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DALL'S PORPOISE (*Phocoenoides dalli*): Alaska Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Dall's porpoise are widely distributed across the entire North Pacific Ocean (Fig. 30). They are found over the continental shelf adjacent to the slope and over deep (2,500+ m) oceanic waters (Hall 1979). They have been sighted throughout the North Pacific as far north as 65°N (Buckland et al. 1993), and as far south as 28°N in the eastern North Pacific (Leatherwood and Fielding 1974). The only apparent distribution gaps in Alaska waters are upper Cook Inlet and the shallow eastern flats of the Bering Sea. Throughout most of the eastern North Pacific they are present during all months of the year, although there may be seasonal onshore-offshore movements along the west coast of the continental United States (Loeb 1972, Leatherwood and Fielding 1974), and winter movements of populations out of Prince William Sound (Hall 1979) and areas in the Gulf of Alaska and Bering Sea (NMFS, unpubl. data, National Marine Mammal Laboratory, 7600 Sand Point Way NE, Seattle, WA 98115).

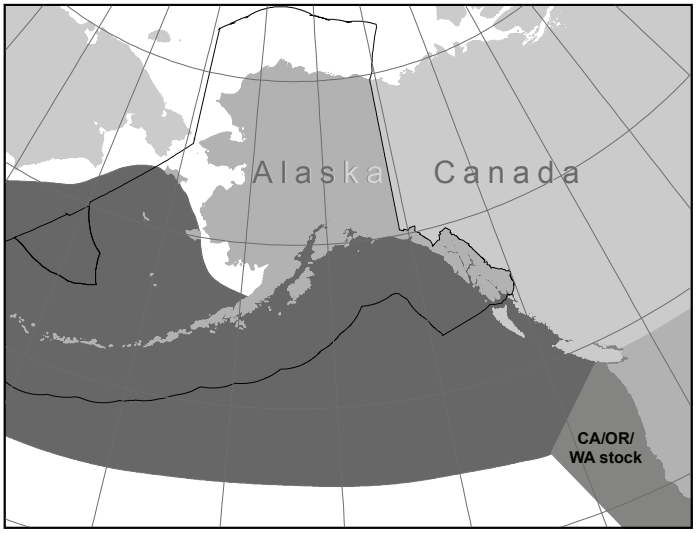

Figure 30. Approximate distribution of Dall's porpoise in Alaska waters (shaded area).

Surveys in the central-eastern and southeastern Bering Sea in 1999 and 2000 (see Fig. 37 for locations of surveys) resulted in new information about the distribution and relative abundance of Dall's porpoise in these areas (Moore et al. 2002). Dall's porpoise were abundant in both areas, were consistently found in deeper water (286 m, SE = 23 m) than harbor porpoise (67 m; SE = 3 m; t-test, $P<0.0001$) and were particularly clustered around the shelf break in the central-eastern Bering Sea (Moore et al. 2002).

The following information was considered in classifying stock structure based on the Dizon et al. (1992) phylogeographic approach: 1) Distributional data: geographic distribution continuous, 2) Population response data: differential timing of reproduction between the Bering Sea and western North Pacific; 3) Phenotypic data: unknown; and 4) Genotypic data: unknown. The stock structure of eastern North Pacific Dall's porpoise is not adequately understood at this time, 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). Based primarily on the population response data (Jones et al. 1986) and preliminary genetics analyses (Winans and Jones 1988), a delineation between Bering Sea and western North Pacific stocks has been recognized. However, similar data are not available for the eastern North Pacific, thus one stock of Dall's porpoise is recognized in Alaskan waters. Dall's porpoise along the west coast of the continental U. S. from California to Washington comprise a separate stock and are reported separately in the Stock Assessment Reports for the Pacific Region.

