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

STOCK DEFINITION AND GEOGRAPHIC RANGE

Dall's porpoise 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 at different times (Green et al. 1992, 1993; Mangels and Gerrodette 1994; Barlow 1995; Forney et al. 1995) 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 porpoise 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 porpoise 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.

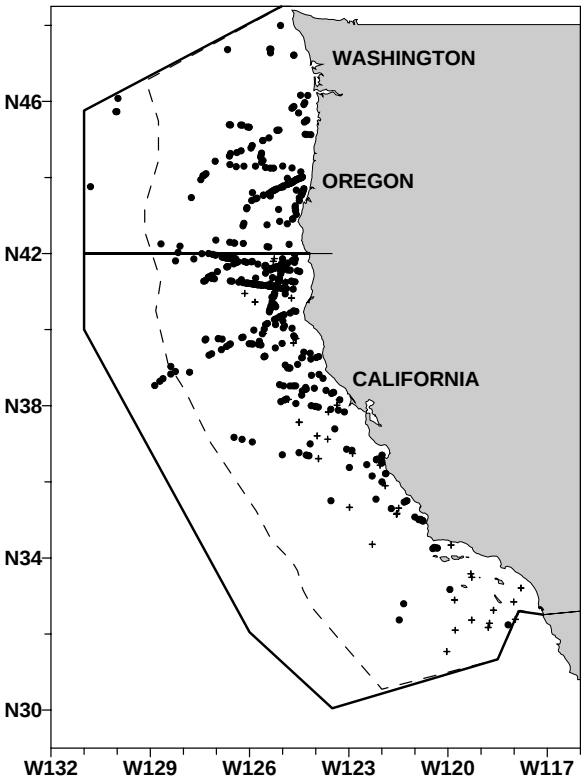

Figure 1. Dall's porpoise sightings based on aerial and shipboard surveys off California, Oregon, and Washington, 1991-2001 (see Appendix 2 for data sources and information on timing and location of survey effort). Dashed line represents the U.S. EEZ, thick line indicates the outer boundary of all surveys combined. ● = summer/autumn ship-based sightings; + = winter/spring aerial-based sightings.

POPULATION SIZE

Shipboard surveys are expected to be more reliable for this species than aerial surveys because of the large, unknown fraction of diving animals missed from the air (Forney 1994). Two summer/fall shipboard surveys were conducted within 300 nmi of the coasts of California Oregon and Washington in 1996 (Barlow 1997) and 2001 (Barlow 2003). The distribution of Dall's porpoise throughout this region is highly variable between years and appears to be affected by oceanographic conditions (Forney 1997; Forney and Barlow 1998). 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 1996-2001 weighted average abundance estimate for California, Oregon and Washington waters based on two ship surveys is 98,617 (CV = 0.33) Dall's porpoise (Barlow 2003). Additional aerial surveys were conducted in the inland waters of Washington in 1996, resulting in Dall's porpoise abundance estimates of 900 (CV=0.40) (Calambokidis et al. 1997). This estimate includes approximate correction factors for animals missed due to perception and availability bias. Combining the 1996 estimate for inland Washington waters with the 1996-2001 outer coast estimate from NMFS ship surveys yields a total abundance estimate of 99,517 (CV=0.33) Dall's porpoise for the California/Oregon/Washington stock.

Minimum Population Estimate

The log-normal 20th percentile of the 1996-2001 weighted average abundance estimate for both the outer coast of California, Oregon and Washington and inland Washington waters is 75,915 Dall's porpoise.

Current Population Trend

No information is available regarding trends in abundance of Dall's porpoise in California, Oregon and Washington. Their distribution and abundance in this region varies considerably at both seasonal and interannual time scales as oceanographic conditions vary (Forney 1997; Forney and Barlow 1998).

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 (75,915) 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 a mortality rate CV>0.30 and $\leq$ 0.60; Wade and Angliss 1997), resulting in a PBR of 729 Dall's porpoise per year.

HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fishery Information

A summary of recent fishery mortality and injury for this stock of Dall's porpoise is given in Table 1. More detailed information on these fisheries is provided in Appendix 1. Mortality estimates for the California drift gillnet fishery are included for the five most recent years of monitoring, 1997-2001 (Cameron and Forney 1999, 2000; Carretta 2001, 2002). After the 1997 implementation of a Take Reduction Plan, which included skipper education workshops and required the use of pingers and minimum 6-fathom extenders, overall cetacean entanglement rates in the drift gillnet fishery dropped considerably (Barlow and Cameron 20031999). However, because of interannual variability in entanglement rates and the relative rarity of Dall's porpoise entanglements, additional years of data will be required to fully evaluate the effectiveness of pingers for reducing mortality of this particular species. Mean annual takes in Table 1 are based on 1997-2001 data. This results in an average estimate of four (CV = 0.95) Dall's porpoise taken annually.

Drift gillnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may take animals from this population. Quantitative data are available only for the Mexican swordfish drift gillnet fishery, which uses vessels, gear, and operational procedures similar to those in the U.S. drift gillnet fishery, although nets may be up to 4.5 km long (Holts and Sosa-Nishizaki 1998). The fleet increased from two vessels in 1986 to 31 vessels in 1993 (Holts and Sosa-Nishizaki 1998). The total number of sets in this fishery in 1992 can be estimated from data provided by these authors to be approximately 2700, with an observed rate of marine mammal bycatch of 0.13 animals per set (10 marine mammals in 77 observed sets; Sosa-Nishizaki et al. 1993). This overall mortality rate is similar to that observed in California driftnet fisheries during 1990-95 (0.14 marine mammals per set; Julian and Beeson, 1998), but species-specific information is not available for the Mexican fisheries. Previous efforts to convert the Mexican swordfish driftnet fishery to a longline fishery have resulted in a mixed-fishery, with 20 vessels alternately using longlines or driftnets, 23 using driftnets only, 22 using longlines only, and seven with unknown gear type (Berdegué 2002).

Low levels of mortality for Dall's porpoise have also been documented in the California/Oregon/Washington domestic groundfish trawl fisheries (Perez and Loughlin 1991; Perez, in prep). Between 1997 and 2001, with 66%-96% of the fishing effort observed, six Dall's porpoise were reported killed in the at-sea processing portion of the Pacific whiting trawl fishery, and two animals were reported in unmonitored hauls. Based only on the systematically observed hauls, Dall's porpoise mortality was estimated to be ten (CV=0.69) in 1997, three (CV= 0.40) in 1998, and one (CV = n/a) in 1999 (Perez, in prep). Combining these estimates with the two reported mortalities for 1997 and 1998 that are not accounted for in the estimates, the minimum average annual mortality for 1997-2001 is 3.2 (CV=0.50) Dall's porpoise per year.

STATUS OF STOCK

The status of Dall's porpoise 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. They are not listed as "threatened" or "endangered" under the Endangered Species Act nor as "depleted" under the MMPA. Including driftnet mortality only for years after implementation of the Take Reduction Plan (1997-98), the average annual human-caused mortality in 1997-2001 (7 animals) is estimated to be less than the PBR (729), and therefore 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.

Table 1. Summary of available information on the incidental mortality and injury of Dall's porpoise (California/ Oregon/Washington Stock) in commercial fisheries that might take this species. All observed entanglements of Dall's porpoise 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 1997-2001 data unless noted otherwise.

Fishery Name	Data Type	Year(s)	Percent Observer Coverage	Observed Mortality	Estimated Annual Mortality	Mean Annual Takes (CV in parentheses)
CA/OR thresher shark/swordfish drift gillnet fishery	observer data	1997 1998 1999 2000 2001	23.0% 20.0% 20.0% 22.9% 20.4%	4 0 0 0 0	20 (0.95) 0 0 0 0	4 (0.95)
WA/OR/CA domestic groundfish trawl fisheries (At-sea processing Pacific whiting fishery only).	observer data	1997 1998 1999 2000 2001	65.7% 77.3% 68.6% 80.6% 96.2%	3 2 1 0 0	10 (0.69) 3 (0.40) 1 (n/a) 0 0	2.8 (0.50)
Minimum total annual takes						7 (0.58)

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