Revised 03/15/2005

BRYDE'S WHALE (*Balaenoptera edeni*): Hawaiian Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Bryde's whales occur in tropical and warm temperate waters throughout the world. Shallenberger (1981) reported a sighting of a Bryde's whale southeast of Nihoa in April 1977 (see DeLong and Brownell 1977; Leatherwood et al. 1982: Fig. 39c). Leatherwood et al. (1982) described the species as relatively abundant in summer and fall on the Mellish and Miluoki banks northeast of Hawaii and around Midway Islands, but the basis for this statement was not explained. Ohsumi and Masaki (1975) reported the tagging of "many" Bryde's whales between the Bonin and Hawaiian Islands in the winters of 1971 and 1972 (Ohsumi 1977). A summer/fall 2002 shipboard survey of waters within the U.S. Exclusive Economic Zone (EEZ) of the Hawaiian Islands resulted in 13 Bryde's whale sightings throughout the study area (Figure 1; Barlow 2003).With presently available evidence, there is no biological basis for defining separate stocks of Bryde's whales in the central North Pacific. Bryde's whales also occasionally occur off southern California (Morejohn and Rice 1973). For the MMPA stock assessment reports, Bryde's whales within the Pacific U.S. EEZ are divided into two areas: 1) Hawaiian waters (this report), and 2) the eastern tropical Pacific (east of 150°W and including the Gulf of California and waters off California).

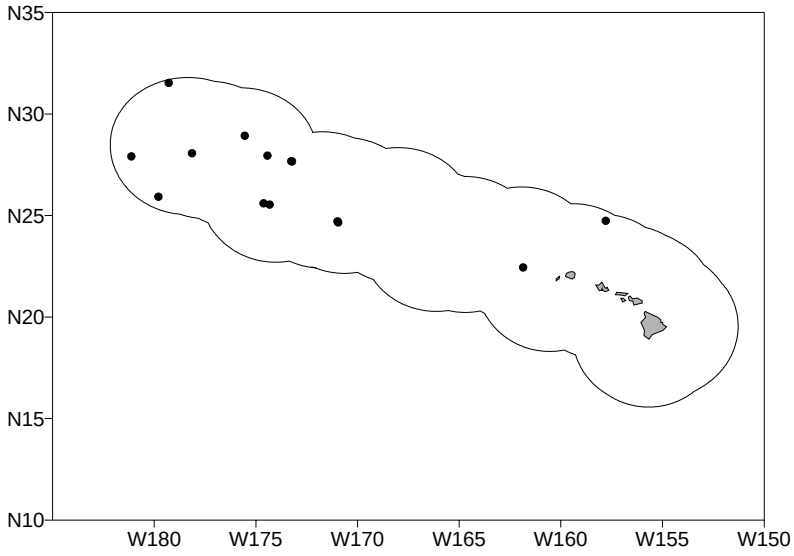

Figure 1. Bryde's whale sighting locations during the 2002 shipboard survey of U.S. EEZ waters surrounding the Hawaiian Islands (Barlow 2003; see Appendix 2 for details on timing and location of survey effort). Outer line represents approximate boundary of survey area and U.S. EEZ.

POPULATION SIZE

Tillman (1978) concluded from Japanese and Soviet CPUE data that the stock size in the North Pacific pelagic whaling grounds, mostly to the west of the Hawaiian Islands, declined from approximately 22,500 in 1971 to 17,800 in 1977. An estimate of 13,000 (CV=0.202) Bryde's whales was made from vessel surveys in the eastern tropical Pacific between 1986 and 1990 (Wade and Gerrodette 1993). The area to which this estimate applies is mainly east and somewhat south of the Hawaiian Islands, and it is not known whether 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 (Mobley et al. 2000). No sightings of Bryde's whales were made. A 2002 shipboard line-transect survey of the entire Hawaiian Islands EEZ resulted in an abundance estimate of 493 (CV=0.34) Bryde's whales (Barlow 2003). 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 373 Bryde's 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 (373) times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.50 (for a stock of unknown status with no known fishery mortality or serious injury within the Hawaiian Islands EEZ; Wade and Angliss 1997), resulting in a PBR of 3.7 Bryde's 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, and large whales have been entangled in longline gear off the Hawaiian Islands (Nitta and Henderson 1993, Forney 2004). Between 1994 and 2002, no interactions with Bryde's whales were observed in the Hawaii-based longline fishery, with approximately 4-25% of all effort observed (Forney 2004).

Historical Mortality

Small numbers of Bryde's whales were taken near the Northwestern Hawaiian Islands by Japanese and Soviet whaling fleets during the early 1970s (Ohsumi 1977). Pelagic whaling for Bryde's whales in the North Pacific ended after the 1979 season (IWC 1981), and coastal whaling for this species ended in the western Pacific in 1987 (IWC 1989).

STATUS OF STOCK

The status of Bryde's 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 Bryde's whale is not considered strategic under the 1994 amendments to the MMPA because there has been no reported fisheries related mortality or serious injury. Insufficient information is available to determine whether the total fishery mortality and serious injury for fin 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).

REFERENCES

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.

DeLong, R. L. and R. L. Brownell, Jr. 1977. Hawaiian monk seal (*Monachus schauinslandi*) habitat and population survey in the northwestern (Leeward) Hawaiian Islands, April 1977. Northwest Alaska Fish Cent. Proc. Rep., 43 pp.

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 92037. 17 pp.

International Whaling Commission. 1981. Japan. Progress report on cetacean research June 1979-May 1980. Rep. Int. Whal. Commn. 31:195-200.

International Whaling Commission. 1989. Japan. Progress report on cetacean research June 1987 to April 1988. Rep. Int. Whal. Commn. 39:201-204.

Leatherwood, S., R. R. Reeves, W. F. Perrin, and W. E. Evans. 1982. Whales, dolphins, and porpoises of the eastern North Pacific and adjacent arctic waters: A guide to their identification. NOAA Tech. Rep. NMFS 444, 245 pp.

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.

Morejohn, G. V. and D. W. Rice. 1973. First record of Bryde's whale (*Balaenoptera edeni*) off California. Cal. Fish Game 59:313-315.

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.
Ohsumi, S. 1977. Stocks and trends of abundance of the sperm whale in the North Pacific. Rep. Int. Whal. Commn. 27:167-175.
Ohsumi, S. and Y. Masaki. 1975. Japanese whale marking in the North Pacific, 1963-72. Bull. Far Seas Fish. Res. Lab. 12:171-219.
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.
Tillman, M. F. 1978. Modified Delury estimates of the North Pacific Bryde's whale stock. Rep. Int. Whal. Commn. 28:315-317.
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.