

RISSO'S DOLPHIN (*Grampus griseus*): Hawaii Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Risso's dolphins are found in tropical to warm-temperate waters worldwide (Perrin et al. 2009). Risso's dolphins represent less than 1% of all odontocete sightings in leeward surveys of the main Hawaii Islands from 2000 to 2012 (Baird et al. 2013); however, six sightings were made during a 2002 survey and 12 during a 2010 survey of the U.S. Exclusive Economic Zone (EEZ) of the Hawaiian Islands (Barlow 2006, Bradford et al. 2017; Figure 1). Most sightings of Risso's dolphins occur in deep waters offshore. A single satellite tagged animal moved broadly between offshore waters off Kona, Kohoolawe, and Lanai over a 2 week period (Baird 2016). Sighting, habitat, and limited movement data do not appear to support finer population structure in Hawaiian waters.

For the Marine Mammal Protection Act (MMPA) stock assessment reports, Risso's dolphins 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 high seas waters; however, because data on abundance, distribution, and human-caused impacts are largely lacking for high seas waters, the status of this stock is evaluated based on data from U.S. EEZ waters of the Hawaiian Islands (NMFS 2005).

POPULATION SIZE

Encounter data from a 2010 shipboard line-transect survey of the entire Hawaiian Islands EEZ was recently evaluated using Beaufort sea-state-specific trackline detection probabilities for Risso's dolphins, resulting in an abundance estimate of 11,613 (CV = 0.43) Risso's dolphins (Bradford et al. 2017) in the Hawaii stock. A 2002 shipboard line-transect survey of the same area resulted in an abundance estimate of 2,372 (CV=0.97) Risso's dolphins (Barlow 2006). Species abundances estimated from the 2002 HICEAS survey used pooled small dolphin, large dolphin, and large whale $g(0)$ (the probability of sighting and recording an animal directly on the track line) estimates stratified by group size (Barlow 1995). Since then, Barlow (2015) developed a more robust method for estimating species-specific $g(0)$ values that are adjusted for the Beaufort sea states that are encountered during a survey. This new method was used for analyzing the data from the 2010 survey, but has not yet been used to analyze the 2002 data. Population estimates have been made off Japan (Miyashita 1993), in the eastern tropical Pacific (Wade and Gerrodette 1993), and off the U.S. West Coast (Barlow and Forney 2007), but it is not known whether these animals are part of the same population that occurs around the Hawaiian Islands and in the central North Pacific.

Minimum Population Estimate

The minimum population size is calculated as the lower 20th percentile of the log-normal distribution (Barlow et al 1995) of the 2010 abundance estimate, or 8,210 Risso's dolphins within the Hawaiian Islands EEZ.

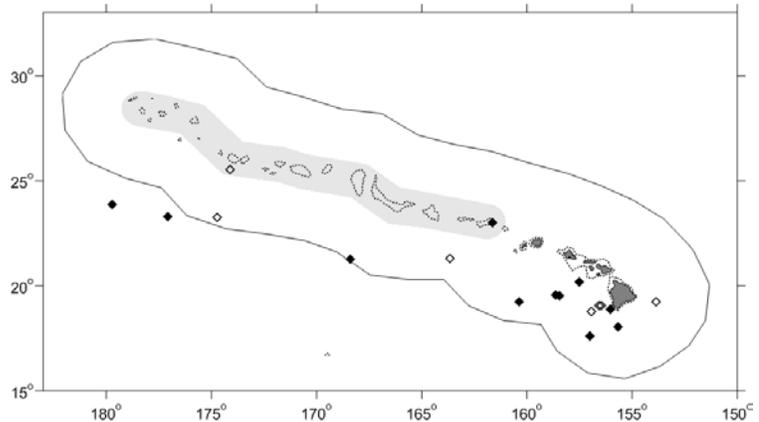


Figure 1. Risso's dolphin sighting locations during the 2002 (open diamonds) and 2010 (black diamonds) shipboard cetacean surveys of U.S. EEZ waters surrounding the Hawaiian Islands (Barlow 2006, Bradford et al. 2017; see Appendix 2 for details on timing and location of survey effort). Outer line represents approximate boundary of survey area and U.S. EEZ. Dark and light gray shading indicate the original and expanded area of Papahānaumokuākea Marine National Monument. Dotted line is the 1000 m isobath.

Current Population Trend

Abundance analyses of the 2002 and 2010 datasets used different $g(0)$ values. The 2002 survey data have not been reanalyzed using this method. This change precludes evaluation of population trends at this time. Assessment of population trend will likely require additional survey data and reanalysis of all datasets using comparable methods.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No data are available on current or maximum net productivity rate for Hawaiian animals.

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for the Hawaii stock of Risso's dolphins is calculated as the minimum population size within the U.S. EEZ of the Hawaiian Islands (8,210) times one half the default maximum net growth rate for cetaceans ($\frac{1}{2}$ of 4%) times a recovery factor of 0.5 (for a stock of unknown status with no known fishery mortality and serious injury within the Hawaii EEZ; Wade and Angliss 1997), resulting in a PBR of 82 Risso's 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. No interactions between nearshore fisheries and Risso's dolphins have been reported in Hawaiian waters. No estimates of human-caused mortality or serious injury are currently available for nearshore hook and line fisheries because these fisheries are not observed or monitored for protected species bycatch.

