HARBOR PORPOISE (*Phocoena phocoena*): Southeast Alaska Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

In the eastern North Pacific Ocean, the harbor porpoise ranges from Point Barrow, along the Alaska coast, and down the west coast of North America to Point Conception, California (Gaskin 1984). The harbor porpoise primarily frequents coastal waters. Relatively high densities of harbor porpoise have been recorded along the coasts of Washington and northern Oregon and California. Relative to the waters off the west coast of the continental U. S., harbor porpoise do not occur in high densities in Alaska waters (Dahlheim et al. submitted). Stock discreteness in the eastern North Pacific was analyzed using mitochondrial DNA from samples collected along the west coast (Rosel 1992) and is summarized in Osmek et al. (1994). Two distinct mitochondrial DNA groupings or clades exist. One clade is present in California, Washington, British Columbia and Alaska (no samples were available from Oregon), while the other is found only in California and Washington. Although these two clades are not geographically distinct by latitude, the results may indicate a low mixing rate for harbor porpoise along the west coast of North America. Investigation of pollutant loads in harbor porpoise ranging from California to the Canadian border also suggests restricted harbor porpoise movements (Calambokidis and Barlow 1991). Further genetic testing of the same data mentioned above along with additional samples found significant genetic differences for 4 of the 6 pair-wise comparisons between the four areas investigated: California, Washington, British Columbia, and Alaska (Rosel et al. 1995). These results demonstrate that harbor porpoise along the west coast of North America are not panmictic or migratory, and that movement is sufficiently restricted to evolve genetic differences. This is consistent with low movement suggested by genetic analysis of harbor porpoise specimen from the North Atlantic. Numerous stocks have been delineated with clinal differences over areas as small as the waters surrounding the British Isles. Unfortunately, no conclusions can be drawn about the genetic structure of harbor porpoise within Alaska because of insufficient samples. Only 19 samples are available from Alaska porpoise and 12 of these come from a single area (Copper River Delta). Accordingly, harbor porpoise stock structure in Alaska remains unknown at this time.

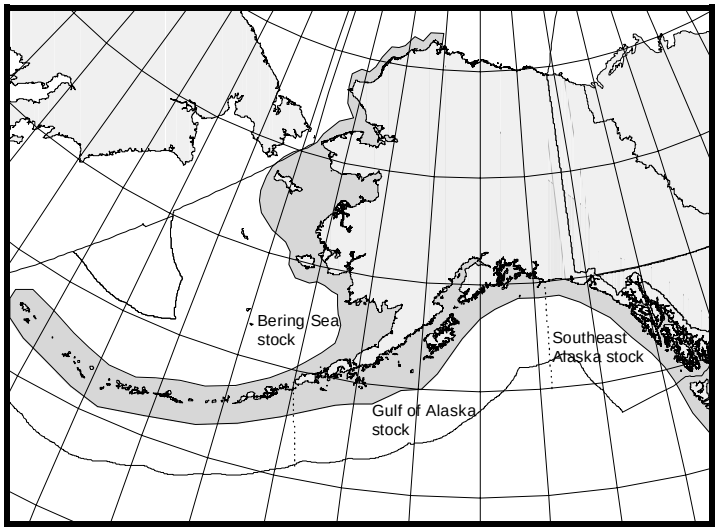

Figure 22. Approximate distribution of harbor porpoise in Alaska waters (shaded area). The distributions of all three stocks found in Alaska waters are shown.

Although it is difficult to determine the true stock structure of harbor porpoise populations in the northeast Pacific, from a management standpoint, it would be prudent to assume that regional populations exist and that they should be managed independently (Rosel et al. 1995, Taylor et al. 1996). The Alaska SRG concurred that while the available data were insufficient to justify recognizing three biological stocks of harbor porpoise in Alaska, it did not recommend against the establishment of three management units in Alaska (DeMaster 1996, 1997). Aerial surveys (Dahlheim et al. 1994) reveal a lower density of harbor porpoise between Yakutat and Cape Suckling. Accordingly, from the above information, three separate harbor porpoise stocks in Alaska are recommended: 1) the Southeast Alaska stock - occurring from the northern border of British Columbia border to Cape Suckling, Alaska, 2) the Gulf of Alaska stock - occurring from Cape Suckling to Unimak Pass, and 3) the Bering Sea stock - occurring throughout the Aleutian Islands and all waters north of Unimak Pass (Fig. 22). Information concerning the 4 harbor porpoise stocks occurring along the west coast of the continental U. S. (Central California, Northern California, Oregon/Washington Coast, and Inland Washington) can be found in the Stock Assessment Reports for the Pacific Region.