POPULATION SIZE

Data collected from vessel surveys, performed by both U. S. fishery observers and U. S. researchers from 1987 to 1991, were analyzed to provide population estimates of Dall's porpoise throughout the North Pacific and the Bering Sea (Hobbs and Lerczak 1993). The quality of data used in analyses was determined by the procedures recommended by Boucher and Boaz (1989). Survey effort was not well distributed throughout the U. S. Exclusive Economic Zone (EEZ) in Alaska, and as a result, Bristol Bay and the northern Bering Sea received little survey effort. Only 3 sightings were reported between 1987 to 1991 in this area by Hobbs and Lerczak (1993), resulting in an estimate of 9,000 (CV = 0.91). In the U. S. EEZ north and south of the Aleutian Islands, Hobbs and Lerczak (1993) reported an estimated abundance of 302,000 (CV = 0.11), whereas for the Gulf of Alaska EEZ, they reported

106,000 (CV = 0.20). Combining these three estimates (9,000 + 302,000 + 106,000) results in a total abundance estimate of 417,000 (CV = 0.097) for the Alaska stock of Dall's porpoise. Turnock and Quinn (1991) estimate that abundance estimates of Dall's porpoise are inflated by as much as 5 times because of vessel attraction behavior. Therefore, a corrected population estimate from 1987-1991 is 83,400 (417,000 × 0.2) for this stock. Surveys for this stock are greater than 21 years old, consequently there is no reliable abundance data for the Alaska stock of Dall's porpoise. No reliable abundance estimates for British Columbia are currently available.

Sighting surveys for cetaceans were conducted during a NMFS pollock acoustic survey in 1999, 2000, 2002 and 2004 on the eastern Bering Sea shelf. The area was stratified into northern and southern regions determined by the survey legs of the pollock survey, and oceanographic domains within each (Friday et al. in press). Pooling the northern domains, abundance for Dall's porpoise was estimated to be 12,486 (CV = 0.38) in 1999 and 14,597 (CV=0.27) in 2002 (the northern regions were not surveyed in 2000 and 2004). Pooling the southern domains, the abundance for Dall's porpoise was estimated to be 13,012 (CV = 0.45) in 2000, 26,922 (CV = 0.92) in 2002, and 6,478 (CV = 0.36) in 2004 (the southern region were not surveyed in 1999). These estimates have not been corrected for animals missed on the trackline or animals submerged when the ship passed. They are also uncorrected for potential biases from responsive movements (ship attraction) and are, therefore, not used as minimum population estimates.

Minimum Population Estimate

The minimum population estimate (N_{MIN}) for this stock is calculated using Equation 1 from the PBR Guidelines (Wade and Angliss 1997): $N_{MIN} = N/\exp(0.842*[\ln(1+[CV(N)]^2)]^{½})$. However, since the abundance estimate is based on data older than 8 years, the N_{MIN} is considered unknown.

Current Population Trend

At present, there is no reliable information on trends in abundance for the Alaska stock of Dall's porpoise.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

A reliable estimate of the maximum net productivity rate is not currently available for the Alaska stock of Dall's porpoise. Hence, until additional data become available, it is recommended that the cetacean maximum theoretical net productivity rate (R_{MAX}) of 4% be employed for the Alaska stock of Dall's porpoise (Wade and Angliss 1997). However, based on life history analyses in Ferrero and Walker (1999), Dall's porpoise reproductive strategy is not consistent with the delphinid pattern on which the default R_{MAX} for cetaceans is based. In contrast to the delphinids, Dall's porpoise mature earlier and reproduce annually which suggest that a higher R_{MAX} may be warranted, pending further analyses.

POTENTIAL BIOLOGICAL REMOVAL

Under the 1994 reauthorized Marine Mammal Protection Act (MMPA), the potential biological removal (PBR) is defined as the product of the minimum population estimate, one-half the maximum theoretical net productivity rate, and a recovery factor: $PBR = N_{MIN} \times 0.5R_{MAX} \times F_R$. This stock was considered to be within optimum sustainable population (Buckland et al. 1993), thus the recovery factor (F_R) for this stock was 1.0 (Wade and Angliss 1997). However, the PBR level is currently unknown. The estimate of abundance for Dall's porpoise is now more than 8 years old; Wade and Angliss (1997) recommend that abundance estimates older than 8 years no longer be used to calculate a PBR level. Thus, because the abundance estimate for this stock is quite old, the N_{MIN} is unknown and therefore the PBR level is undetermined.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fisheries Information

Until 2003, there were six different federally-regulated commercial fisheries in Alaska that could have interacted with Dall's porpoise and were monitored for incidental mortality by fishery observers. As of 2003, changes in fishery definitions in the List of Fisheries have resulted in separating these six fisheries into 22 fisheries (69 FR 70094, 2 December 2004). This change does not represent a change in fishing effort, but provides managers with better information on the component of each fishery that is responsible for the incidental serious injury or mortality of marine mammal stocks in Alaska. For the fisheries with observed takes, the range of observer coverage over the 4-year period (2007-2010), as well as the annual observed and estimated mortalities are presented in Table 35.