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 2011 and 2015, 13 Risso's dolphins were observed killed or seriously injured in the SSL fishery (100% observer coverage), and 2 Risso's dolphins were observed killed or seriously injured in the DSL fishery (20-21% observer coverage) (Bradford 2017, Bradford and Forney 2017, McCracken 2017). One Risso's dolphin in the DSL fishery and four in the SSL fishery were killed, 9 in the SSL fishery and one in the DSL fishery were considered to have been seriously injured, and the remaining three interactions in the SSL fishery were determined to be not seriously injured or could not be determined based on an evaluation of the observer's description of the interaction. When otherwise undetermined, the injury status of takes is prorated to serious versus non-serious using the historic rate of serious injury within the observed takes. Average 5-yr estimates of annual mortality and serious injury for 2011-2015 are 5.1 (CV = 0.9) Risso's dolphins outside of U.S. EEZs, and 0 within the Hawaiian Islands EEZ (Table 1, McCracken 2017). Four additional unidentified cetaceans were taken in the DSL fishery, and one unidentified cetacean was taken in the SSL fishery, some of which may have been Risso's dolphins.

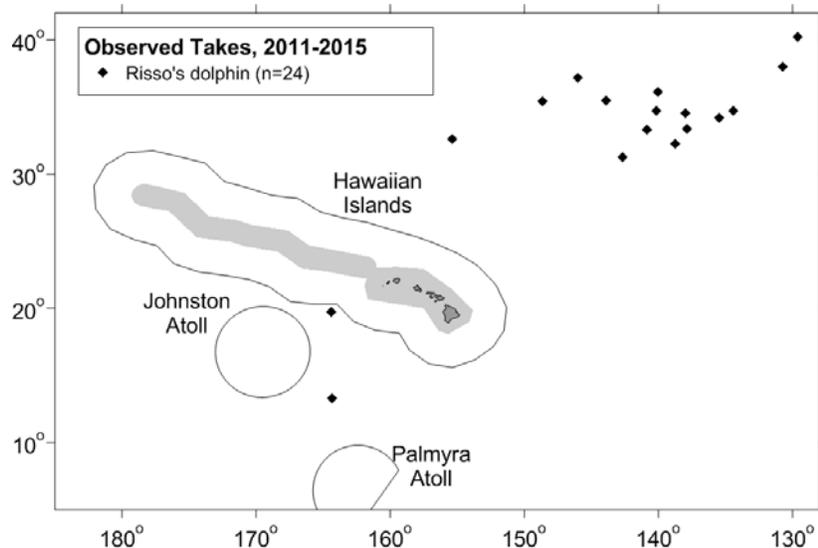


Figure 2. Locations of Risso's dolphin takes (filled diamonds) in Hawaii-based longline fisheries, 2011-2015. Solid lines represent the U.S. EEZs. Gray shading notes areas closed to longline fishing. Fishery descriptions are provided in Appendix 1.

Table 1. Summary of available information on incidental mortality and serious injury of Risso’s dolphin (Hawaii stock) in commercial longline fisheries, within and outside of U.S. EEZs (McCracken 2017). Mean annual takes are based on 2011–2015 data unless indicated otherwise. Information on all observed takes (T) and combined mortality events & serious injuries (MSI) is included. Total takes were prorated to deaths, serious injuries, and non-serious injuries based on the observed proportions of each outcome.

| Fishery Name | Year | Data Type | Percent Observer Coverage | Observed total interactions (T) and mortality events, and serious injuries (MSI), and total estimated mortality and serious injury (M&SI) of Risso's dolphins | | | |
|---|------|---------------|---------------------------|---|---------------------|--------------|---------------------|
| | | | | Outside U.S. EEZs | | Hawaiian EEZ | |
| | | | | Obs. T/MSI | Estimated M&SI (CV) | Obs. T/MSI | Estimated M&SI (CV) |
| Hawaii-based deep-set longline fishery | 2011 | Observer data | 20% | 0 | 0 (-) | 0 | 0 (-) |
| | 2012 | | 20% | 0 | 0 (-) | 0 | 0 (-) |
| | 2013 | | 20% | 0 | 0 (-) | 0 | 0 (-) |
| | 2014 | | 21% | 0 | 0 (-) | 0 | 0 (-) |
| | 2015 | | 21% | 2/2 | 10 (0.6) | 0 | 0 (-) |
| Mean Estimated Annual Take (CV) | | | | 1.9 (0.9) | | 0 (-) | |
| Hawaii-based shallow-set longline fishery | 2011 | Observer data | 100% | 4/3 | 3 | 0 | 0 |
| | 2012 | | 100% | 0/0 | 0 | 0 | 0 |
| | 2013 | | 100% | 3/2 | 2 | 0 | 0 |
| | 2014 | | 100% | 6/6 [†] | 6 | 0 | 0 |
| | 2015 | | 100% | 3/3 | 3 | 0 | 0 |
| Mean Annual Takes (100% coverage) | | | | 3.2 | | 0 | |
| Minimum total annual takes within U.S. EEZ | | | | | | 0 (-) | |

[†] Injury status could not be determined based on information collected by the observer. Injury status is prorated (see text).

STATUS OF STOCK

The Hawaii stock of Risso’s dolphins is not considered strategic under the 1994 amendments to the MMPA. The status of Risso's dolphins in Hawaiian waters relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance. Risso’s dolphins are not listed as “threatened” or “endangered” under the Endangered Species Act (1973), nor designated as “depleted” under the MMPA. Given the absence of recent recorded fishery-related mortality or serious injuries the total fishery mortality and serious injury can be considered to be insignificant and approaching zero. One Risso’s dolphin stranded on the MHI tested positive for *Morbillivirus* (Jacob et al. 2016). The presence of *morbillivirus* in 10 species of cetacean in Hawaiian waters, all identified as a unique strain of *morbillivirus*, (Jacob et al. 2016), raises concerns about the history and prevalence of this disease in Hawaii and the potential population impacts, including cumulative impacts of disease with other stressors.

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