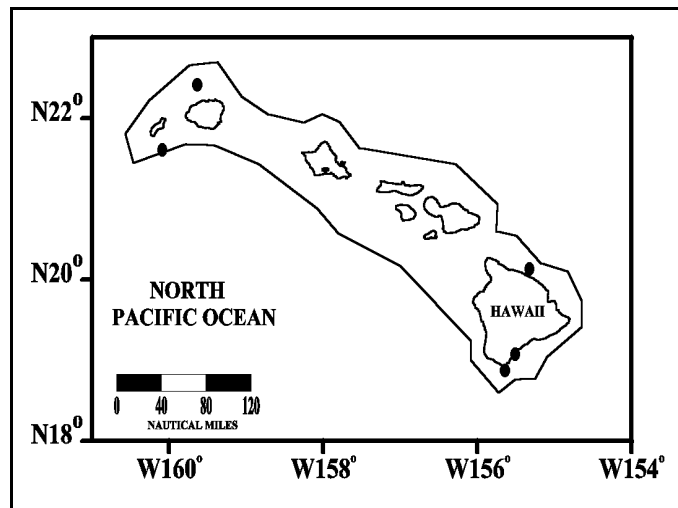


## CUVIER'S BEAKED WHALE (*Ziphius cavirostris*): Hawaiian Stock

### STOCK DEFINITION AND GEOGRAPHIC RANGE

Cuvier's beaked whales occur in all oceans and major seas (Heyning 1989). In Hawaii, strandings have been reported from Midway Islands, Pearl and Hermes Reef, Oahu, and Hawaii Islands (Shallenberger 1981; Galbreath 1963; Richards 1952; Nitta 1991). Sightings have been reported off Lanai and Maui (Shallenberger 1981). Recent sighting locations around the main Hawaiian Islands (Mobley et al. 2000) are shown in Figure 1. Nothing is known about stock structure for 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) Hawaiian waters (this report), 2) Alaskan waters, and 3) waters off California, Oregon and Washington.



**Figure 1.** Cuvier's beaked whale sighting locations during 1993-98 aerial surveys within about 25 nmi of the main Hawaiian Islands (see Appendix 2 for details on timing and location of survey effort). Outer line indicates approximate boundary of survey area.

### POPULATION SIZE

Wade and Gerrodette (1993) made an estimate for Cuvier's beaked whales in the eastern tropical Pacific, but it is not known whether any of these animals are part of the same population that occurs around the Hawaiian Islands. As part of the Marine Mammal Research Program of the Acoustic Thermometry of Ocean Climate (ATOC) study, a total of twelve aerial surveys were conducted within about 25 nmi of the main Hawaiian Islands in 1993, 1995 and 1998. Seven sightings of Cuvier's beaked whales were made. An abundance estimate of 43 (CV=0.51) Cuvier's beaked whales was recently calculated from the combined survey data (Mobley et al. 2000). This abundance underestimates the total number of Cuvier's beaked whales within the U.S. EEZ off Hawaii, because areas around the Northwest Hawaiian Islands (NWHI) and beyond 25 nautical miles from the main islands were not surveyed. Furthermore, this species is known to spend a large proportion of time diving, causing additional downward bias in the abundance estimate.

### Minimum Population Estimate

The log-normal 20th percentile of the combined 1993-98 abundance estimate is 29 Cuvier's beaked whales. As with the best abundance estimate above, this includes only areas within about 25 nmi of the main Hawaiian Islands and does not include a large proportion of animals that were diving and therefore unavailable to be seen.

### Current Population Trend

No data are available on current population trend.

### CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No data are available on current or maximum net productivity rate.

### POTENTIAL BIOLOGICAL REMOVAL

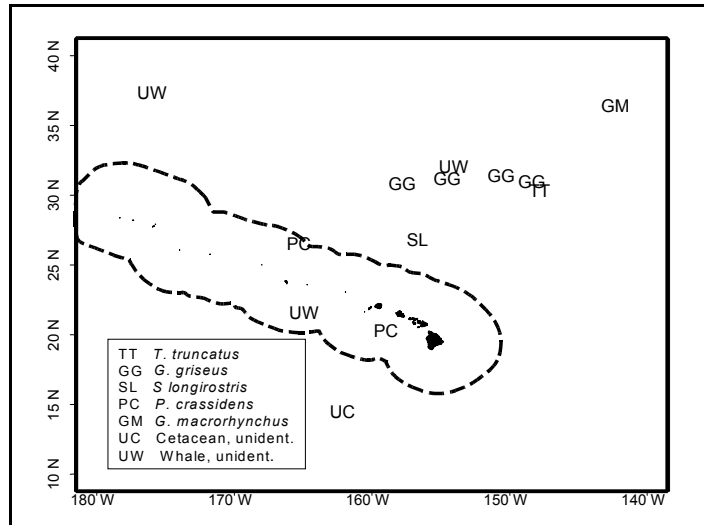
The potential biological removal (PBR) level for this stock is calculated as the minimum population size (29) times one half the default maximum net growth rate for cetaceans ( $\frac{1}{2}$  of 4%) times a recovery factor of 0.50 (for a species of unknown status with no known fishery mortality; Wade and Angliss 1997), resulting in a PBR of 0.3 Cuvier's beaked whales per year.

### HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

## Fishery Information

No estimate of annual human-caused mortality and serious injury is available as there are no reports of direct or incidental takes of Cuvier's beaked whales in Hawaiian waters (Nitta and Henderson 1993). However, mortality of other cetacean species has been observed in Hawaiian fisheries, and the gear types used in these fisheries are responsible for marine mammal mortality and serious injury in other fisheries throughout U.S. waters. Gillnets are used in Hawaiian waters and appear to capture marine mammals wherever they are used, and float lines from lobster traps and longlines can be expected to occasionally entangle whales (Perrin et al. 1994).

Interactions with dolphins are reported for all pelagic fisheries, and humpback whales have been entangled in longlines off the Hawaiian Islands (Nitta and Henderson 1993), but no takes of Cuvier's beaked whales have been documented. However, three unidentified whales and one unidentified cetacean were observed hooked in the Hawaiian longline fishery between 1994 and 1998 (Figure 2), with approximately 4.4% of all effort (measured as the number of hooks fished) observed. Observer descriptions and photographs of these interactions indicate that at least two of the unidentified whales may have been beaked whales, including one within the U.S. EEZ. The total interaction rate based on these two possible beaked whales extrapolates to a 5-year estimate of 45 (95% CI = 7-108), or an average of 9 interactions per year (Kleiber 1999). One of the two possible beaked whales was hooked in the fluke, and following the guidelines of a 1997 Serious Injury Workshop (Angliss and DeMaster 1998), this would not be considered a serious injury (defined under the MMPA as likely to result in mortality). The other interaction, which took place within the U.S. EEZ, involved a possible beaked whale that was hooked but broke the line and swam away before the location of the hook could be ascertained. Therefore, no determination can be made regarding the severity of this second injury. Reports for other odontocetes indicate they may also become hooked in the mouth or ingest the hook, and that they may occasionally become entangled in the fishing line. Insufficient information is available to evaluate whether some of these unidentified whales may have been Cuvier's beaked whales.



**Figure 2.** Locations of observed cetacean interactions in the Hawaiian longline fishery, 1994-98 (modified from Kleiber 1999). Dashed line is the U.S. Exclusive Economic Zone (EEZ); UW = unidentified whale; UC = unidentified cetacean. The two westernmost unidentified whales may have been Cuvier's beaked whales.

## STATUS OF STOCK

The status of Cuvier's beaked whales in Hawaiian waters relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance. They are not listed as "threatened" or "endangered" under the Endangered Species Act (1973), nor as "depleted" under the MMPA. Although information on Cuvier's beaked whales in Hawaiian waters is limited, this stock would not be considered strategic under the 1994 amendments to the MMPA because there has been no reported fisheries related mortality within the U.S. EEZ. However, the effect of potential interactions of unidentified beaked whales (which may have been Cuvier's beaked whales) with the Hawaiian longline fishery in U.S. and international waters is not known. Insufficient information is available to determine whether the total fishery mortality and serious injury for Cuvier's beaked whales is insignificant and approaching zero mortality and serious injury rate. The increasing levels of anthropogenic noise in the world's oceans has been suggested to be a habitat concern for whales, particularly for deep-diving whales like Cuvier's beaked whales that feed in the oceans' "sound channel".

## REFERENCES

Angliss, R. P. and D. P. DeMaster. 1998. Differentiating Serious and Non-Serious Injury of Marine Mammals Taken Incidental to Commercial Fishing Operations: Report of the Serious Injury Workshop 1-2 April 1997, Silver

- Spring, Maryland. U. S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-13. 48 pp.
- Galbreath, E. C. 1963. Three beaked whales stranded on the Midway Islands, central Pacific Ocean. *J. Mamm.* 44:422-423.
- Heyning, J. E. 1989. Cuvier's beaked whale *Ziphius cavirostris* G. Cuvier, 1823. *In*: S. H. Ridgway and R. Harrison (eds.), *Handbook of Marine Mammals*, Vol. 4: The River Dolphins and Larger Toothed Whales, pp. 289-308. Academic Press, 442 pp.
- Kleiber, P. 1999. Estimates of marine mammal takes in the Hawaiian longline fishery. (Unpublished). Southwest Fisheries Science Center, NMFS, 2570 Dole St, Honolulu, HI, 96822-2396.
- Mobley, J. R., Jr, S. S. Spitz, K. A. Forney, R. A. Grotefendt, and P. H. Forestall. 2000. Distribution and abundance of odontocete species in Hawaiian waters: preliminary results of 1993-98 aerial surveys. Admin. Rep. LJ-00-14C. Southwest Fisheries Science Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, CA 92038. 26 pp.
- Nitta, E. 1991. The marine mammal stranding network for Hawaii: an overview. *In*: J.E. Reynolds III, D.K. Odell (eds.), *Marine Mammal Strandings in the United States*, pp.56-62. NOAA Tech. Rep. NMFS 98, 157 pp.
- Nitta, E. and J. R. Henderson. 1993. A review of interactions between Hawaii's fisheries and protected species. *Mar. Fish. Rev.* 55(2):83-92.
- Perrin, W.F., G. P. Donovan and J. Barlow. 1994. Gillnets and Cetaceans. Rep. Int. Whal. Commn., Special Issue 15, 629 pp.
- Richards, L. P. 1952. Cuvier's beaked whale from Hawaii. *J. Mamm.* 33:255.
- Shallenberger, E.W. 1981. The status of Hawaiian cetaceans. Final report to U.S. Marine Mammal Commission. MMC-77/23, 79pp.
- 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.
- Wade, P. R. and T. Gerrodette. 1993. Estimates of cetacean abundance and distribution in the eastern tropical Pacific. Rep. Int. Whal. Commn. 43:477-493.