ALASKA BELUGA WHALE COMMITTEE
REPORT 98-2

Beluga Whale Surveys in the eastern Chukchi Sea, July 1998

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SUMMARY

In 1998, the Alaska Beluga Whale Committee (ABWC) conducted a third year of aerial surveys for beluga whales in the eastern Chukchi Sea. Surveys were flown on nine days during the period 25 June through 6 July 1998 (Appendix A). Survey conditions were generally good except for around Point Hope where ice and fog often precluded survey operations. Only one beluga was seen on four surveys in Kotzebue Sound. Beluga whales were seen four of the five flights made in the Kasegaluk Lagoon area. Very few belugas were seen in the Cape Sabine-Omalik Lagoon region where they were common in most previous years. A large group of belugas was seen on 5 and 6 July in the Icy Cape area. The peak single day count was on 6 July and totaled 1,172 animals. This is an underestimate of the total eastern Chukchi Sea population because: 1) many belugas were in the ice off Icy Cape where they were not completely counted; 2) four of five satellite tagged whales were far to the northeast outside of the area surveyed; and 3) no correction factors have been applied to account for whales that were in the survey area but were not visible because they were diving. Analysis of aerial photographs provided valuable information on beluga whale numbers, as well as lengths of adult females and calves.

INTRODUCTION

In 1996 and 1997, the ABWC supported aerial surveys to determine the distribution and abundance of beluga whales in the eastern Chukchi Sea. During 1996 and 1997, emphasis was on the Kasegaluk Lagoon region, an area that had been surveyed repeatedly in previous years (Seaman et al. 1986, Frost and Lowry 1990, Frost et al. 1993, Lowry et al. 1996, 1997). In 1998, the third and final year of the planned survey was completed. A summary of the survey findings for all three years is currently in preparation. Preliminary results of the 1998 survey are presented herein.

METHODS

Methods used for the aerial surveys were similar to those used for previous ABWC aerial surveys in the Chukchi Sea (Lowry et al. 1996, 1997). The aircraft was a high-wing, twin-engine AeroCommander (N7UP). Observers were Debbie Blaesing, Douglas DeMaster, Willie Goodwin, and Wayne Perryman. All transects were flown at 120 knots. Survey altitude was usually 1000 ft, although a variety of altitudes were used when photographing beluga aggregations. Most surveys were coastal surveys which were flown with the aircraft centerline approximately 0.6 nm off shore (Figure 1). Offshore lines were flown to cross Kotzebue Sound and Eschscholtz Bay, and to avoid areas where pack-ice was blown in against the shore line. When large aggregations of beluga whales were located, as many animals as possible were positioned to the right of the survey track line, and two to four passes were made while observers counted whales on both sides of the aircraft. On the right side of the aircraft, typically two independent estimates of group size were made. The group sizes presented in this report are the sum of the maximum estimates from each side of the aircraft.

Photographs of beluga aggregations were taken with a KA76 aerial reconnaissance camera that was mounted vertically over a port in the deck of the aircraft. The camera has a 152 mm lens and a forward image motion compensation system that eliminates the loss of image resolution caused by the forward motion of the aircraft. All photographs were taken with Kodak SO-359 aerial transparency film. Altitudes for photographic passes depended partly on the position of the cloud ceiling and varied between 1000 and 3000 ft. Photographic passes were typically done prior to the passes where group size was visually estimated because photographic passes were done at higher altitudes and were not likely to disturb the whales. Upon processing the film, the following information was determined directly from the photographic image, according to the methods described in Perryman and Lynn (1993): 1) group size; 2) length distribution of all animals that were measurable; 3) length distribution of all measurable calves (i.e., animals accompanied by a large adult); 4) the percent of calves accompanied by cows; and 5) the percent of animals in various categories of "color" (ranging from dark gray to white). For comparison, the photographic results from the beluga whale survey conducted in 1996 (Perryman, unpublished data) are also reported.

RESULTS

Surveys were flown on nine days during the period 25 June through 6 July 1998 (Figure 1; Appendix A). In general conditions for surveying were good, except that the area around Point Hope was covered with ice throughout the survey period and often had ground fog that precluded surveys.

The coastal portion of Kotzebue Sound from Kotzebue north past Cape Krusenstern was surveyed several times between 25 June and 5 July, and the main Sound including Eschscholtz Bay and Kobuk Lake was surveyed on 30 June and 3 July (Figure 2; Appendix A). Only one beluga was seen, 10 nm east of Cape Espenberg on 3 July. No belugas were seen along the coast or offshore in the area between Kotzebue and Cape Lisburne (Figure 1).

