

BLAINVILLE'S BEAKED WHALE (*Mesoplodon densirostris*): Hawaiian Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Blainville's beaked whale has a cosmopolitan distribution in tropical and temperate waters, apparently the most extensive known distribution of any *Mesoplodon* species (Mead 1989). Two strandings were reported in 1961 from Midway Island (Galbreath 1963) and another in 1983 from Laysan Island (Nitta 1991). Sixteen sightings were reported from the main islands by Shallenberger (1981), who suggested that Blainville's beaked whales were present off the Waianae Coast of Oahu for prolonged periods annually. Three sightings were made during a 2002 shipboard survey of waters within the U.S. Exclusive Economic Zone (EEZ) of the Hawaiian Islands (Figure 1; Barlow 2003). While nothing is known about stock structure, some genetic samples have been collected recently from around the main Hawaiian islands, and there have been re-sightings of individuals from the island of Hawaii (R.W. Baird, pers. comm.). For the Marine Mammal Protection Act (MMPA) stock assessment reports, three *Mesoplodon* stocks are defined within the Pacific U.S. EEZ : 1) *M. densirostris* in Hawaiian waters (this report), 2) *M. stejnegeri* in Alaskan waters, and 3) all *Mesoplodon* species off California, Oregon and Washington.

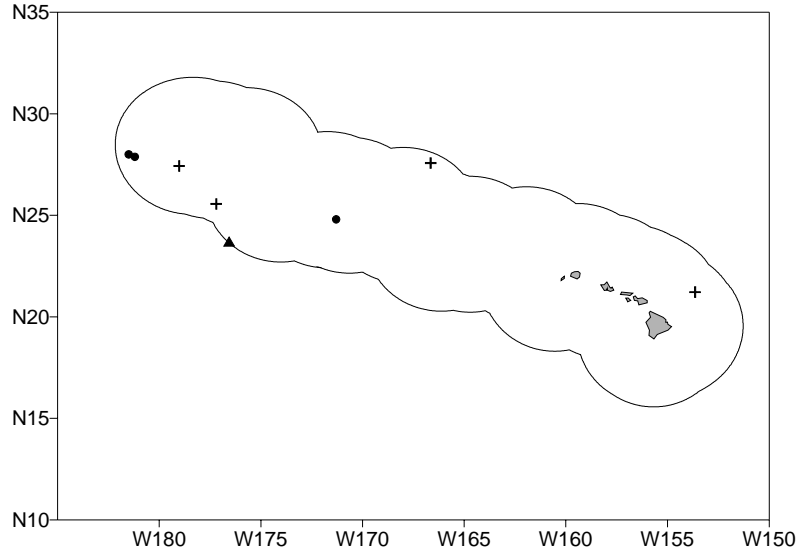


Figure 1. Sighting locations of *Mesoplodon densirostris* (filled circles), *Indopacetus pacificus* (triangle), and unidentified *Mesoplodon* beaked whales (cross) during the 2002 shipboard cetacean survey of U.S. EEZ waters surrounding the Hawaiian Islands (Barlow 2003; see Appendix 2 for details on timing and location of survey effort). Outer line indicates approximate boundary of survey area and U.S. EEZ.

POPULATION SIZE

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 Blainville's beaked whales were made. An abundance estimate of 68 (CV=0.60) Blainville's beaked whales was calculated from the combined survey data (Mobley et al. 2000). This study underestimated the total number of Blainville's beaked whales within the U.S. EEZ off Hawaii, because areas around the Northwestern 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. The data on which this estimate was based are now over 5 years old. A 2002 shipboard line-transect survey of the entire Hawaiian Islands EEZ resulted in an abundance estimate of 2,138 (CV=0.77) Blainville's beaked whales (Barlow 2003), including a correction factor for missed diving animals. This is currently the best available abundance estimate for this stock.

Minimum Population Estimate

The log-normal 20th percentile of the 2002 abundance estimate is 1,204 Blainville's beaked whales. .

