b). 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 relative rarity of mesoplodont beaked whale entanglements, additional years of data will be required to fully evaluate the effectiveness of pingers for reducing mortality of this group of species. Mean annual takes in Table 1 are

based on 2000-2004 data. This results in an average estimated annual mortality of zero mesoplodont beaked 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).

Table 1. Summary of available information on the incidental mortality and injury of *Mesoplodon* beaked whales (California/Oregon/Washington Stocks) in commercial fisheries that might take these species. Mean annual takes are based on 2000-2004 data unless noted otherwise.

Fishery Name	Data Type	Year	Percent Observer Coverage	Observed Mortality	Estimated Annual Mortality	Mean Annual Takes (CV in parentheses)
CA/OR thresher shark/swordfish drift gillnet fishery	observer	2000	22.9%	0	0	0
		2001	20.4%	0	0	
		2002	22.1%	0	0	
		2003	20.2%	0	0	
		2004	20.6%	0	0	
Minimum total annual takes of <i>Mesoplodon</i> beaked whales						0

Other mortality

Additional, unknown levels of injuries and mortalities of mesoplodont 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 mortalities 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 STOCKS

The status of mesoplodont 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 mesoplodont 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 Bahamas (U.S. Dept. of Commerce and Secretary of the Navy 2001).

None of the six species is listed as "threatened" or "endangered" under the Endangered Species Act nor considered "depleted" under the MMPA. Including driftnet mortality only for years after implementation of the Take Reduction Plan (1997-98), the average annual human-caused mortality in 2000-2004 is zero. Because recent mortality is zero, mesoplodont beaked whales are not classified as a "strategic" stock under the MMPA, and the total fishery mortality and serious injury for this stock can be considered to be insignificant and approaching zero. It is likely that the difficulty in identifying these animals in the field will remain a critical obstacle to obtaining species-specific abundance estimates and stock assessments in the future.

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