Revised 3/15/2022

DALL'S PORPOISE (*Phocoenoides dalli dalli*): California/Oregon/Washington Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Dall's porpoises are endemic to temperate waters of the North Pacific. Off the U.S. west coast, they are seen in shelf, slope and offshore waters (Figure 1). Sighting patterns from aerial and shipboard surveys in California, Oregon and Washington waters (Green et al. 1992, 1993; Forney and Barlow 1998; Barlow 2016, Henry *et al.* 2020) suggest that movement between these states occurs as oceanographic conditions change, both on seasonal and inter-annual time scales (Boyd *et al.* 2018, Becker *et al.* 2020). The southern end of this stock's range is not well-documented, but they are seen off Southern California in winter, and during cold-water periods they probably range into Mexican waters off northern Baja California. The stock structure of eastern North Pacific Dall's porpoises is not known, but based on patterns of stock differentiation in the western North Pacific, where they have been more intensively studied, it is expected that separate stocks may exist (Perrin and Brownell 1994). Although Dall's porpoises occur outside U.S. waters, there are no cooperative management agreements with Mexico or Canada for fisheries which may take this species (e.g. gillnet fisheries). For the Marine Mammal Protection Act (MMPA) stock assessment reports, Dall's porpoises 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) Alaskan waters.

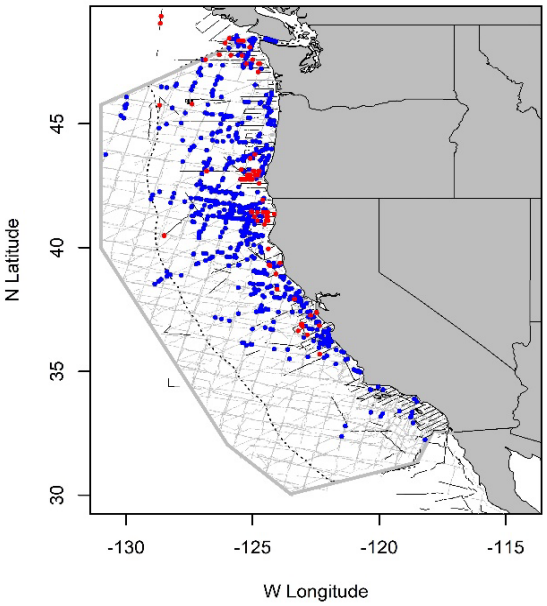

Figure 1. Dall's porpoise sightings based on shipboard surveys off California, Oregon, and Washington, 1991-2018. Dashed line represents U.S. EEZ, thin lines indicate completed transect effort (gray = 1991-2014, black = 2018). Sightings from the 2018 survey are shown in red.

POPULATION SIZE

Population size has been estimated from a series of line-transect surveys using multiple-covariate line-transect approaches (Barlow 2016), Bayesian integrated population redistribution models (Boyd *et al.* 2018) and species distribution models (SDMs) (Becker *et al*. 2020) (Figure 2). 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 16,498 (CV=0.608) animals (Becker *et al.* 2020). Additional numbers of Dall's porpoises occur in the inland waters of Washington state, but the most recent abundance estimate obtained in 1996 (900 animals, CV=0.40) is over 8 years old (Calambokidis *et al*. 1997) and is not included in the overall estimate of abundance for this stock.

Minimum Population Estimate

The log-normal 20th percentile of the 2018 abundance estimate for the outer coasts of California, Oregon and Washington waters is 10,286 Dall's porpoises (Becker *et al.* 2020).

Current Population Trend

The distribution and abundance of Dall's porpoise off California, Oregon and Washington varies at both seasonal and interannual time scales (Forney and Barlow 1998, Becker *et al*. 2012, Barlow 2016, Boyd *et al.* 2018), and the entire population does not reside within the California Current, thus, assessment of population trends isn't straightforward. Boyd *et al.* (2018) reported that the population size of Dall's porpoise within the California Current survey area was relatively stable over each summer/fall survey season from 1996 to 2008, and noted that the distribution of animals expanded and contracted with the extent of suitable habitat.