Surveys were flown of the Kasegaluk Lagoon area on 28 and 29 June and 2, 5, and 6 July (Figure 3; Appendix A). Only two belugas were seen in the southern part of this area, one off Cape Sabine and one south of Point Lay, both on 28 June. Most of the belugas seen on 28 June, and all the whales seen on later surveys (except for whales seen in Kasegaluk Lagoon associated with the Point Lay subsistence hunt), were north of Point Lay.

Large numbers of beluga whales were only seen on 5 and 6 July, in the vicinity of Icy Cape (Figure 3). On 5 July, the maximum count based on four passes during which independent counts were made on each pass by observers on the right and left side of the aircraft was 615 animals. The estimated size of this same group based on counts of animals on photographs was 592 animals. On 6 July, the aggregation seen on 5 July had moved a few miles to the north and east. The best visual count based on the maximum count from two passes where observers were able to estimate group size was 917 animals. The comparable count from photographs was

1,018. On 6 July belugas were also numerous offshore from Icy Cape. On a transect line along the ice edge, 151 belugas were counted in a 20 nm long segment, and 3 were seen 12 nm further east (Figure 4). Twenty-one belugas were counted on an east-west transect where it crossed the ice edge transect at the location where whales were concentrated.

Based on analysis of the photographic images from 1996 and 1998, calf lengths could be broken into three groupings: 1) 144 - 175 cm; 2) 203 - 228 cm; and 3) 240 - 278 cm (Figure 5). A majority of calves were accompanied by females up until a length of 230 cm. Animals longer than 280 cm were never associated with a large adult (Figure 6). The average length of females accompanied by calves was 360 cm (se = 2.8 cm), while the smallest was 307 cm and the largest was 414 cm in length (Figure 7). The average lengths of adult females (defined here as a larger animals swimming closely alongside a calf) in 1996 and 1998 were not significantly different (1996: mean length = 359 cm, se = 2.8 cm; 1998: mean length = 360 cm, se = 6.8 cm). The largest beluga measured in 1996 was 448 cm, while the largest measured in 1998 was 433 cm (Figure 8).

DISCUSSION AND CONCLUSIONS

For most years since 1978, the Alaska Department of Fish and Game has recorded reports of the presence of beluga whales near Kasegaluk Lagoon prior to or during the Pt. Lay hunt, which is typically around 4 July. Lowry et al. (1997) noted that earliest recorded sighting was on 19 June and the latest was on 22 July. Hunting dates were reported to range from 26 June to 16 July. In 1998, belugas were seen at Kasegaluk Lagoon on our first survey of that area on 28 June, and they were still very numerous in the Icy Cape area on 6 July. In previous years beluga whales have usually concentrated for several days along the coast south of Point Lay between Cape Sabine and Omalik Lagoon (Frost et al. 1993; Point Lay residents, personal communication). However, in 1998 this area was surveyed on four days between 28 June and 5 July and only one beluga was seen. Many belugas were seen in that region during ABWC surveys in 1996 (Lowry et al. 1996), but none were seen in 1997 (Lowry et al. 1997).

In 1998, the Pt. Lay hunt took place on 28 June 1998. Forty-seven animals were harvested, all of them were reported to be males. This group was driven approximately 10 miles south from where they were encountered to the entrance to Kasegaluk Lagoon at 11-mile Pass. On our survey on 28 June, which took place after some whales had been driven into the Lagoon, we saw scattered groups of belugas nearshore north of 11-mile Pass.

The peak single day count in 1998 was on 6 July and totaled 1,172 animals. This estimate is the sum of the photographic count of the group at Icy Cape (1,018), plus the animals counted on the ice edge transect (154, not including the 21 seen on the east-west transect which may have been counted twice, see Figure 4). On this day it was obvious to the survey party that there were considerably more whales distributed along and in the ice than we were able to count, and we only flew a relatively small segment of this habitat. As part of another ABWC study, satellite-linked tags were attached to five beluga whales that were part of the group hunted by Point Lay

residents in June 1998 (R. Suydam, personal communication). On 6 July, one of those whales was off Icy Cape and very likely in the large group that was counted there, but the other four whales were more than 110 nm to the northeast (Figure 9). Based on these results from tagged whales, it is apparent that the belugas that had been off Kasegaluk Lagoon had split into at least two groups, and that many of the whales were no longer in the area covered by the 6 July survey.