The Alaska Peninsula and Aleutian Island salmon driftnet fishery was monitored in 1990. Observers were onboard 59 (38.3%) of the 154 vessels participating in the fishery, monitoring a total of 373 sets, or less than 4% of the estimated number of sets made by the fleet (Wynne et al. 1991). One Dall's porpoise mortality was observed which extrapolated to an annual (total) incidental mortality rate of 28 Dall's porpoise. Combining the estimates from the Bering Sea and Gulf of Alaska fisheries (0.69) with the estimate from the Alaska Peninsula and Aleutian Island salmon drift gillnet fishery (28) results in an estimated annual incidental kill rate in observed fisheries of 28.7 porpoise per year from this stock.

The Prince William Sound salmon drift gillnet fishery was also monitored by observers during 1990 and 1991, with no incidental mortality of Dall's porpoise reported. In 1990, observers boarded 300 (57.3%) of the 524 vessels that fished in the Prince William Sound salmon drift gillnet fishery, monitoring a total of 3,166 sets, or roughly 4% of the estimated number of sets made by the fleet (Wynne et al. 1991). In 1991, observers boarded 531 (86.9%) of the 611 registered vessels and monitored a total of 5,875 sets, or roughly 5% of the estimated sets made by the fleet (Wynne et al. 1992).

Table 35. Summary of incidental mortality of Dall's porpoise (Alaska stock) due to commercial fisheries from 2007 to 2010 and calculation of the mean annual mortality rate.

Fishery name	Years	Data type	Observer coverage	Observed mortality (in given yrs.)	Estimated mortality (in given yrs.)	Mean annual mortality
Bering Sea/ Aleutian Is. (BSAI) pollock trawl	2007 2008 2009 2010	obs data	85 85 86 86	0 0 1 0	0 0 1.2 0	0.31 (CV = 0.67)
Bering Sea/ Aleutian Is. (BSAI) Pacific cod longline	2007 2008 2009 2010	obs data	63 63 61 64	0 0 1 0	0 0 1.5 0	0.38 (CV = 0.77)
Gulf of Alaska (GOA) pollock trawl	2007 2008 2009 2010	obs data	27 34 43 29	0 0 0 0	0 0 0 0	0
AK Peninsula/ Aleutian Island salmon drift gillnet	1990	obs data	4%	1	28	28 (CI: 1-81)
Minimum total annual mortality						28.69 (CV = 0.52)

No incidental takes of Dall's porpoises were recorded in the Cook Inlet salmon driftnet and setnet fisheries (1999-2000), the Kodiak Island salmon set gillnet fishery (2002 and 2005), and Yakutat salmon setnet fishery (2007 and 2008) by the Alaska Marine Mammal Observer Program, although Dall's porpoises were among the species spotted in the area of operations (Manly et al. 2003; Manly 2006, 2007). Note that no observers have been assigned to several of the gillnet fisheries that are known to interact with this stock, making the estimated mortality unreliable. However, due to the large stock size it is unlikely that unreported mortalities from those fisheries are a significant source of mortality.

From 2006-2010, two entanglements of Dall's porpoises have been reported to the Alaska Region Stranding Program (NMFS Alaska Regional Office, unpublished data). These animals both entangled together in a sockeye salmon gillnet in 2008, with one self-release and one mortality. The mean minimum annual mortality rate of Dall's porpoises based on stranding reports is 0.2.

Subsistence/Native Harvest Information

There are no reports of subsistence take of Dall's porpoise in Alaska.

STATUS OF STOCK

Dall's porpoise are not listed as "depleted" under the MMPA or listed as "threatened" or "endangered" under the Endangered Species Act. The level of human-caused mortality and serious injury (29) is not known to

exceed the PBR, which is undetermined as the most recent abundance estimate is more than 8 years old. Because the PBR is undetermined, the level of annual U.S. commercial fishery-related mortality that can be considered insignificant and approaching zero mortality and serious injury rate is unknown. The Alaska stock of Dall's porpoise is not classified as a strategic stock. Population trends and status of this stock relative to OSP are currently unknown.

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