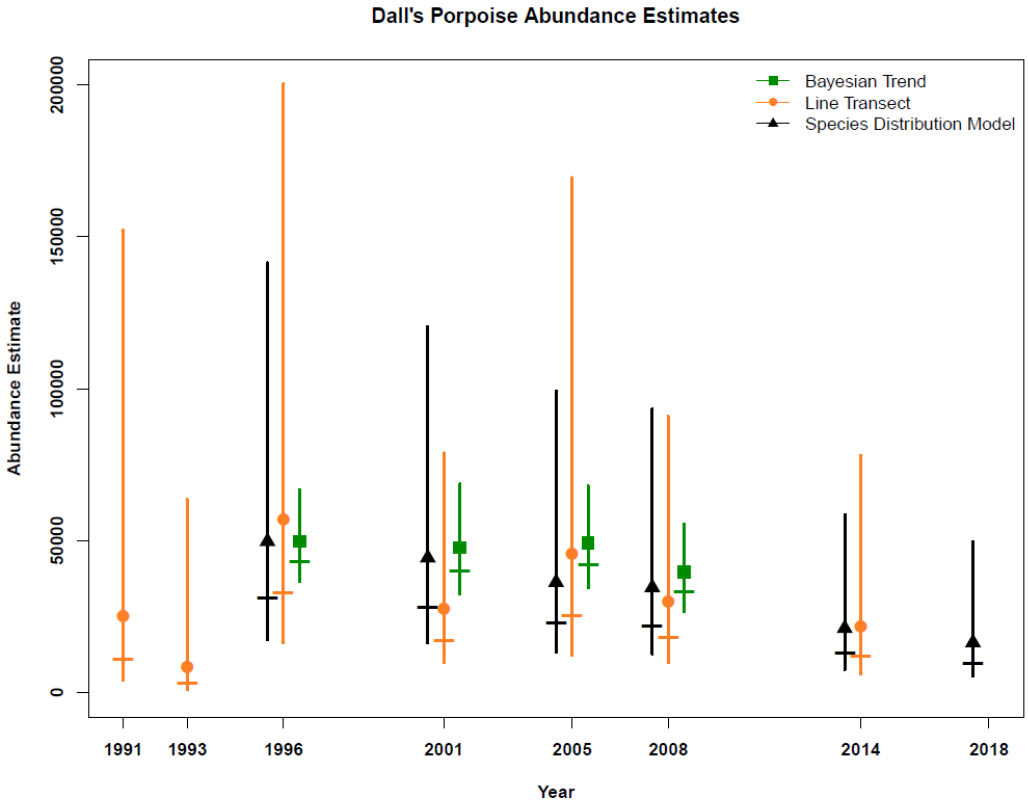

Figure 2. Abundance estimates and 95% confidence intervals from vessel-based line transect surveys (Barlow 2016), Bayesian trend models (Boyd *et al.* 2018), and species distribution models (Becker *et al*. 2020) within the California Current. Line-transect surveys in 1991 and 1993 did not include the waters of Oregon and Washington. Vertical bars indicate approximate 95% confidence limits for line-transect, Bayesian trend, and species distribution model estimates. Horizontal hatch marks represent minimum population size estimates based on 20th percentiles of mean estimates.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

No information on current or maximum net productivity rates is available for Dall's porpoise off the U.S. west coast.

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (10,286) 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 and mortality rate CV between 0.3 and 0.6; Wade and Angliss 1997), resulting in a PBR of 99 Dall's porpoises per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

A summary of recent fishery mortality and injury information for this stock of Dall's porpoises is given in Table 1. More detailed information on these fisheries is provided in Appendix 1. The estimate of mortality and serious injury for Dall's porpoise in the California drift gillnet fishery for the five most recent years of monitoring, 2015-2019, averages 0.46 animals per year (Carretta 2021). Although Dall's porpoises have been incidentally killed in West Coast groundfish fisheries in the past, no takes of this species were observed during the five most recent years for which data are available, 2012-2016 (Jannot *et al*. 2018). One animal was killed in an unidentified gillnet fishery in Washington state inland waters in 2016 (Carretta *et al*. 2021).

Table 1. Summary of available information on the incidental mortality and serious injury of Dall's porpoises (California/ Oregon/Washington Stock) in commercial fisheries that might take this species (Carretta 2021, Carretta *et al.* 2021; Jannot *et al*. 2018). All observed entanglements of Dall's porpoises resulted in the death of the animal. Coefficients of variation for mortality estimates are provided in parentheses; n/a = not available.

Fishery Name	Data Type	Year(s)	Percent Observer Coverage	Observed Mortality	Estimated Annual Mortality (CV)	Mean Annual Takes (CV)
CA/OR thresher shark/swordfish drift gillnet fishery	observer	2015-2019	21%	0	2.3 (0.4)	0.46 (0.4)
WA, OR, CA domestic groundfish trawl fishery (includes at-sea hake and other limited-entry groundfish sectors)	observer	2012-2016	98% - 100%	0	0	0
Unidentified gillnet fishery	Stranding	2015-2019	n/a	1	1	≥ 0.2
Minimum total annual takes						0.66 (0.4)

STATUS OF STOCK

The status of Dall's porpoises in California, Oregon and Washington relative to OSP is not known, and trends in abundance were described as stable by Boyd *et al.* (2018). 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 nor as "depleted" under the MMPA. The average annual human-caused mortality of Dall's porpoise (0.66 animals) is estimated to be less than the PBR (99), and they are not classified as a "strategic" stock under the MMPA. The total fishery mortality and serious injury for this stock is less than 10% of the calculated PBR and, therefore, can be considered to be insignificant and approaching zero mortality and serious injury rate.

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