

BELUGA WHALE (*Delphinapterus leucas*): Beaufort 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).

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: mitochondrial DNA analyses indicate distinct differences among summering areas (O'Corry-Crowe et al. 1997). 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. 14).

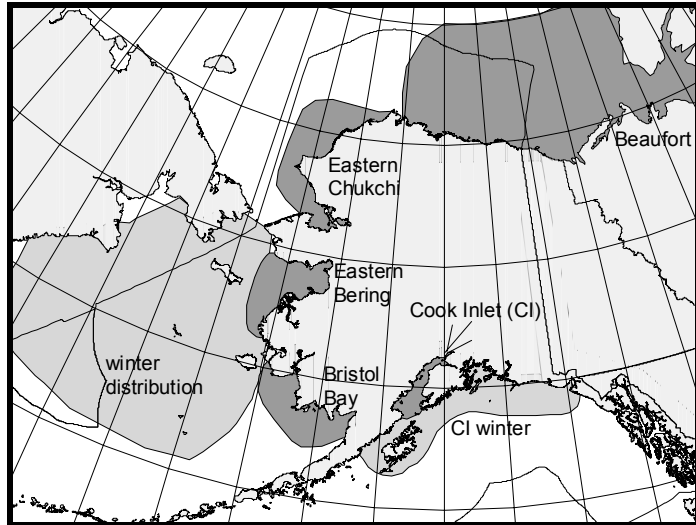


Figure 14. Approximate distribution of beluga whales in Alaska waters. The dark shading displays the summer distributions of the five stocks. Winter distributions are depicted with lighter shading.

POPULATION SIZE

The sources of information to estimate abundance for belugas in the waters of northern Alaska and western Canada have included both opportunistic and systematic observations. Duval (1993) reported an estimate of 21,000 for the Beaufort Sea stock, similar to that reported by Seaman et al. (1985). The most recent aerial survey was conducted in July of 1992, when stock size was estimated to include 19,629 (CV = 0.229) beluga whales (Harwood et al. 1996). To account for availability bias a correction factor (CF), which was not data-based, has been recommended for the Beaufort Sea beluga whale stock (Duval 1993), resulting in a population estimate of 39,258 ($19,629 \times 2$) animals. A CV for the CF is not available; however, this CF was considered negatively biased by the Alaska SRG considering that CFs for this species typically range between 2.5 and 3.27 (Frost and Lowry 1995).

Minimum Population Estimate

For the Beaufort 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, $N_{\text{MIN}} = N / \exp(0.842 \times [\ln(1 + [CV(N)]^2)]^{1/2})$. Using the population estimate (N) of 39,258 and an associated CV(N) of 0.229, N_{MIN} for this stock is 32,453.

Current Population Trend

The Beaufort Sea stock of beluga whales is considered to be stable or increasing (DeMaster 1995).

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

A reliable estimate of the maximum net productivity rate is currently unavailable for the Beaufort 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 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: $PBR = N_{MIN} \times 0.5R_{MAX} \times F_R$. As this stock is stable or increasing (DeMaster 1995), the recovery factor (F_R) for this stock is 1.0 (Wade and Angliss 1997). Thus, for the Beaufort Sea stock of beluga whales, $PBR = 649$ animals ($32,453 \times 0.02 \times 1.0$).

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fisheries Information

The total fishery mortality and serious injury for this stock is estimated to be zero as there are no reports of mortality incidental to commercial fisheries in recent years.

Subsistence/Native Harvest Information

The subsistence take of beluga whales from this stock within U. S. waters is reported by the Alaska Beluga Whale Committee (ABWC). The most recent Alaska Native subsistence harvest estimates for the Beaufort Sea beluga stock are provided in Table 13a (Frost and Suydam 1995, Frost 1998). Given these data, the annual subsistence take by Alaska Natives averaged 68 belugas during the 5-year period from 1996-2000. Recent harvest reports are not considered negatively biased because they are based on on-site harvest monitoring and harvest reports from well established ABWC representatives. The 1993-95 data are negatively biased because reliable estimates for the number of animals struck and lost are not available prior to 1996.

Table 13a. Summary of the Alaska Native subsistence harvest from the Beaufort Sea stock of beluga whales, 1993-2000. Canadian subsistence takes are provided in Table 13b. n/a indicates the data are not available.

Year	Reported total number taken	Estimated range of total take	Reported number harvested	Estimated number struck and lost
1993	85 ^{1,2}	n/a	85 ²	n/a
1994	63 ²	n/a	62	1 ²
1995	44 ¹	n/a	44	n/a
1996	42	n/a	24	18
1997	71	69-73	43	26-30
1998	65	n/a	59	6
1999	45+	n/a	35	10+
2000	117	n/a	66	51
Mean annual take (1996-2000)	68			

¹ Does not include the number of struck and lost; ² Indicates a lower bound.

The subsistence take of beluga whales within Canadian waters of the Beaufort Sea is reported by the Fisheries Joint Management Committee (FJMC). The data are collected by on-site harvest monitoring conducted by the FJMC at Inuvialuit communities in the Mackenzie River delta, Northwest Territories. The most recent Canadian Inuvialuit subsistence harvest estimates for the Beaufort Sea beluga stock are provided in Table 13b (Harwood et al., in press; data for 2000 from FJMC Beluga Monitor Program, Fisheries Joint Management Committee, Inuvik, NT, Canada). Given these data, the annual subsistence take in Canada averaged 109 belugas during the 5-year period from 1996-2000. Therefore, the mean estimated subsistence take in Canadian and U. S. waters from the Beaufort Sea beluga stock during 1996-00 is 177 (68 + 109) whales.

Table 13b. Summary of the Canadian subsistence harvest from the Beaufort Sea stock of beluga whales, 1993-2000. n/a indicates the data are not available.

Year	Reported total number taken	Estimated range of total take	Reported number harvested	Reported number struck and lost
1993	120	n/a	110	10
1994	149	n/a	141	8
1995	143	n/a	129	14
1996	139	n/a	120	19
1997	123	n/a	114	9
1998	93	n/a	86	7
1999	102	n/a	86	16
2000	89	n/a	82	7
Mean annual take (1996-2000)	109			

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 a lack of reported mortalities, the estimated annual fishery-related mortality (0) is not known to exceed 10% of the PBR (65) and, therefore, is considered to be insignificant and approaching zero mortality and serious injury rate. Based on currently available data, the estimated annual level of human-caused mortality and serious injury (177) is not known to exceed the PBR (649). Therefore, the Beaufort Sea stock of beluga whales is not classified as a strategic stock. The population size is considered stable or increasing, however, at this time it is not possible to assess the status of this stock relative to its Optimum Sustainable Population size.

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