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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 Ocean. Off the U.S. west coast, they are commonly seen in shelf, slope and offshore waters (Figure 1; Morejohn 1979). Sighting patterns from aerial and shipboard surveys conducted in California, Oregon and Washington (Green et al. 1992, 1993; Forney and Barlow 1998; Barlow 2016) suggest that north-south movement between these states occurs as oceanographic conditions change, both on seasonal and inter-annual time scales. The southern end of this population's range is not well-documented, but they are commonly 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 will emerge when data become available (Perrin and Brownell 1994). Although Dall's porpoises are not restricted to U.S. territorial 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.

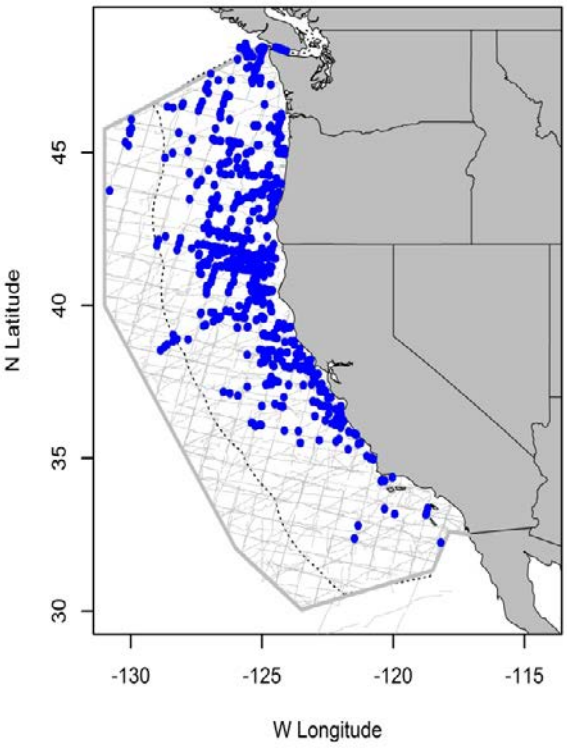

Figure 1. Dall's porpoise sightings based on shipboard surveys off California, Oregon, and Washington, 1991-2014 (Barlow 2016). Dashed line represents the U.S. EEZ, thin gray lines represent the completed transect effort of all surveys combined.

POPULATION SIZE

Dall's porpoise distribution in this region is highly variable between years and appears to be affected by oceanographic conditions (Forney 1997; Forney and Barlow 1998, Barlow 2016). Because animals may spend time outside the U.S. Exclusive Economic Zone as oceanographic conditions change, a multi-year average abundance estimate is the most appropriate for management within U.S. waters. The most recent estimate of Dall's porpoise abundance is the geometric mean of estimates from 2008 and 2014 summer/autumn vessel-based line-transect surveys of California, Oregon, and Washington waters, or 25,750 (CV=0.45) animals (Barlow 2016). This estimate includes new correction factors for animals missed during the surveys. 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 2008-2014 average abundance estimate for the outer coast of California, Oregon and Washington waters is 17,954 Dall's porpoises.

Current Population Trend

The distribution and abundance of Dall's porpoise off California, Oregon and Washington varies considerably at both seasonal and interannual time scales (Forney and Barlow 1998, Becker *et al*. 2012, Barlow 2016), but no longterm trends have been identified.

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 (17,954) 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 172 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, 2010-2014, averages 0.3 animals per year (Carretta *et al*. 2017). 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, 2009-2013 (Jannot et al. 2011; NWFSC unpublished data). Gillnets have been documented to entangle marine mammals off Baja California (Sosa-Nishizaki et al. 1993), where Dall's porpoise may occasionally be found, but no recent bycatch data from Mexico are available.

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 *et al*. 2017; Jannot *et al*. 2011). 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. Mean annual takes are based on 2010-2014 data for the CA/OR swordfish drift gillnet fishery and 2005-2009 for groundfish fisheries.

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	2010 2011 2012 2013 2014	12% 20% 19% 37% 24%	0 0 0 0 1	0 0 0 0.2 (2.3) 1.1 (0.29)	0.3 (0.53)
WA/OR/CA groundfish (bottom trawl)[a]	observer	2009-2013	23% (2009) 18% (2010) 100% (2011-2013)	0	0	0

WA/OR/CA groundfish (midwater trawl - at-sea hake sector)	observer	2009-2013	100%	0	0	0
WA/OR/CA groundfish (midwater trawl - shoreside hake sector)[b]	observer	2011-2013	100%	0	0	0
Minimum total annual takes						0.3 (0.53)

[a]The bottom trawl fishery was a limited entry fishery in 2010 and a catch shares fishery in 2011-2013.
[b]Fishery observers began monitoring the shoreside hake sector of the fishery in 2011.

STATUS OF STOCK

The status of Dall's porpoises in California, Oregon and Washington 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. 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 (0.3 animals) is estimated to be less than the PBR (172), 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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