Based on the results of the 1998 survey it is not possible to estimate abundance of the eastern Chukchi stock of beluga whales. Clearly, a large portion of the whales were in the ice and were not adequately counted. Also, the aggregation of belugas nearshore at Icy Cape was in shallow and clear water, and it is unlikely that a large fraction of this group was missed because they were below the surface. Currently we do not have a correction factor that can be used to account for belugas missed in such conditions.

The photogrammetric data added considerably to the information collected during this survey. In addition to confirming visual estimates of group size, the length-frequency data support the conclusion that beluga whale calves are typically weaned at two years of age. Therefore, the most common reproductive interval is likely three years. Information on the percent of calves in the population (based on length and color data) and estimates of survival from birth to one and two years of age (based on length data) may be possible. Those analyzes are currently underway. These findings will be compared to the information collected from the biological sampling of the annual harvest. Finally, the data on asymptotic length will be used to supplement the current information available on stock structure.

ACKNOWLEDGEMENTS

We thank Tom Blaesing and Dave Weintraub for their expert piloting of the survey aircraft. We also thank the residents and beluga whale hunters of Kotzebue and Pt. Lay for their cooperation, and for accompanying us on some survey flights. We especially want to acknowledge the efforts of Willie Goodwin from Kotzebue, who participated in all of the surveys, except one. His knowledge of the local environment, the behavior of beluga whales, and the techniques used to hunt beluga whales in this area was critically important to the manner in which the surveys were conducted and the success of this year's survey. Finally, we wish to acknowledge the efforts of Debbie Blaesing for serving as an observer and data recorder throughout the entire survey. This study was funded by NOAA grant NA67FX0197 to the Alaska Beluga Whale Committee and by funds from the NMFS Office of Protected Resources to the National Marine Mammal Laboratory. Additional contributions were provided by the Alaska Department of Fish and Game, the Alaska Fisheries Science Center, and the Southwest Fisheries Science Center.

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APPENDIX A. DAILY SURVEY SUMMARIES

25 June 1998: Flew a coastal survey from Kotzebue to just north of Kivalina, then back to Kotzebue offshore. No belugas were sighted.

26 June 1998: Flew a coastal survey from Kotzebue to Kivalina, where poor sighting conditions precluded further surveys to the north. Returned to Kotzebue and surveyed southern and eastern Kotzebue Sound. No belugas were sighted.

28 June 1998: Flew a coastal survey from Cape Sabine to east of Icy Cape and back to Kotzebue. Fifty-six belugas were sighted in the area between Cape Sabine and Icy Cape.

29 June 1998: Flew a coastal survey from Cape Sabine to east of Icy Cape. Poor sighting conditions around Kivalina and Point Hope due to fog. No belugas were sighted.

30 June 1998. Flew a coastal survey from Kotzebue to Kivalina and back, and around all of Kobuk Lake. Ideal sighting conditions. No belugas were sighted.

2 July 1998: Flew a coastal survey from Kotzebue to Point Barrow. Sighted one beluga east of Icy Cape and approximately 20 belugas in Kasegaluk Lagoon near Pt. Lay (associated with the beluga hunt).

3 July 1998: Flew a coastal survey all around Kotzebue Sound and Eschscholtz Bay. One beluga was sighted east of Cape Espenberg.

5 July 1998: Flew a coastal survey from Kotzebue to Point Franklin. A large aggregation of belugas was seen near Icy Cape, and one beluga was seen east of Icy Cape at the northeast end of Kasegaluk Lagoon.

6 July 1998: Flew to Icy Cape and initiated a survey of four transect legs starting at Icy Cape flying 30 miles north, 100 miles to the west, 60 miles to the south, east back to the coast and north returning to Icy Cape. A large aggregation of belugas was seen just to the northeast of Icy Cape. A dispersed group of belugas was seen along the ice edge, as well as on the southern offshore leg.

