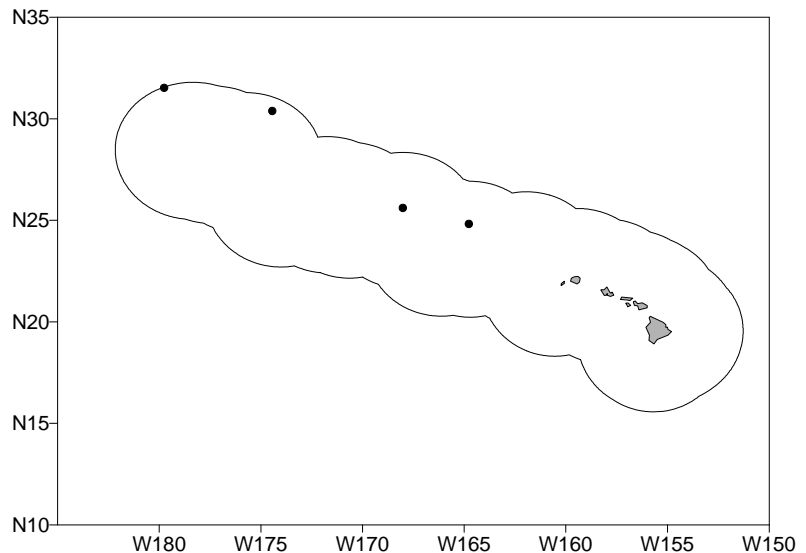


## CUVIER'S BEAKED WHALE (*Ziphius cavirostris*): Hawaiian Stock

### STOCK DEFINITION AND GEOGRAPHIC RANGE

Cuvier's beaked whales occur in all oceans and major seas (Heyning 1989). In Hawaii, five strandings have been reported from Midway Islands, Pearl and Hermes Reef, Oahu, and Hawaii Islands (Shallenberger 1981; Galbreath 1963; Richards 1952; Nitta 1991; Maldini et al. 2005). Sightings have been reported off Lanai and Maui (Shallenberger 1981) and Hawaii, Ni'ihau, and Kauai (Mobley 2000, Baird et al. 2004, 2009). Four 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 2006). While nothing is known about stock structure, some genetic samples have been collected recently from around the island of Hawaii. Resightings of individual Cuvier's beaked whales during a 21-yr study suggests long-term site fidelity and year round occurrence off the island of Hawaii (McSweeney *et al* 2007). For the Marine Mammal Protection Act (MMPA) stock assessment reports, Cuvier's beaked whales within the Pacific U.S. EEZ are divided into three discrete, non-contiguous areas: 1) Hawaiian waters (this report), 2) Alaskan waters, and 3) waters off California, Oregon and Washington. The Hawaiian stock includes animals found both within the Hawaiian Islands EEZ and in adjacent international waters; however, because data on abundance, distribution, and human-caused impacts are largely lacking for international waters, the status of this stock is evaluated based on data from U.S. EEZ waters of the Hawaiian Islands (NMFS 2005).



**Figure 1.** Cuvier's beaked whale sighting locations during the 2002 shipboard survey of U.S. EEZ waters surrounding the Hawaiian Islands (Barlow 2006; 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

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. The data on which this estimate was based are now over 8 years old. Based on the photo-identification catalog for the island of Hawaii, a minimum of 35 individuals are known to occur there (McSweeney *et al.* 2007). A 2002 shipboard line-transect survey of the entire Hawaiian Islands EEZ resulted in an abundance estimate of 15,242 (CV=1.43) Cuvier's beaked whales (Barlow 2006), 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 (Barlow 2006) is 6,269 Cuvier's beaked whales within the Hawaiian Islands EEZ.

#### 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 within the U.S. EEZ of the Hawaiian Islands (6,269) times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.50 (for a species of unknown status with no known fishery mortality within the Hawaiian Islands EEZ; Wade and Angliss 1997), resulting in a PBR of 63 Cuvier'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 cetaceans (Perrin et al. 1994).

Interactions with cetaceans are reported for all pelagic fisheries (Nitta and Henderson 1993). There are currently two distinct longline fisheries based in Hawaii: a deep-set longline (DSL) fishery that targets primarily tunas, and a shallow-set longline fishery (SSL) that targets swordfish. Both fisheries operate within U.S. waters and on the high seas. Between 2004 and 2008, no Cuvier's beaked whales were observed hooked or entangled in the SSL fishery (100% observer coverage) or the DSL fishery (20-28% observer coverage) (McCracken & Forney 2010). However, one unidentified cetacean, which may have been a Cuvier's beaked whale, was taken in the DSL fishery in international waters (Forney 2009).

### 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. It has been suggested that quick ascent from deep dives in response to acoustic exposure could lead to death in beaked whales (Cox et al. 2006). A modeling exercise based on dive data from Blainville's, Cuvier's and northern bottlenose whales suggest that the dive habits of all three species produce tissue nitrogen saturation levels that would normally cause decompression sickness in terrestrial mammals (Hooker et al. 2009). The longer dives and shorter surface intervals of Cuvier's beaked whales may put them at higher risk for decompression sickness than other species, possibly increasing their susceptibility to high-intensity underwater noise (Hooker et al. 2009). No estimates of potential mortality or serious injury are available for U.S. waters.

## 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. It is not listed as "threatened" or "endangered" under the Endangered Species Act (1973), nor as "depleted" under the MMPA. Because there have been no reported fishery related mortality or injuries within the Hawaiian Islands EEZ, the Hawaiian stock of Cuvier's beaked whales is not considered strategic under the 1994 amendments to the MMPA, and the total mortality and serious injury can be considered to be insignificant and approaching zero. The increasing level 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 Cuvier's beaked whales that feed in the oceans' "sound channel".

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