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 (1,204) times one half the default maximum net growth rate for cetaceans ($\frac{1}{2}$ of 4%) times a recovery factor of 0.40 (for a species of unknown status with a Hawaiian Islands EEZ fishery mortality and serious injury rate $CV > 0.80$; Wade and Angliss 1997), resulting in a PBR of 9.6 Blainville's beaked whales per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

Information on fishery-related mortality of cetaceans in Hawaiian waters is limited, but the gear types used in Hawaiian fisheries are responsible for marine mammal mortality and serious injury in other fisheries throughout U.S. waters. Gillnets 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 cetaceans are reported for all pelagic fisheries (Nitta and Henderson 1993). Between 1994 and 2002, one Blainville's beaked whale was observed hooked and killed in the Hawaii-based longline fishery, with approximately 4-25% of all effort observed (Table 1; Forney 2004). Three additional unidentified cetaceans, which may have been Blainville's beaked whales, were also taken in this fishery (Figure 2, Forney 2004). During the 905 observed trips with 11,014 sets, the average interaction rate of Blainville's beaked whales was one animal per 905 fishing trips, or one animal per 11,014 sets. Average 5-yr estimates of annual mortality and serious injury for 1998-2002 are zero Blainville's beaked whales outside of the U.S. EEZs, and 0.8 ($CV = 1.00$) within the Hawaiian Islands EEZ (Table 1). Since 2001, the Hawaii-based longline fishery has undergone a series of regulatory changes, primarily to protect sea turtles (NMFS 2001). Potential impacts of these regulatory changes on the rate of Blainville's beaked whale interactions are unknown.

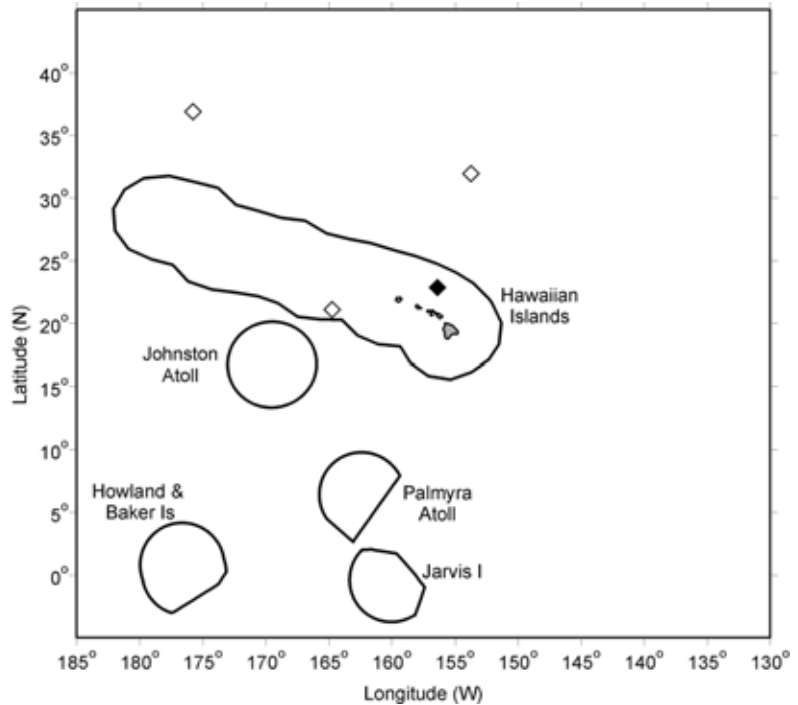


Figure 2. Location of the single Blainville's beaked whale take (filled diamond) and possible takes of this species (open diamonds) in the Hawaii-based longline fishery, 1994-2002. Solid lines represent the U.S. EEZ.

Other Mortality

In recent years, there has been increasing concern that loud underwater sounds, such as active sonar and seismic operations, may be harmful to beaked whales (Malakoff 2002). The use of active sonar from military vessels has been implicated in mass strandings of beaked whales in the Mediterranean Sea during 1996 (Frantzis 1998), the Bahamas during 2000 (U.S. Dept. of Commerce and Secretary of the Navy 2001), and the Canary Islands 2002 (Martel 2002). Similar military active sonar operations occur around the Hawaiian islands. No estimates of potential mortality or serious injury are available for U.S. waters.

