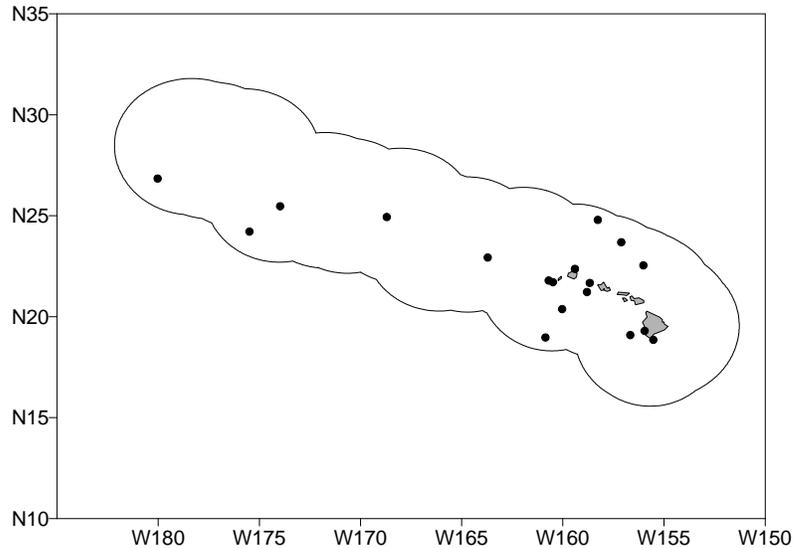


## ROUGH-TOOTHED DOLPHIN (*Steno bredanensis*): Hawaiian Stock

### STOCK DEFINITION AND GEOGRAPHIC RANGE

Rough-toothed dolphins are found throughout the world in tropical and warm-temperate waters (Perrin et al. 2009). They are present around all the main Hawaiian islands (Shallenberger 1981; Tomich 1986) and have been observed at least as far northwest as French Frigate Shoals (Nitta and Henderson 1993). Recent sighting locations of rough-toothed dolphins during a 2002 shipboard survey of waters within the U.S. Exclusive Economic Zone (EEZ) of the Hawaiian Islands (Barlow 2006) are shown in Figure 1. Eight strandings have been reported from Maui, Oahu, and the island of Hawaii (Nitta 1991; Maldini et al. 2005). Little is known about stock structure for this species in the North Pacific. Photographic identification studies around the main Hawaiian islands have indicated that dispersal rates between the islands of Kauai/Niihau and Hawaii do not exceed 2% per year (Baird *et al.* 2008). Resighting rates off the island of Hawaii are high, with 75% of well-marked individuals resighted on two or more occasions, suggesting high site fidelity and low population size. Resighting data coupled with relatively high sighting rates within the Main Islands stratum versus the outer EEZ stratum (Barlow 2006) may suggest that there are island-associated populations of rough-toothed dolphins in the Hawaii EEZ. Rough-toothed dolphins have also been documented in American Samoan waters (NMFS, PIR, unpublished data). For the Marine Mammal Protection Act (MMPA) stock assessment reports, there are two Pacific management stocks: 1) The Hawaiian Stock (this report), and 2) the American Samoa Stock. 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 the U.S. EEZ waters of the Hawaiian Islands (NMFS 2005).



**Figure 1.** Rough-toothed dolphin sighting locations during the 2002 shipboard cetacean 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

A population estimate for this species has been made in the eastern tropical Pacific (Wade and Gerrodette 1993), but it is not known whether these animals are part of the same population that occurs around the Hawaiian Islands. Mark-recapture estimates for the islands of Kauai/Niihau and Hawaii were estimated from identification photographs obtained between 2003 and 2006, resulting in estimates of 1,665 (CV=0.33) around Kauai/Niihau and 198 (CV=0.12) around the island of Hawaii (Baird *et al.* 2008). These estimates are specific to those island areas and do not represent the abundance of rough-toothed dolphins within the Hawaiian EEZ, as surveys were primarily conducted within 40km of shore. A 2002 shipboard line-transect survey of the entire Hawaiian Islands EEZ resulted in an abundance estimate of 8,709 (CV=0.45) rough-toothed dolphins (Barlow 2006). This is currently the best available abundance estimate for this stock.

### Minimum Population Estimate

The log-normal 20th percentile of the 2002 abundance estimate for Hawaiian Islands EEZ waters (Barlow 2006) is 6,067 rough-toothed dolphins 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 (6,067) 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; Wade and Angliss 1997), resulting in a PBR of 61 rough-toothed dolphins per year.

### **HUMAN-CAUSED MORTALITY AND SERIOUS INJURY**

#### **Fishery Information**

Information on fishery-related mortality and serious injury 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 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, and some of these interactions involved rough-toothed dolphins (Nitta and Henderson 1993). Rough-toothed dolphins are known to take bait and catch from Hawaiian sport and commercial fisheries operating near the main islands and in a portion of the northwestern islands (Shallenberger 1981; Schlais 1984; Nitta and Henderson 1993), and they have been specifically reported to interact with the day handline fishery for tuna (palu-ahi) and the troll fishery for billfish and tuna (Schlais 1984; 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 rough-toothed dolphins were observed hooked or entangled in the SSL fishery (100% observer coverage) or the DSL fishery (20-28% observer coverage) (McCracken & Forney 2010). Interaction rates between dolphins and the NWHI bottomfish fishery have been estimated based on studies conducted in 1990-1993, indicating that an average of 2.67 dolphin interactions, most likely involving bottlenose and rough-toothed dolphins, occurred for every 1000 fish brought on board (Kobayashi and Kawamoto 1995). Fishermen claim interactions with dolphins that steal bait and catch are increasing. It is not known whether these interactions result in serious injury or mortality of dolphins. Baird *et al.* (2008) reported increased vessel avoidance of boats by rough-toothed dolphins off the island of Hawaii relative to those off Kauai or Niihau and attributed this to possible shooting of dolphins that are stealing bait or catch from recreational fisherman off the island of Hawaii (Kuljis 1983).

### **STATUS OF STOCK**

The status of rough-toothed dolphins in Hawaiian waters relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance. No habitat issues are known to be of concern for this species. It is not listed as “threatened” or “endangered” under the Endangered Species Act (1973), nor as “depleted” under the MMPA. Given the absence of recent fishery-related mortality or serious injuries, the Hawaiian stock of rough-toothed dolphins is not considered strategic under the 1994 amendments to the MMPA, and the total fishery mortality and serious injury can be considered to be insignificant and approaching zero.

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