

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

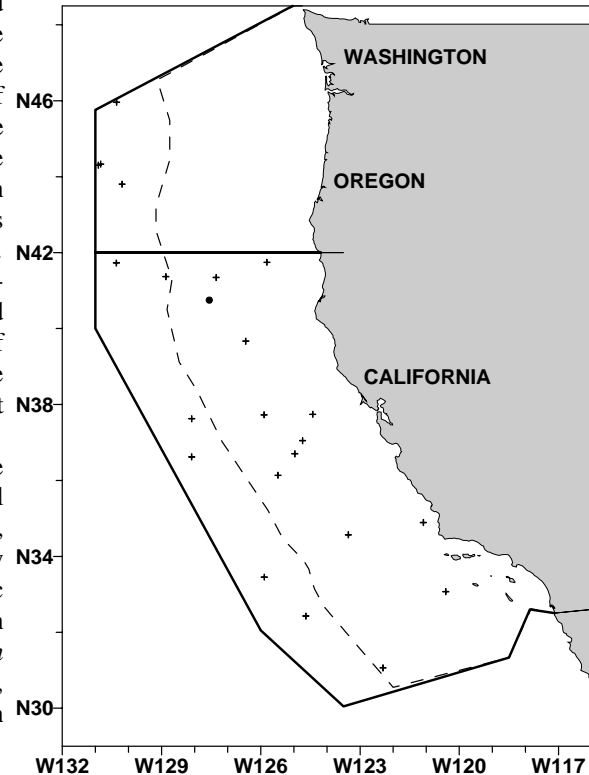
### STOCK DEFINITION AND GEOGRAPHIC RANGE

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 *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 1996; (Barlow 1997) and 2001 (Barlow 2003), 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 12 sightings of *Mesoplodon* made during the 1996 and 2001 surveys, none could be identified to the species level. Thus, an updated estimate of Blainville's beaked whale abundance is unavailable. An updated estimate of abundance for unidentified mesoplodont beaked whales is presented, based on 1996-2001 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 1996-2001 weighted



**Figure 1.** *Mesoplodon* beaked whale sightings based on aerial and shipboard surveys off California, Oregon and Washington, 1991-2001 (see Appendix 2 for data sources and information on timing and location of survey effort). Key: ● = *Mesoplodon densirostris*, + = *Mesoplodon* spp. Dashed line represents the U.S. EEZ, thick line indicates the outer boundary of all surveys combined.

average abundance estimates for California, Oregon and Washington waters based on the above analyses are 1,247(CV=0.92) mesoplodont beaked whales of unknown species.

### **Minimum Population Estimate**

Based on the abundance estimate of 1,247 (CV=0.92), 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 645 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 (645) 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 6.5 mesoplodont beaked whales per year.

### **HUMAN-CAUSED MORTALITY AND SERIOUS INJURY**

#### **Fishery Information**

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, 1997-2001 (Cameron and Forney 1999, 2000; Carretta 2001, 2002). 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 1997-2001 data. This results in an average estimated annual mortality of zero mesoplodont beaked whales. Prior to the most recent 5-year period, there were a total of eight mesoplodont beaked whales entangled in the drift gillnet fishery: 1990 (one animal), 1992 (four), and 1994 (three).

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 mortalities of mesoplodont beaked whales may occur as a result of anthropogenic noise, 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).

**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. All observed entanglements of *Mesoplodon* beaked whales resulted in the death of the animal. Coefficients of variation for mortality estimates are provided in parentheses. Mean annual takes are based on 1997-2001 data unless noted otherwise.

| Fishery Name   | Data Type   | Year(s) | Percent Observer Coverage | Observed Mortality | Estimated Annual Mortality | Mean Annual Takes (CV in parentheses) |
|--|---|---------|---------------------------|--------------------|----------------------------|---------------------------------------|
| CA/OR thresher shark/swordfish drift gillnet fishery                 | Hubbs' beaked whale, <i>Mesoplodon carlhubbsi</i>       |         |                           |                    |                            |                                       |
|  | observer data   | 1997    | 23.0%                     | 0                  | 0                          | 0                                     |
|  |   | 1998    | 20.0%                     | 0                  | 0                          |                                       |
|  |   | 1999    | 20.0%                     | 0                  | 0                          |                                       |
|  |   | 2000    | 22.9%                     | 0                  | 0                          |                                       |
|  |   | 2001    | 20.4%                     | 0                  | 0                          |                                       |
|  | Stejneger's beaked whale, <i>Mesoplodon stejnegeri</i>  |         |                           |                    |                            |                                       |
|  | observer data   | 1997    | 23.0%                     | 0                  | 0                          | 0                                     |
|  |   | 1998    | 20.0%                     | 0                  | 0                          |                                       |
|  |   | 1999    | 20.0%                     | 0                  | 0                          |                                       |
|  |   | 2000    | 22.9%                     | 0                  | 0                          |                                       |
|  |   | 2001    | 20.4%                     | 0                  | 0                          |                                       |
|  | Unidentified beaked whale (probably <i>Mesoplodon</i> ) |         |                           |                    |                            |                                       |
|  | observer data   | 1997    | 23.0%                     | 0                  | 0                          | 0                                     |
|  |   | 1998    | 20.0%                     | 0                  | 0                          |                                       |
|  |   | 1999    | 20.0%                     | 0                  | 0                          |                                       |
|  |   | 2000    | 22.9%                     | 0                  | 0                          |                                       |
|  |   | 2001    | 20.4%                     | 0                  | 0                          |                                       |
| <b>Minimum total annual takes of <i>Mesoplodon</i> beaked whales</b> |   |         |                           |                    | 0                          |                                       |

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 1997-2001 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.