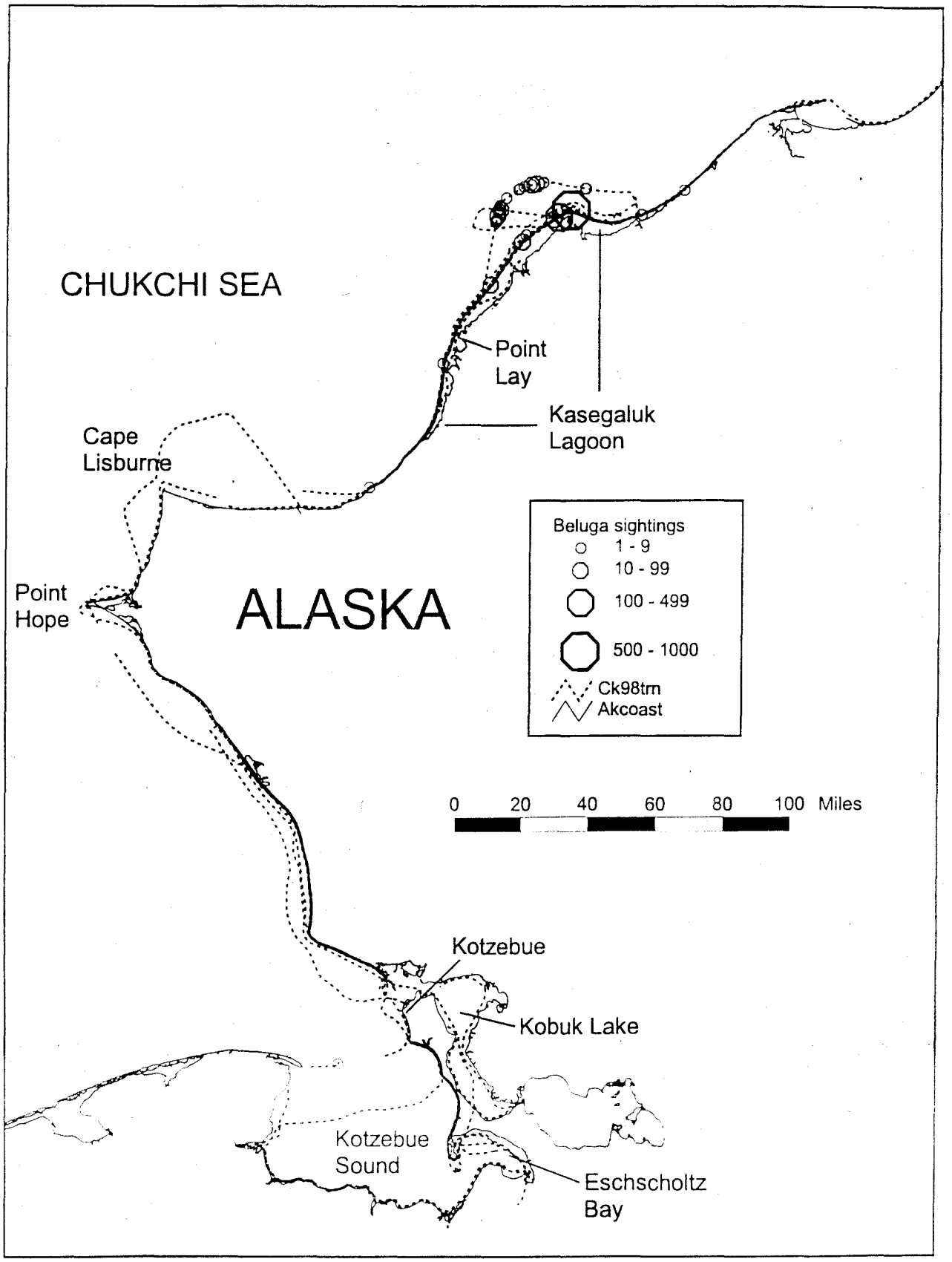


Figure 1. Map of the eastern Chukchi Sea showing flight lines and all beluga sightings made during ABWC aerial surveys conducted 25 June-6 July 1998.

