HARBOR PORPOISE (*Phocoena phocoena*):
Central Oregon Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

In the Pacific, harbor porpoise are found in coastal and inland waters from Point Conception, California to Alaska and across to Kamchatka and Japan (Gaskin 1984). Harbor porpoise appear to have more restricted movements along the western coast of the continental U.S. than along the eastern coast. Regional differences in pollutant residues in harbor porpoise indicate that they do not move extensively between California, Oregon, and Washington (Calambokidis and Barlow 1991). This pattern is a sharp contrast with the eastern coast of the U.S. and Canada, where harbor porpoise are believed to migrate seasonally from as far south as the Carolinas to the Gulf of Maine and Bay of Fundy (Polacheck *et al*. 1995). A phylogeographic analysis of genetic data from northeast Pacific harbor porpoise did not show complete concordance between DNA sequence types and geographic location (Rosel 1992). However, an analysis of molecular variance (AMOVA) of the same data with additional samples found significant genetic differences for four of the six pair-wise comparisons between the four areas investigated: California, Washington, British Columbia, and Alaska (Rosel *et al*. 1995). These results demonstrated that harbor porpoise along the west coast of North America are not panmictic or migratory, and movement is sufficiently restricted that genetic differences have evolved.

Significant genetic differences have been identified for harbor porpoises along the

Figure 1. Stock boundaries and distributional range of harbor porpoise along the outer U.S. West Coast. Dashed line represents an approximate boundary for harbor porpoise habitat (0-200m water depth).

outer U.S. West Coast and in inland waters of Washington (Chivers *et al*. 2002, 2007; Morin *et al*. 2021), leading to the designation of multiple stocks in this region. The most recent study (Morin *et al*. 2021) identified additional genetic differences between porpoises found off central and southern Oregon, and suggested that a new stock boundary was warranted at approximately 43.2°N latitude. Based on these findings, the northern boundary of the Northern California – Southern Oregon stock has been moved south to 43.2°N, and a new central Oregon stock has been designated between 43.2°N and 45°N (Figure 1).

For the Marine Mammal Protection Act (MMPA) Stock Assessment Reports, the following harbor porpoise stocks are designated in the Pacific Ocean: 1) Morro Bay, 2) Monterey Bay, 3) San Francisco-Russian River, 4) Northern California/Southern Oregon, 5) Central Oregon, 6) Northern Oregon/Washington Coast, 7) Washington Inland Waters, 8) Northern Southeast Alaska Inland Waters, 9) Southern Southeast Alaska Inland Waters, 10) Yakutat/Southeast Alaska Offshore Waters, 11) Gulf of Alaska, and 12) Bering Sea. Reports for harbor porpoise stocks within waters of California, Oregon, and Washington appear in this volume. The five Alaska harbor porpoise stocks are reported separately in the Stock Assessment Reports for the Alaska Region.
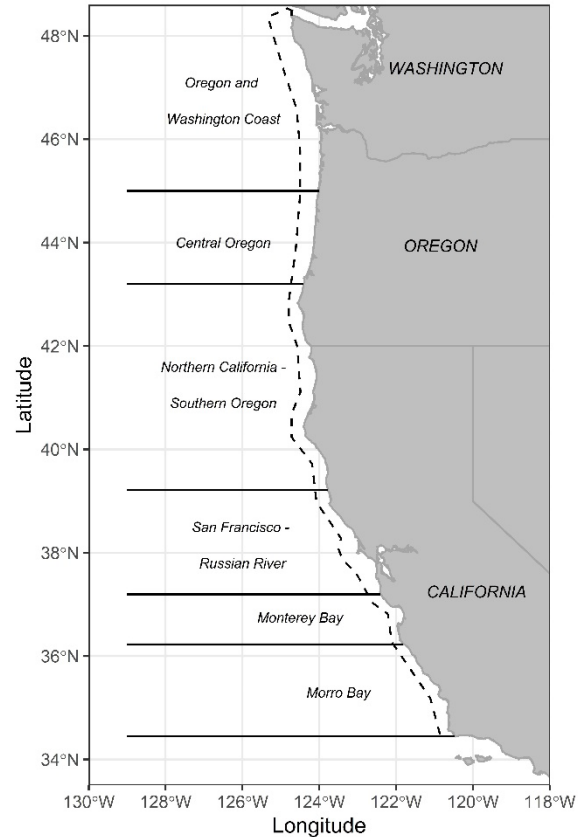
POPULATION SIZE