POPULATION SIZE

In June of 1993, an aerial survey covering the offshore Alaska waters from Dixon Entrance to Prince William Sound was conducted, resulting in an abundance estimate of 3,982 (CV=0.187) harbor porpoise (Dahlheim et al. submitted). Of the 106 harbor porpoise sightings during the 1993 aerial survey, 71 were encountered east of Cape Suckling (144°W), representing approximately 67% of the sightings. Prorating the abundance estimate to include only the portion of the survey conducted east of Cape Suckling results in an abundance estimate of 2,668 animals from the Southeast Alaska harbor porpoise stock. This estimate is admittedly ad hoc and deemed provisional at this time, pending reanalysis of the 1993 aerial survey data. The coefficient of variation for the entire 1993 survey area (0.187) is considered a reasonable estimate until such reanalysis occurs. Correction factors for aerial surveys of harbor porpoise have been estimated at 3.1 (CV=0.171) (Calambokidis et al. 1993) from Puget Sound, Washington, and 3.2 (Barlow et al. 1988) from the west coast of the continental U.S. The correction factor of 3.1 should be used for this harbor porpoise stock, as both estimates are considered conservative for Alaska aerial surveys due to differences in survey conditions. Thus, the estimated corrected abundance from this survey is 8,271 (2,668 x 3.1; CV=0.255) harbor porpoise for the offshore waters from Dixon Entrance to Cape Suckling.

Systematic vessel surveys of harbor porpoise in the inside waters of Southeast Alaska were conducted in 1991 (Dahlheim et al. 1992), 1992 (Dahlheim et al. 1993), and 1993 (Dahlheim et al. 1994). Three vessel surveys in the spring, summer, and fall of each year were performed with abundance estimates relatively similar in each year (Dahlheim et al. 1994). The June 1993 vessel survey of the inside waters occurred simultaneously with the 1993 aerial survey, mentioned above, and resulted in an abundance estimate of 1,586 (CV=0.392) harbor porpoise. Correction factors for vessel surveys of harbor porpoise have been estimated at 1.28 (CV=0.091) in the Pacific Ocean along the west coast of the U. S. (Barlow 1988) and at 1.9 (CV=0.142) from vessel surveys in the Gulf of Maine (D. Palka, pers. comm., Northeast Fisheries Science Center, P. O. Box 314, Woods Hole, MA 02543). The estimated correction factor from the Pacific Ocean surveys (1.28) should be used for the Alaska vessel surveys because it is more conservative and the techniques used in the Barlow study were more similar to the Alaska surveys than those employed in the Gulf of Maine. Therefore, the total corrected abundance estimate for the inside waters of Southeast Alaska is 2,030 (1,586 x 1.28; CV=0.404) harbor porpoise. Accordingly, the corrected abundance estimate for the Southeast Alaska harbor porpoise stock, from aerial surveys in offshore waters and vessel surveys in inside waters, is 10,301 (8,271+2,030) animals.

In the previous stock assessment, harbor porpoise in Alaska were considered a single stock composed of 29,744 animals (Small and DeMaster 1995). If the abundance estimates for the 3 Alaska stocks of harbor porpoise in this volume are pooled, the resulting estimate would also be 29,744 animals (10,301+8,497+10,946).

Minimum Population Estimate

For the Southeast Alaska stock of harbor porpoise, the minimum population estimates (N_{MIN}) for the aerial and vessel surveys are calculated separately, using Equation 1 from the PBR Guidelines (Wade and Angliss 1997): $N_{MIN} = N/\exp(0.842*[\ln(1+[CV(N)]^2)]^{½})$. Using the population estimates (N) of 8,271 and 2,030 along with their associated CVs (0.255 and 0.404, respectively), N_{MIN} for this stock is 8,156 (6,693+1,463).

