Revised 3/14/2022

STRIPED DOLPHIN (*Stenella coeruleoalba*): California/Oregon/Washington Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Striped dolphins are distributed world-wide in tropical and warm-temperate pelagic waters. Striped dolphins are commonly encountered in warm offshore waters of California, and a few sightings have been made off Oregon (Figure 1, Barlow 2016, Henry *et al.* 2020). Striped dolphins are also commonly found in the central North Pacific, but sampling between this region and California has been insufficient to determine whether the distribution is continuous. Based on sighting records off California and Mexico, striped dolphins appear to have a continuous distribution in offshore waters of these two regions (Perrin *et al*. 1985; Mangels and Gerrodette 1994). No information on possible seasonality in distribution is available, because the California surveys which extended 300 nmi offshore were conducted only during the summer/fall period. Although striped dolphins are not restricted to U.S. waters, cooperative management agreements with Mexico exist only for the tuna purse seine fishery and not for other fisheries which may take this species (e.g. gillnet fisheries). Therefore, the management stock includes only animals found within U.S. waters. For the Marine Mammal Protection Act (MMPA) stock assessment reports, striped dolphins within the Pacific U.S. Exclusive Economic Zone are divided into two discrete, non-contiguous areas: 1) waters off California, Oregon and Washington (this report), and 2) waters around Hawaii.

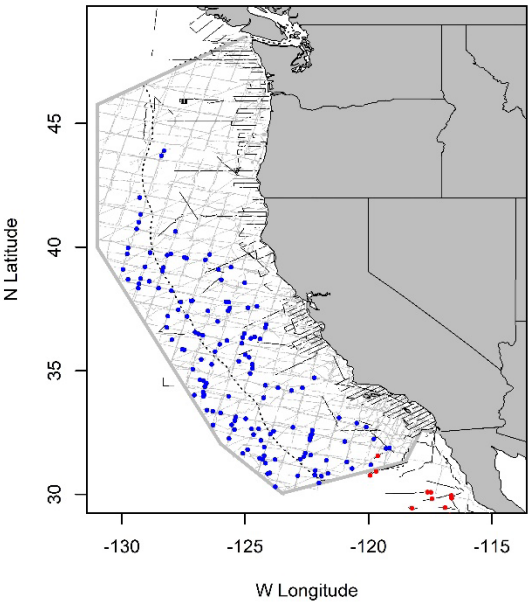

Figure 1. Striped dolphin sightings based on shipboard surveys off California, Oregon, and Washington, 1991-2018 (Barlow 2016, Henry *et al*. 2020). Dashed line represents U.S. EEZ, thin lines indicate completed transect effort (gray = 1991-2014, black = 2018). Sightings from the 2018 survey are shown in red.

POPULATION SIZE

The abundance of striped dolphins in this region appears to be variable between years and may be affected by oceanographic conditions, as with other odontocete species (Forney 1997, Becker et al. 2012, Barlow 2016). Becker *et al*. (2020) generated species distribution models (SDMs) from fixed and dynamic ocean variables using 1991-2018 line-transect survey data to estimate density and abundance of cetaceans in the California Current Ecosystem (CCE). The use of SDMs for density estimation is well-established for this region and models incorporate changes in species abundance and habitat shifts over time (Becker *et al*. 2012, 2016, 2017, Redfern *et al*. 2017). Additionally, use of SDMs facilitates abundance estimation when survey coverage is limited, as was the case in 2018 when line-transect effort was largely limited to continental shelf waters (Henry *et al*. 2020). The best-estimate of abundance is taken as the estimate from 2018, or 29,988 (CV=0.299) animals (Becker *et al.* 2020).

Minimum Population Estimate

The log-normal 20th percentile of the 2018 abundance estimate is 23,448 striped dolphins.

Current Population Trend

The distribution and abundance of striped dolphins off California, Oregon and Washington varies interannually (Barlow 2016, Becker *et al*. 2020), but no long-term trends have been identified (Figure 2). The

highest estimates of abundance were obtained in 2014, an anomalously-warm year in the California Current (Bond *et al.* 2015).

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No information on current or maximum net productivity rates is available for striped dolphins off California.