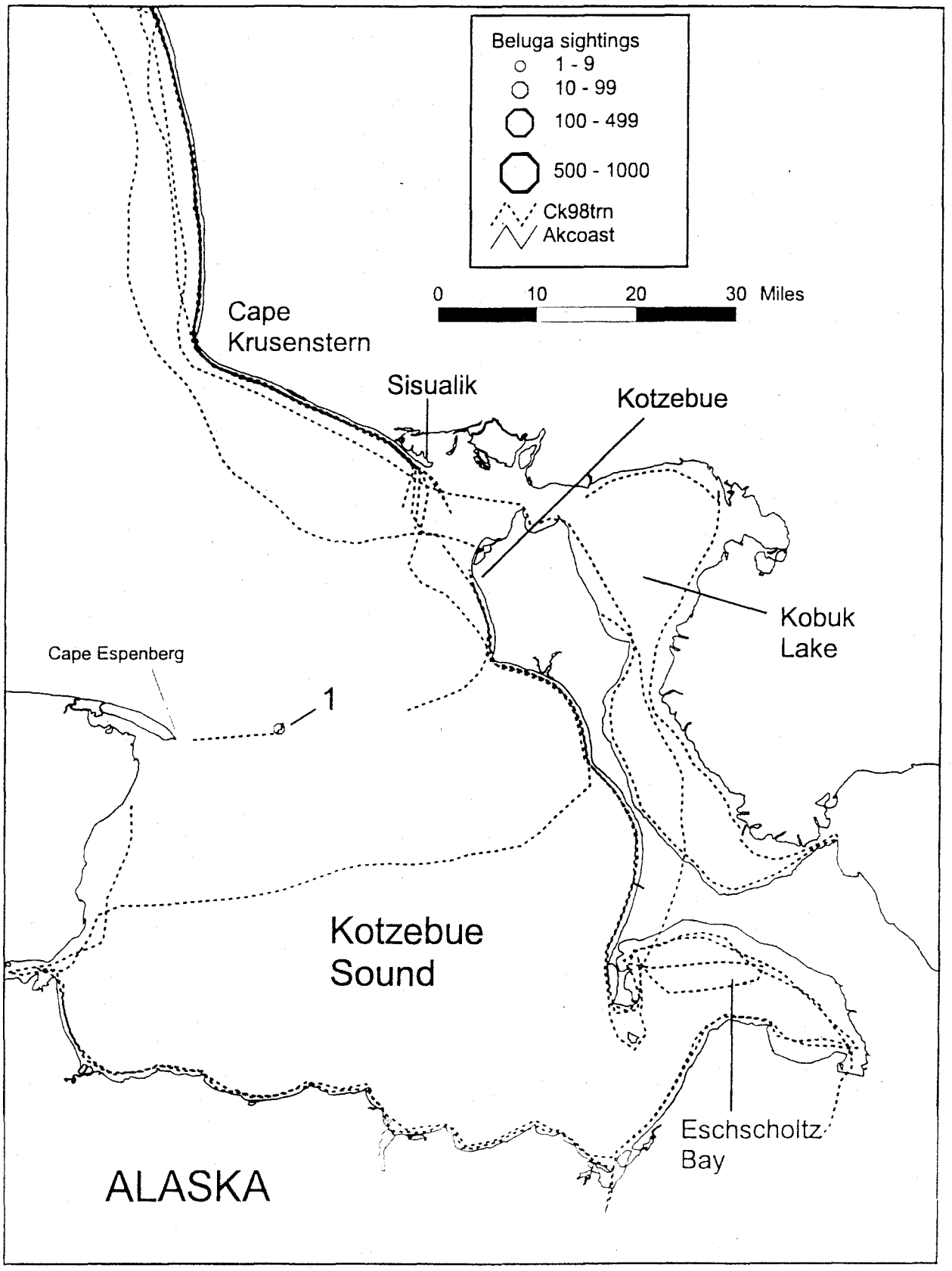


Figure 2. Map of Kotzebue Sound showing flight lines and beluga sightings during ABWC aerial surveys conducted 25 June-6 July 1998.