Aerial surveys off Oregon were previously conducted during 2010-2011 (Forney *et al.* 2014); however, the abundance estimate presented in that study was for a larger area than the central Oregon stock range. More recently, Forney *et al.* (2023) estimated the abundance of harbor porpoise within shelf waters (0-200m water depth) of the central Oregon stock range to be 7,492 (CV = 0.421) based on a habitat-based density model developed from 2021-2022 aerial surveys off Oregon and Washington. This estimate includes a correction factor of 3.42 (1/g(0); g(0)=0.292, CV=0.366) (Laake *et al*. 1997) to adjust for groups missed by aerial observers.

Minimum Population Estimate

The minimum population estimate for harbor porpoise in the central Oregon stock is calculated as the lower 20th percentile of the log-normal distribution of the above abundance estimate, or 5,332 animals.

Current Population Trend

There are no reliable data on population trends of harbor porpoise for coastal Oregon; however, the sum of the abundance estimates reported in Forney *et al.* (2023) for southern Oregon (3,143; CV=0.464) and central Oregon (7,492; CV=0.421), equal to 10,635 individuals, falls within the confidence limit of the previous abundance estimate of 12,525 (CV=0.48) reported for that region in Forney *et al.* (2014) based on 2010-2011 aerial surveys.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Based on what are argued to be biological limits of the species (i.e. females give birth first at age 4 and produce one calf per year until death), the theoretical, maximum-conceivable growth rate of a closed harbor porpoise population was estimated as 9.4% per year based on a human survivorship curve (Barlow and Boveng 1991). This is very similar to the growth rate of 9.6% per year (95% credible interval: 6.2% - 13.0%) estimated by Forney *et al.* (2020) for the Morro Bay harbor porpoise stock between 1991 and 2012, based on long-term aerial surveys. Because a reliable estimate of the maximum net productivity rate is not available for the central Oregon harbor porpoise stock, we use the default maximum net productivity rate (R_{MAX}) of 4% for cetaceans (Wade and Angliss 1997).

POTENTIAL BIOLOGICAL REMOVAL

The potential biological removal (PBR) level for this stock is calculated as the minimum population size (5,332) times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.5 (for a stock of unknown status, Wade and Angliss 1997), resulting in a PBR of 53.

HUMAN-CAUSED MORTALITY
Fishery Information

There were no harbor porpoise strandings in this stock's range with evidence of fishery interactions during 2017-2021 (Carretta *et al.* 2023).

Table 1. Summary of available information on incidental mortality and injury of harbor porpoise (central Oregon stock) in commercial fisheries that might take this species during 2017-2021 (Carretta *et al.* 2023). n/a indicates that data are not available.

Fishery Name	Year(s)	Data Type	Percent Observer Coverage	Observed Mortality	Estimated Mortality (CV in parentheses)	Mean Annual Takes (CV in parentheses)
Unknown fishery	2017-2021	Stranding	-	none	n/a	0 (n/a)
Minimum total annual takes						0 (n/a)

STATUS OF STOCK

Harbor porpoise in central Oregon are not listed as threatened or endangered under the Endangered Species Act nor as depleted under the Marine Mammal Protection Act. The status of this stock relative to its Optimum Sustainable Population (OSP) level and population trends is unknown. Because there is no known

human-caused mortality or serious injury, this stock is not considered a "strategic" stock under the MMPA, and fishery mortality can be considered insignificant and approaching zero mortality and serious injury rate.

OTHER FACTORS THAT MAY BE AFFECTING THE STOCK

Harbor porpoises are sensitive to disturbance by a variety of anthropogenic sound sources, and the limited range of several U.S. West Coast harbor porpoise stocks makes them particularly vulnerable to potential impacts (see overview in Forney *et al*. 2017). A recent habitat concern along the U.S. West coast includes the use of acoustic deterrent devices ('seal bombs') that are used in commercial fishing activities off California (Simonis *et al*. 2020), especially in the Monterey Bay region.

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