Current Population Trend

At present, there is no reliable information on trends in abundance for the Southeast Alaska stock of harbor porpoise.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

A reliable estimate of the maximum net productivity rate (R_{MAX}) is not currently available for the Southeast Alaska stock of harbor porpoise. Hence, until additional data become available, it is recommended that the cetacean maximum theoretical net productivity rate of 4% be employed (Wade and Angliss 1997).

POTENTIAL BIOLOGICAL REMOVAL

Under the 1994 re-authorized 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: $PBR = N_{MIN} \times 0.5R_{MAX} \times F_R$. The recovery factor ($F_R$) for this stock is 0.5, the

value for cetacean stocks with unknown population status (Wade and Angliss 1997). Thus, for the Southeast Alaska stock of harbor porpoise, PBR = 82 animals (8,156 x 0.02 x 0.5).

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fisheries Information

Some fishing effort by vessels participating in the Gulf of Alaska (GOA) groundfish longline fishery occurs in the offshore waters of Southeast Alaska. Effort levels are insignificant for the portion of the GOA groundfish trawl and pot fisheries operating in these waters. However, during the period from 1990 to 1995, 21-31% of the GOA longline catch occurred within the range of the Southeast Alaska harbor porpoise stock. This fishery has been monitored for incidental take by NMFS observers from 1990 to 1995 (8-21% observer coverage), although observer coverage has been very low in the offshore waters of Southeast Alaska (<1-4% observer coverage). No mortalities from this stock of harbor porpoise incidental to commercial fisheries have been observed.

The only source of information on the number of harbor porpoise killed or injured incidental to commercial fishery operations is the logbook reports maintained by vessel operators as required by the MMPA interim exemption program. During the 4-year period between 1990 and 1993, logbook reports from the Southeast Alaska salmon drift gillnet fishery (Table 18) resulted in an annual mean of 3.25 mortalities from interactions with commercial fishing gear. However, because logbook records are most likely negatively biased (Credle et al. 1994), this is considered to be a minimum estimate. There were no other logbook mortalities for any other fishery within the range of the Southeast Alaska harbor porpoise stock. Complete logbook data after 1993 are not available.

Table 18. Summary of incidental mortality of harbor porpoise (Southeast Alaska stock) due to commercial fisheries from 1990 through 1995 and calculation of the mean annual mortality rate. Mean annual mortality in brackets represents a minimum estimate from logbook reports.

Fishery name	Years	Data type	Range of observer coverage	Reported mortality (in given yrs.)	Estimated mortality (in given yrs.)	Mean annual mortality
Observer program total	90-95					0
Southeast Alaska salmon drift gillnet	90-93	logbook	n/a	2, 2, 7, 2	n/a	[≥3.25]
Minimum total annual mortality						≥3.25

For this stock of harbor porpoise, the estimated minimum annual mortality rate incidental to commercial fisheries is 4 animals (rounded up from 3.25), based entirely on logbook data. However, a reliable estimate of the mortality rate incidental to commercial fisheries is currently unavailable because of the absence of observer placements in Southeast Alaska fisheries. Therefore, it is unknown whether the kill rate is insignificant. At present, annual mortality levels less than 8.2 animals per year (i.e., 10% of PBR) can be considered to be insignificant and approaching zero mortality and serious injury rate.

Subsistence/Native Harvest Information

Subsistence hunters in Alaska have not been reported to take from this stock of harbor porpoise.

STATUS OF STOCK

Harbor porpoise are not listed as "depleted" under the MMPA or listed as "threatened" or "endangered" under the Endangered Species Act. Logbook records are most likely negatively biased (Credle et al. 1994) resulting in an underestimate of incidental kill. However, based on the best scientific information available, the estimated level of human-caused mortality and serious injury (4) is not known to exceed the PBR (82). Therefore, the Southeast Alaska stock of harbor 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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