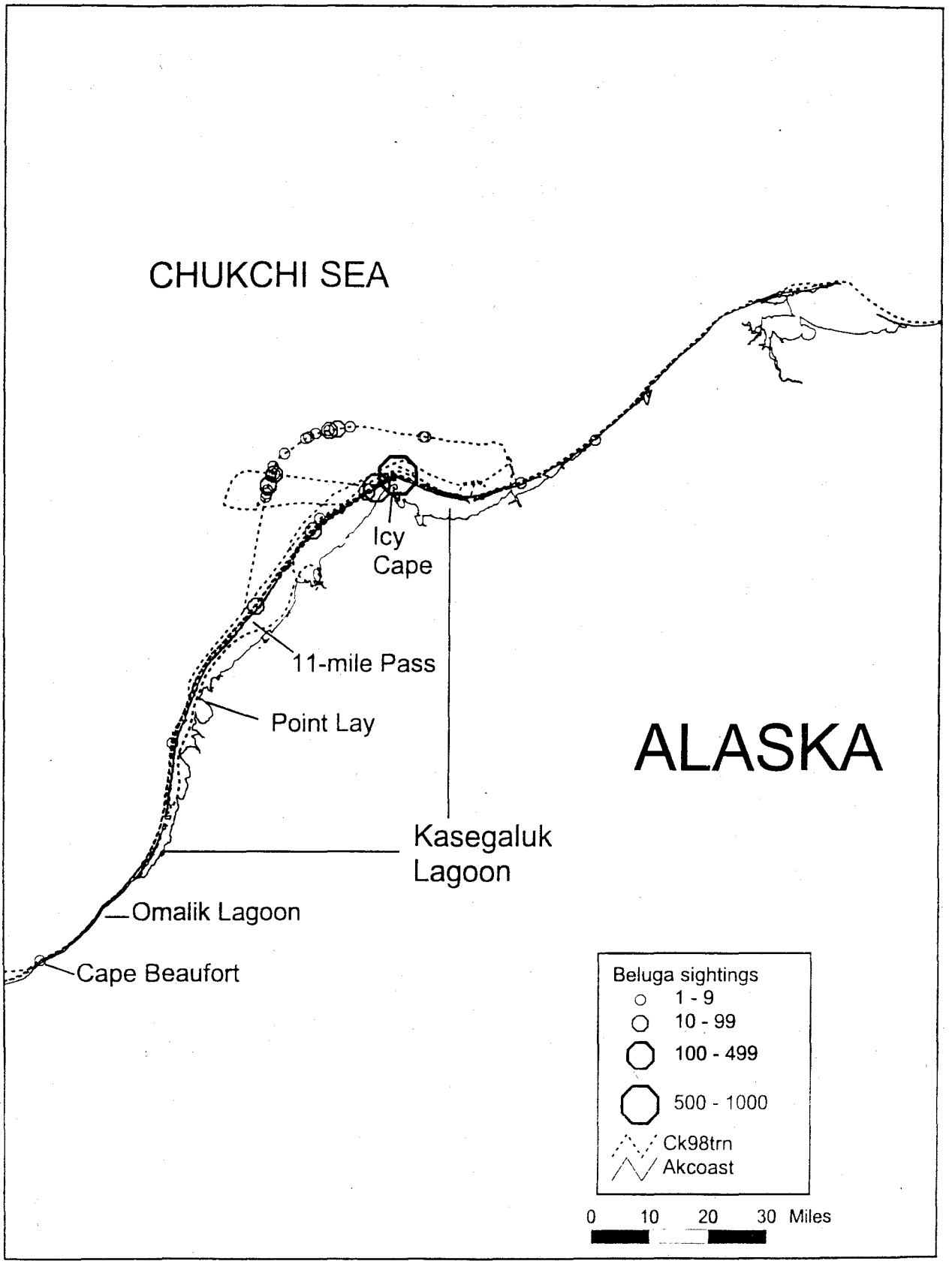


Figure 3. Map of the Kasegaluk Lagoon area showing flight lines and beluga sightings made during ABWC aerial surveys conducted 25 June-6 July 1998.