## REFERENCES

- Barlow, J. 1997. Preliminary estimates of cetacean abundance off California, Oregon, and Washington based on a 1996 ship survey and comparisons of passing and closing modes. Southwest Fisheries Science Center Administrative Report. LJ-97-11. 25pp.
- Barlow, J. 1997. Preliminary estimates of cetacean abundance off California, Oregon and Washington based on a 1996 ship survey and comparisons of passing and closing modes. Administrative Report LJ-97-11, Southwest

- Fisheries Science Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, CA 92038. 25p.
- Barlow, J. and G. A. Cameron. 2003. Field experiments show that acoustic pingers reduce marine mammal bycatch in the California drift gillnet fishery. *Marine Mammal Science* 19(2):265-283.
- Barlow, J. and T. Gerrodette. 1996. Abundance of cetaceans in California waters based on 1991 and 1993 ship surveys. NOAA Technical Memorandum NMFS, NOAA-TM-NMFS-SWFSC-233.
- Barlow, J. and S. Sexton. 1996. The effect of diving and searching behavior on the probability of detecting track-line groups,  $g_0$ , of long-diving whales during line transect surveys. Administrative Report LJ-96-14. Available from NMFS, Southwest Fisheries Science Center, P.O. Box 271, La Jolla, California, 92038, USA. 21 p.
- Barlow, J. 2003. Preliminary estimates of the abundance of cetaceans along the U.S. west coast: 1991-2001. Southwest Fisheries Science Center Administrative Report LJ-03-03. Available from SWFSC, 8604 La Jolla Shores Dr., La Jolla CA 92037. 31p.
- Berdegue, J. 2002. Depredación de las especies pelágicas reservadas a la pesca deportiva y especies en peligro de extinción con uso indiscriminado de artes de pesca no selectivas (palangres, FAD's, trampas para peces y redes de agallar fijas y a la deriva) por la flota palangrera Mexicana. Fundación para la conservación de los picudos. A.C. Mazatlán, Sinaloa, 21 de septiembre.
- Cameron, G., and K. A. Forney. 1999. Estimates of cetacean mortality in the California gillnet fisheries for 1997 and 1998. Paper SC/51/O4 presented to the International Whaling Commission, 1999 (unpublished). 14pp.
- Cameron, G.A. and K.A. Forney. 2000. Preliminary estimates of cetacean mortality in California/Oregon Gillnet Fisheries for 1999. Report SC/52/O24 presented to the Scientific Committee of the International Whaling Commission, June 2000 (unpublished). 12p. [Available from Southwest Fisheries Science Center, National Marine Fisheries Service, 8604 La Jolla Shores Drive, La Jolla, CA 92037, USA.]
- Carretta, J.V. 2001. Preliminary estimates of cetacean mortality in California gillnet fisheries for 2000. Report SC/53/SM9 presented to the Scientific Committee of the International Whaling Commission, June 2001 (unpublished). 21p. [Available from Southwest Fisheries Science Center, National Marine Fisheries Service, 8604 La Jolla Shores Drive, La Jolla, CA 92037, USA.]
- Carretta, J.V. 2002. Preliminary estimates of cetacean mortality in California gillnet fisheries for 2001. Report SC/54/SM12 presented to the Scientific Committee of the International Whaling Commission, April 2002 (unpublished). 22p. [Available from Southwest Fisheries Science Center, National Marine Fisheries Service, 8604 La Jolla Shores Drive, La Jolla, CA 92037, USA.]
- Frantz, A. 1998. Does acoustic testing strand whales? *Nature* 392(5):29.
- Holts, D. Southwest Fisheries Science Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, CA 92038.
- Holts, D. and O. Sosa-Nishizaki. 1998. Swordfish, *Xiphias gladius*, fisheries of the eastern North Pacific Ocean. In: I. Barrett, O. Sosa-Nishizaki and N. Bartoo (eds.). *Biology and fisheries of swordfish, Xiphias gladius*. Papers from the International Symposium on Pacific Swordfish, Ensenada Mexico, 11-14 December 1994. U.S. Dep. Commer., NOAA Tech. Rep. NMFS 142, 276 p.
- Julian, F. and M. Beeson. 1998. Estimates of mammal, turtle and bird mortality for two California gillnet fisheries: 1990-1995. *Fishery Bulletin* 96:271-284.
- Mead, J. G. 1989. Beaked whales of the genus *Mesoplodon*. In: Ridgway, S. H. and Harrison, R. (eds.), *Handbook of Marine Mammals*, Vol. 4., p. 349-430. Academic Press Limited.
- National Marine Fisheries Service, Southwest Fisheries Science Center. Unpublished data.
- Richardson, W. J., C. R. Greene, Jr., C. I. Malme, and D. H. Thompson. 1995. *Marine Mammals and Noise*. Academic Press, San Diego. 576 p.
- Sosa-Nishizaki, O., R. De la Rosa-Pacheco, R. Castro-Longoria, M. Grijalva Chon, and J. De la Rosa Velez. 1993. Estudio biológico pesquero del pez (*Xiphias gladius*) y otras especies de picudos (marlins y pez vela). Rep. Int. CICESE, CTECT9306.
- U.S. Department of Commerce and Secretary of the Navy. 2001. Joint Interim Report, Bahamas Marine Mammal Stranding Event of 15-16 March 2000. Available from NOAA, NMFS, Office of Protected Resources, Silver Spring, MD.
- Wade, P. R. and R. P. Angliss. 1997. Guidelines for Assessing Marine Mammal Stocks: Report of the GAMMS Workshop April 3-5, 1996, Seattle, Washington. U. S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-12. 93 pp.