

BELUGA WHALE (*Delphinapterus leucas*): Eastern Bering Sea Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Beluga whales are distributed throughout seasonally ice-covered arctic and subarctic waters of the Northern Hemisphere (Gurevich 1980), and are closely associated with open leads and polynyas in ice-covered regions (Hazard 1988). Depending on season and region, beluga whales may occur in both offshore and coastal waters, with concentrations in Cook Inlet, Bristol Bay, Norton Sound, Kasegaluk Lagoon, and the Mackenzie Delta (Hazard 1988). It is assumed that most beluga whales from these summering areas overwinter in the Bering Sea, excluding those found in the northern Gulf of Alaska (Shelden 1994). Seasonal distribution is affected by ice cover, tidal conditions, access to prey, temperature, and human interaction (Lowry 1985). During the winter, beluga whales occur in offshore waters associated with pack ice. In the spring, they migrate to warmer coastal estuaries, bays, and rivers for molting (Finley 1982) and calving (Sergeant and Brodie 1969). Annual migrations may cover thousands of kilometers (Reeves 1990).

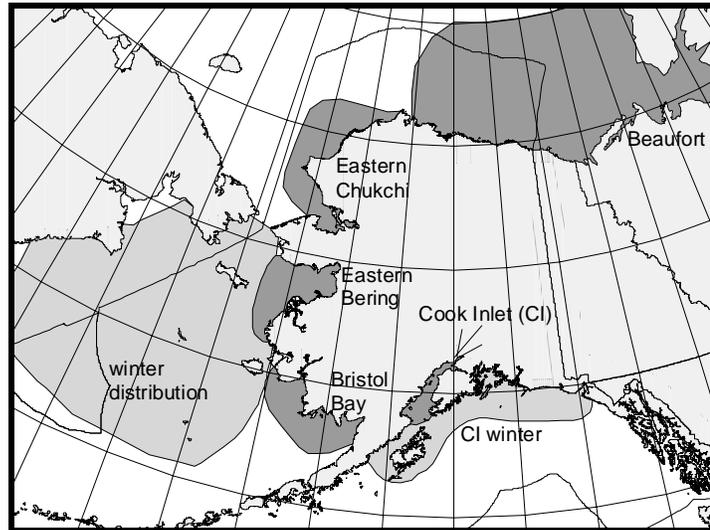


Figure 16. Approximate distribution of beluga whales in Alaska waters. The dark shading displays the summer distributions of the five stocks. Winter distributions are depicted with lighter shading.

The following information was considered in classifying beluga whale stock structure based on the Dizon et al. (1992) phylogeographic approach: 1) Distributional data: geographic distribution discontinuous in summer (Frost and Lowry 1990), distribution unknown outside of summer; 2) Population response data: possible extirpation of local populations; distinct population trends between regions occupied in summer; 3) Phenotypic data: unknown; and 4) Genotypic data: preliminary mitochondrial DNA analyses indicate distinct differences among summering areas (G. O'Corry-Crowe, unpubl. data, Southwest Fisheries Science Center, P.O. Box 271, La Jolla, CA 92038). Based on this information, 5 stocks of beluga whales are recognized within U. S. waters: 1) Cook Inlet, 2) Bristol Bay, 3) Eastern Bering Sea, 4) Eastern Chukchi Sea, and 5) Beaufort Sea (Fig. 16).

POPULATION SIZE

DeMaster et al. (1994) estimated the minimum abundance (e.g., uncorrected for probability of sighting) of belugas from aerial surveys over Norton Sound in 1992, 1993, and 1994 at 2,095, 620, and 695, respectively (see also Lowry et al. 1995). The variation between years was due, in part, to variability in the timing of the migration and movement of animals into the Sound. As a result the 1993 and 1994 estimates were considered to be negatively biased. Due to the disparity of estimates, the Norton Sound aerial surveys were repeated in June of 1995 leading to the highest abundance estimate of any year, but not significantly different than in 1992. An aerial survey conducted June 22 of 1995 resulted in an uncorrected estimate of 2,583 beluga whales (Lowry and DeMaster 1996). It should be noted that a slightly higher estimate (2,666) occurred during the 1995 survey over three day period from June 6-8. The single day estimate of (2,583), instead of the 3-day estimate was used to minimize the potential for double counting of whales. Correction factors recommended from studies of belugas range from 2.5 to 3.27 (Frost and Lowry 1995). For Norton Sound, the correction factor of 2.62 (CV[CF] not available) is recommended for the proportion of animals that were diving and thus not visible at the surface (based on methods of Frost and Lowry 1995), given the particular altitude

and speed of the survey aircraft. If this correction factor is applied to the June 22 estimate of 2,583 (CV=0.26) along with the additional correction factor for the proportion of newborns and yearlings not observed due to their small size and dark coloration (1.18; Brodie 1971), the total corrected abundance estimate for the Eastern Bering Sea stock is 7,986 (2,583 x 2.62 x 1.18) beluga whales.