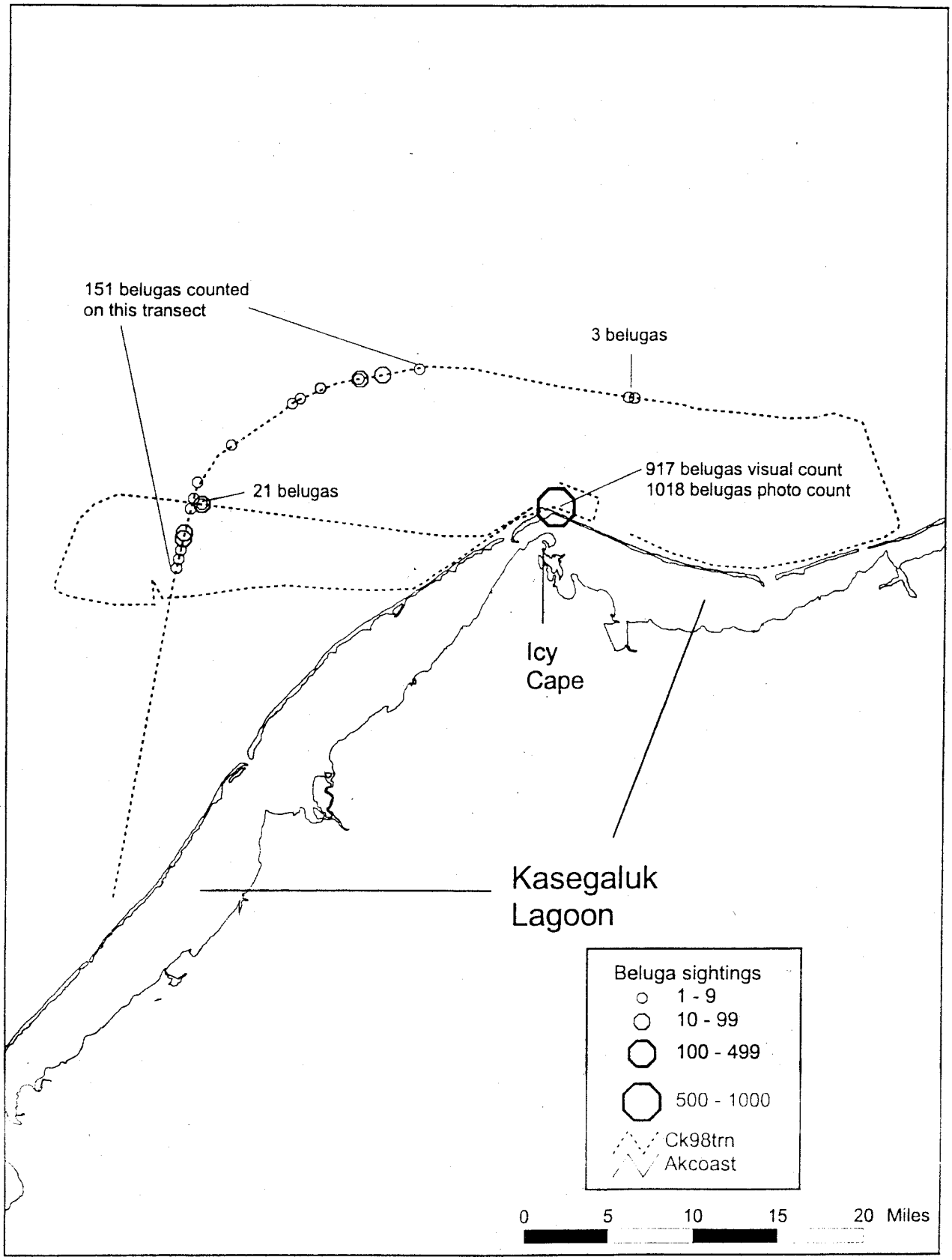


Figure 4. Map of the Kasegaluk Lagoon area showing flight lines and beluga sightings made during ABWC aerial surveys conducted on 6 July 1998.