Table 1. Summary of available information on incidental mortality and serious injury of Blainville’s beaked whales (Hawaiian stock) in commercial fisheries, within and outside of the Hawaiian Islands EEZ (Forney 2004). Mean annual takes are based on 1998-2002 data unless otherwise indicated.

Fishery Name	Year	Data Type	Percent Observer Coverage	Mortality and Serious Injury outside of U.S. EEZ			Mortality and Serious Injury within Hawaiian Islands EEZ		
				Observed	Estimated (CV)	Mean Annual Takes (CV)	Observed	Estimated (CV)	Mean Annual Takes (CV)
Hawaii-based longline fishery	1998	1998-2002 observer data	4.6%	0	0 (-)		0	0 (-)	
	1999		3.5%	0	0 (-)		0	0 (-)	
	2000		11.8%	0	0 (-)		0	0 (-)	
	2001		22.7%	0	0 (-)	0 (-)	0	0 (-)	0.8 (1.00)
	2002		24.9%	0	0 (-)		1	4 (1.00)	
Minimum total annual takes within U.S. EEZ waters									0.8 (1.00)

STATUS OF STOCK

The status of Blainville'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. The Hawaiian stock of Blainville’s beaked whales is not considered strategic under the 1994 amendments to the MMPA because the estimated rate of fisheries related mortality or serious injury within the Hawaiian Islands EEZ (0.8 animals per year) is less than the PBR (9.6). However, the effect of potential interactions of unidentified beaked whales (which may have been Blainville’s beaked whales) with the Hawaii-based 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 Blainville’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 (Richardson et al. 1995), particularly for deep-diving whales like Blainville’s beaked whales that feed in the oceans’ “sound channel”.

REFERENCES

- Balcomb, K. C., III. 1987. The Whales of Hawaii. Marine Mammal Fund, 99 pp.
- Barlow, J. 2003. Cetacean abundance in Hawaiian waters during summer/fall 2002. Admin. Rep. LJ-03-13. Southwest Fisheries Science Center, National Marine Fisheries Service, 8604 La Jolla Shores Drive, La Jolla, CA 92037.
- Forney, K.A. 2004. Estimates of cetacean mortality and injury in two U.S. Pacific longline fisheries, 1994-2002. Admin. Rep. LJ-04-07. Southwest Fisheries Science Center, National Marine Fisheries Service, 8604 La Jolla Shores Drive, La Jolla, CA 92038. 17 pp.
- Frantzis, A. 1998. Does acoustic testing strand whales? Nature 392(5):29.
- Galbreath, E. C. 1963. Three beaked whales stranded on the Midway Islands, central Pacific Ocean. J. Mamm. 44:422-423.
- Malakoff, D. 2002. Suit ties whale deaths to research cruise. Science 298:722-723.
- Martel, V. M. 2002. Summary of the report on the atypical mass stranding of beaked whales in the Canary Islands in September 2002 during naval exercises. Society for the Study of the Cetaceans in the Canary Archipelago (SECAC). Unpublished report. 11p.
- 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.
- Mead, J. G. 1989. Beaked whales of the genus *Mesoplodon*. In: S. H. Ridgway and R. Harrison (eds.), Handbook of Marine Mammals, Vol. 4: The River Dolphins and Larger Toothed Whales, pp. 349-430. Academic Press, 442 pp.
- NMFS 2001. Western Pacific Pelagic Fisheries Biological Opinion. Available from Pacific Islands Region, 1602 Kapiolani Blvd, Suite 1110, Honolulu, HI 96814 (<http://swr.nmfs.noaa.gov/pir>).
- 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.
- 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.
- Shallenberger, E. W. 1981. The status of Hawaiian cetaceans. Final report to U.S. Marine Mammal Commission. MMC-77/23, 79pp.
- 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.