Minimum Population Estimate

For the Eastern Bering Sea stock of beluga whales, the minimum population estimate (N_{MIN}) is calculated according to Equation 1 from the PBR Guidelines (Wade and Angliss 1997). Thus, $N_{\text{MIN}} = N/\exp(0.842*[\ln(1+[CV(N)]^2)]^{1/2})$. Using the population estimate (N) of 7,986 and an associated CV of 0.26, N_{MIN} for this stock is 6,439 beluga whales. A CV(N) that incorporates variance due to all of the correction factors is currently not available. However, the Alaska Scientific Review Group (SRG) considers the CV derived from the abundance estimate (CV=0.26) as adequate in calculating a minimum population estimate (DeMaster 1996, 1997; see discussion of N_{MIN} for the Eastern Chukchi stock of beluga whales). Due to foggy conditions encountered during the 1995 surveys, it was not possible to survey the entire Norton Sound area occupied by belugas during a continuous time period. As a result, the 1995 abundance estimate is considered to be conservative (Lowry and DeMaster 1996).

Current Population Trend

Surveys to estimate population abundance in Norton Sound were not conducted prior to 1992. However, between 1992 and 1995, survey data indicate that the population is less likely to be declining than it is to be stable or increasing.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

A reliable estimate of the maximum net productivity rate is currently unavailable for the Eastern Bering Sea stock of beluga whales. Hence, until additional data become available, it is recommended that the cetacean maximum theoretical net productivity rate (R_{MAX}) of 4% be employed for this stock (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: $PBR = N_{\text{MIN}} \times 0.5R_{\text{MAX}} \times F_R$. The recovery factor (F_R) for this stock is 1.0, the value for cetacean stocks that are thought to be stable in the presence of a subsistence harvest (Wade and Angliss 1997). The Alaska SRG recommended using a F_R of 1.0 for this stock as the Alaska Beluga Whale Committee (ABWC) intends to continue regular surveys (i.e., 3-5 years) to estimate abundance for this stock and to annually monitor levels of subsistence harvest (DeMaster 1997). For the Eastern Bering Sea stock of beluga whales, $PBR = 129$ animals (6,439 x 0.02 x 1.0).

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fisheries Information

Three different commercial fisheries that could have interacted with beluga whales in the Eastern Bering Sea were monitored for incidental take by NMFS observers during 1990-95: Bering Sea (and Aleutian Islands) groundfish trawl, longline, and pot fisheries. Observers did not report any mortality or serious injury of beluga whales incidental to these groundfish fisheries. An additional source of information on the number of beluga whales 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 from 1990 to 1993, logbook reports, where observer data were not available, did not include any mortality or injury to beluga whales from this stock. Complete logbook data after 1993 are not available. In the near shore waters of the Eastern Bering Sea, substantial effort occurs in gillnet (mostly set nets), herring, and personal-use fisheries. Although a potential source of mortality, there have been no reported takes of beluga whales as a result of these fisheries.

The estimated minimum annual mortality rate incidental to commercial fisheries (0) is not known to exceed 10% of the PBR (16) and, therefore, is considered to be insignificant and approaching zero mortality and serious injury rate.

Subsistence/Native Harvest Information

The subsistence take of beluga whales from the Eastern Bering Sea stock is provided by the ABWC, who reported that the number of whales harvested for subsistence during the period from 1991 through 1994 was 209, 94, 136 and 122 whales, respectively (Frost and Suydam 1995). These estimates are based on household surveys and on-site harvest monitoring, but are negatively biased because they have not been corrected for hunters that did not respond, and there is not a reliable estimate for the percent struck and lost. In 1995, the ABWC reported 56 whales taken from the stock, including 6 animals which were struck and lost. The harvest report from one Yukon Delta village in 1995 is unknown, but based on historical information is expected to be approximately 8 (Frost 1996), making the estimated harvest from the stock 64 (56+8) whales. However, the 1995 data did not include harvest information from the Kuskokwim region, an area averaging approximately 10 whales annually from 1990 to 1994 (Frost and Suydam 1995). Assuming the Kuskokwim subsistence take was similar to previous years, the best estimate for the 1995 take from the Eastern Bering Sea stock is 74 (64+10) whales. Thus, during the 5-year period from 1991 to 1995 the average subsistence take is approximately 127 whales. As mentioned above, this estimate is negatively biased, furthermore, an unknown proportion of the animals harvested each year by Native hunters in this region may belong to other beluga stocks migrating through Norton Sound in both the fall and spring (DeMaster 1995: pp. 4).

In the draft stock assessment reports (Hill et al. 1996), subsistence mortality was averaged over the most recent 3-year period for which data were available. This was an attempt to incorporate interannual variability, while still recognizing that mortality rates have declined in recent years. However, based on a request from the ABWC, human-related removals have been averaged over the last 5 years for which data are available for all beluga whale stocks, except the Cook Inlet stock. This request was due to the large amount of interannual variability in harvest levels in most areas (letter from ABWC to Alaska SRG, 20 December 1996).

STATUS OF STOCK

Beluga whales are not listed as “depleted” under the MMPA or listed as “threatened” or “endangered” under the Endangered Species Act. Based on currently available data, the estimated annual rate, over the 5-year period from 1991 to 1995, of human-caused mortality and serious injury (127) is not known to exceed the PBR (129) for this stock. Further, the 1995 estimate (74) was well below the PBR, and may reflect a lower directed level of take rather than annual variation in harvest data. Therefore, the Eastern Bering Sea beluga whale stock is not classified as strategic. No decreasing trend has been detected for this stock in the presence of a known harvest, although at this time it is not possible to assess the status of this stock relative to OSP.

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