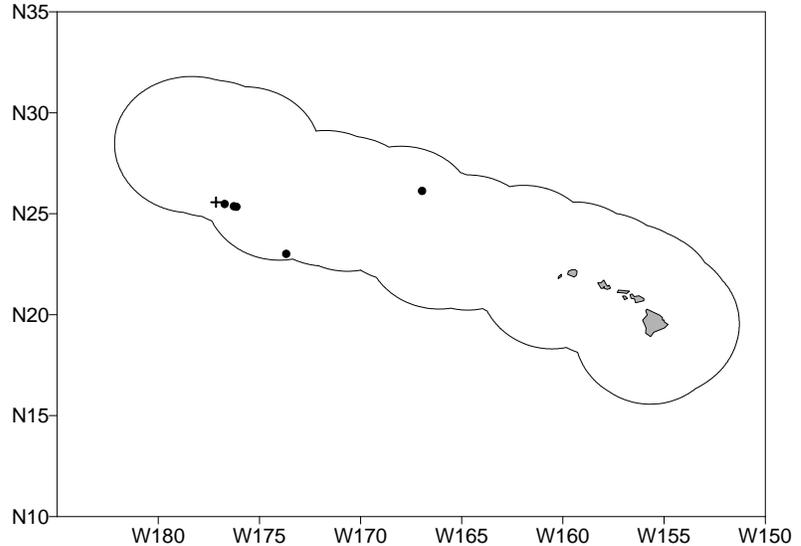


## DWARF SPERM WHALE (*Kogia sima*): Hawaiian Stock

### STOCK DEFINITION AND GEOGRAPHIC RANGE

Dwarf sperm whales are found throughout the world in tropical to warm-temperate waters (Nagorsen 1985). Rice (1998) recently argued that the species name *simus*, was incorrect and should be replaced by *sima* to reflect rules of Latin usage. At least four strandings of dwarf sperm whales have been documented in Hawaii (Tomich 1986; Nitta 1991; Maldini et al. 2005). Two sightings of pygmy or dwarf sperms whales were made between Hawaii and Maui during 1993-98 aerial surveys within about 25 nmi of the main Hawaiian Islands (Mobley et al. 2000), and dwarf sperm whales were seen near Niihau, Kauai, Lanai, and Hawaii during small boat surveys between 2000 and 2003 (Baird et al 2005). Five sightings of dwarf sperm whales 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). For the Marine Mammal Protection Act (MMPA) stock assessment reports, dwarf sperm whales within the Pacific U.S. EEZ are divided into two discrete, non-contiguous areas: 1) Hawaiian waters (this report), and 2) 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.** Sighting locations of dwarf sperm whales (filled circle) and unidentified *Kogia* (cross) during the 2002 shipboard cetacean survey of U.S. waters surrounding the Hawaiian Islands (Barlow 2006; 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

Wade and Gerrodette (1993) provided an estimate for the eastern tropical Pacific, but it is not known whether these animals are part of the same population that occurs in the central North Pacific. Baird (2005) reports that dwarf sperm whales are the sixth most commonly sighted odontocete around the Main Hawaiian Islands. This species' small size, tendency to avoid vessels, deep-diving habits, combined with the high proportion of *Kogia* sightings that are not identified to species, may result in negatively biased relative abundances in this region (R.W. Baird, pers. comm.). A 2002 shipboard line-transect survey of the entire Hawaiian Islands EEZ resulted in an abundance estimate of 17,519 (CV=0.74) dwarf sperm 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 10,043 dwarf sperm 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.

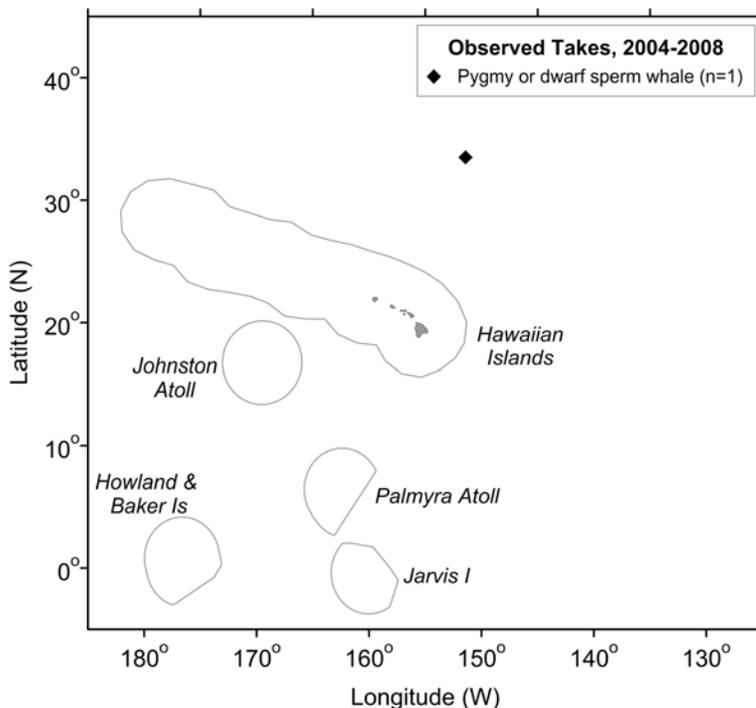
## POTENTIAL BIOLOGICAL REMOVAL

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 (10,043) 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 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 100 dwarf sperm 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 have been reported for all Hawaiian 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 (SSL) fishery that targets swordfish. Both fisheries operate within U.S. waters and on the high seas. Between 2004 and 2008, one pygmy or dwarf sperm whale was observed hooked in the SSL fishery (100% observer coverage) (Figure 2, McCracken & Forney 2010). Based on an evaluation of the observer's description of the interaction and following the most recently developed criteria for assessing serious injury in marine mammals (Andersen et al. 2008), this animal was considered not seriously injured (Forney 2009). No dwarf sperm whales were observed hooked or entangled in the DSL fishery (20-28% observer coverage).



**Figure 2.** Location of pygmy or dwarf sperm whale take (filled diamond) in Hawaii-based longline fisheries, 2004-2008. Solid lines represent the U.S. EEZs. Fishery descriptions are provided in Appendix 1.

## STATUS OF STOCK

The status of dwarf sperm 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 dwarf sperm 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 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 dwarf sperm whales that feed in the oceans' “sound channel”.

**Table 1.** Summary of available information on incidental mortality and serious injury of pygmy sperm whales (Hawaiian stock) in commercial fisheries, within and outside of the Hawaiian Islands EEZ (McCracken & Forney 2010). Mean annual takes are based on 2004-2008 data unless otherwise indicated; n/a = not available.

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)
<b>Hawaii-based deep-set longline fishery</b>	2004	observer data	25%	0	0 (-)	0 (-)	0	0 (-)	0 (-)
	2005		28%	0	0 (-)		0	0 (-)	
	2006		22%	0	0 (-)		0	0 (-)	
	2007		20%	0	0 (-)		0	0 (-)	
	2008		22%	0	0 (-)		0	0 (-)	
<b>Hawaii-based shallow-set longline fishery</b>	2004	observer data	100%	0	Same as observed	0.2	0	Same as observed	0
	2005		100%	0			0		
	2006		100%	0			0		
	2007		100%	0			0		
	2008		100%	1*			0		
<b>Minimum total annual takes within U.S. EEZ waters</b>									0 (-)

\*One animal, which was either a pygmy sperm whale or dwarf sperm whales, observed not seriously injured.

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