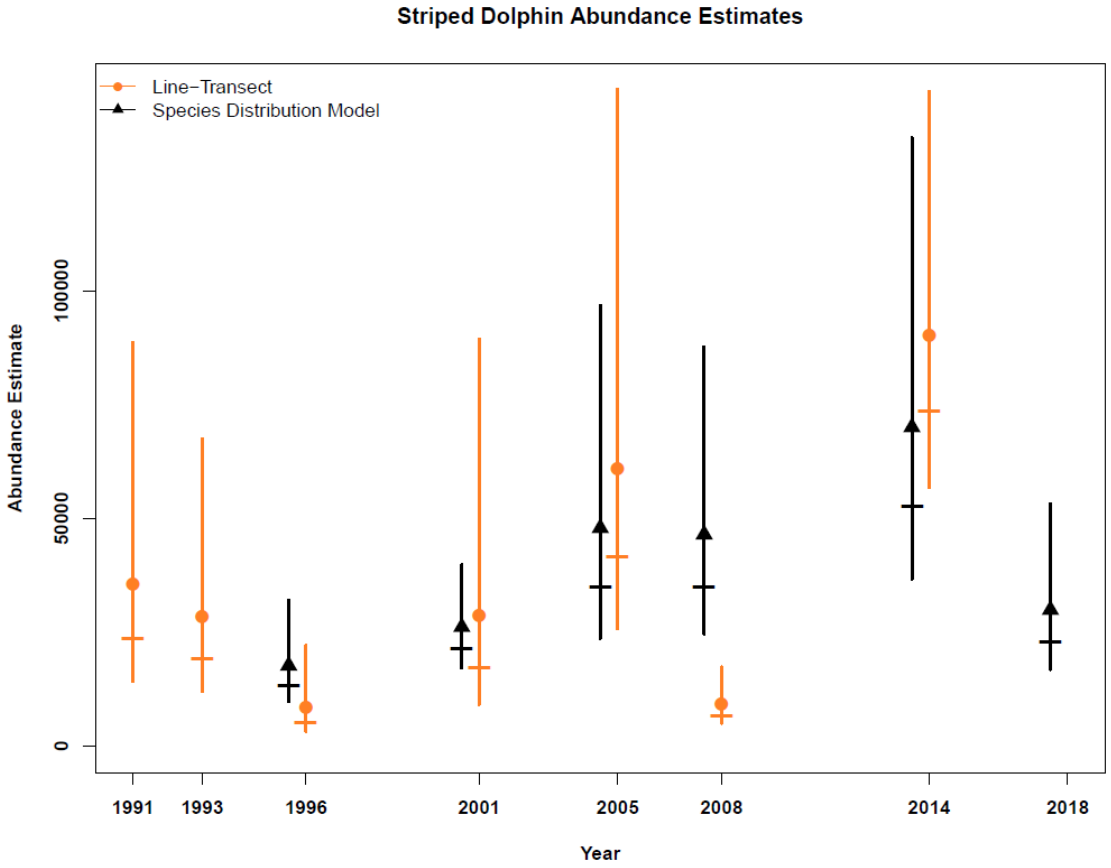

Figure 2. Abundance estimates and 95% confidence intervals from vessel-based line transect surveys (Barlow 2016) and species distribution models (Becker *et al*. 2020) within the California Current. Line-transect surveys in 1991 and 1993 did not include the waters of Oregon and Washington. Vertical bars indicate approximate 95% confidence limits for line-transect and species distribution model estimates. Horizontal hatch marks represent minimum population size estimates based on 20th percentiles of mean estimates.

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (23,448) times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.48 (for a species of unknown status with fishery mortality CV > 0.3 and < 0.6; Wade and Angliss 1997), resulting in a PBR of 225 striped dolphins per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

A summary of recent fishery mortality and injury for this stock of striped dolphin is shown in Table 1. More detailed information on these fisheries is provided in Appendix 1. The estimate of mortality and serious injury for striped dolphin in the California drift gillnet fishery for the five most recent years of monitoring, 2015-2019, is zero animals per year (Carretta 2020). Human-caused mortality and injury

documentation is often based on stranding data, where raw counts are negatively-biased because only a fraction of carcasses are detected. In this stock assessment report and others involving dolphins along the U.S. West Coast, human-related deaths and injuries counted from beach strandings along the outer U.S. West Coast are multiplied by a factor of 4 (including a coefficient of variation = 0.46 derived from the results of Carretta *et al*. 2016) to account for the non-detection of most carcasses (Carretta *et al*. 2016). Five striped dolphin stranded during 2015-2019 with evidence of fishery interactions (Carretta *et al*. 2021), yielding a minimum estimate of 20 fishery-related dolphin deaths.

Table 1. Summary of available information on the incidental mortality and serious injury of striped dolphins (California/ Oregon/Washington Stock) in commercial fisheries that might take this species (Carretta *et al*. 2021, Carretta 2021). Human-caused mortality values based on strandings recovered along the outer U.S. West Coast are multiplied by a correction factor of 4 to account for undetected mortality (Carretta *et al*. 2016a).

Fishery Name	Data Type	Year(s)	Percent Observer Coverage	Observed Mortality + Serious Injury	Estimated Mortality + Serious Injury	Mean Annual Takes (CV in parentheses)
CA/OR thresher shark/swordfish drift gillnet fishery	observer	2015-2019	21%	0	0 (n/a)	0 (n/a)
Unidentified fishery (includes unidentified gillnet)	Stranding	2015-2019	n/a	5	≥ 20	≥ 4.0 (0.46)
Minimum total annual takes (includes correction for unobserved beach strandings)						≥ 4.0 (0.46)

STATUS OF STOCK

The status of striped dolphins in California relative to OSP is not known, and there are insufficient data to evaluate potential trends in abundance. No habitat issues are known to be of concern for this species. They are not listed as "threatened" or "endangered" under the Endangered Species Act nor as "depleted" under the MMPA. Because recent fishery and human-caused mortality (≥ 4.0) is less than 10% of the PBR (225), striped dolphins are not classified as a "strategic" stock under the MMPA, and the total fishery mortality and serious injury for this stock can be considered to be insignificant and approaching zero.

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