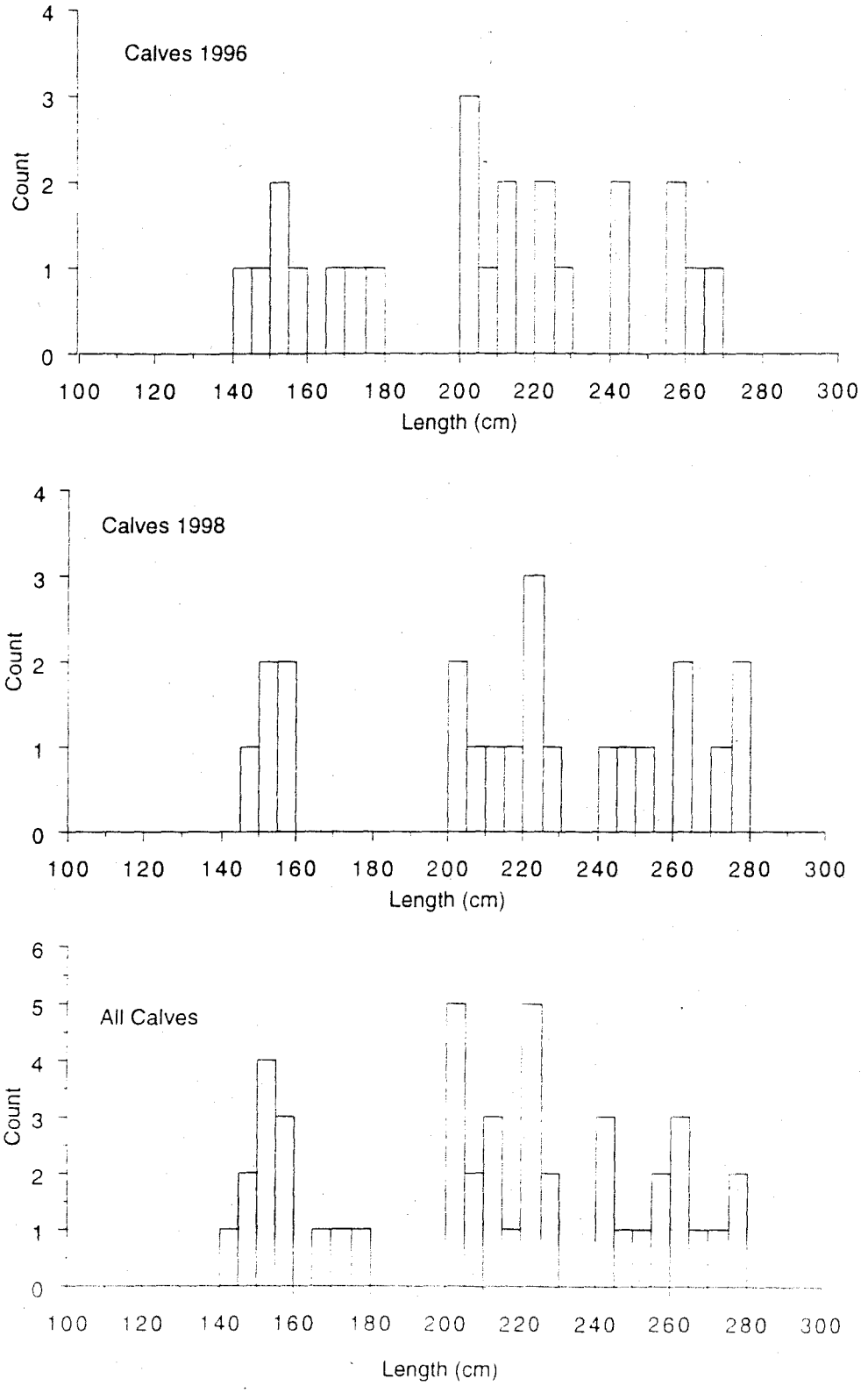


Figure 5 - Lengths of beluga whales calves measured from vertical aerial photographs taken in 1996 and 1998.

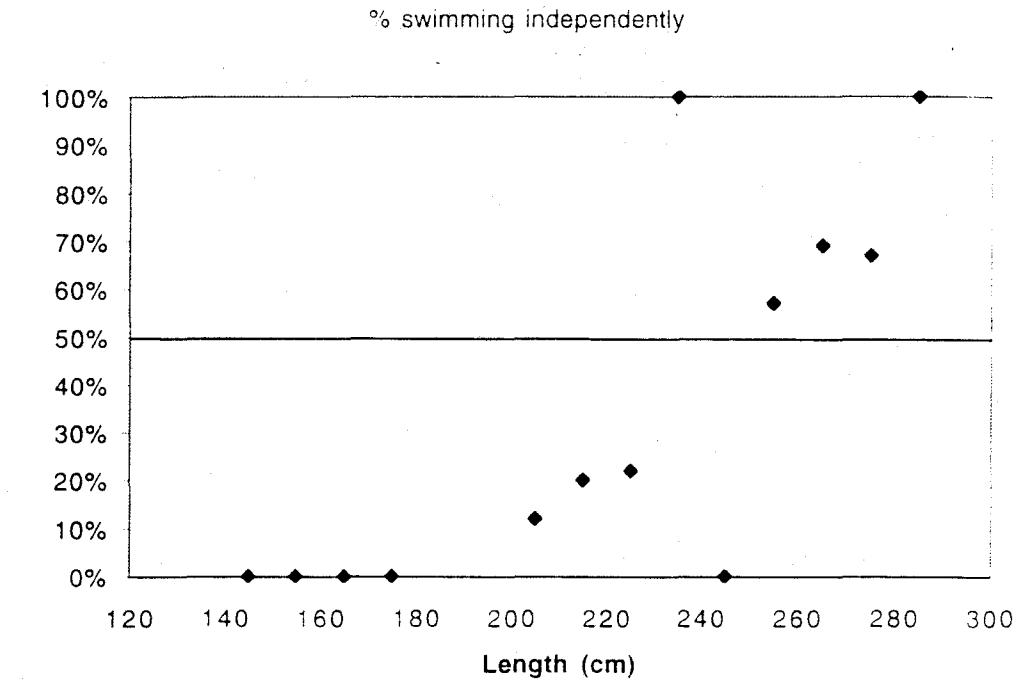
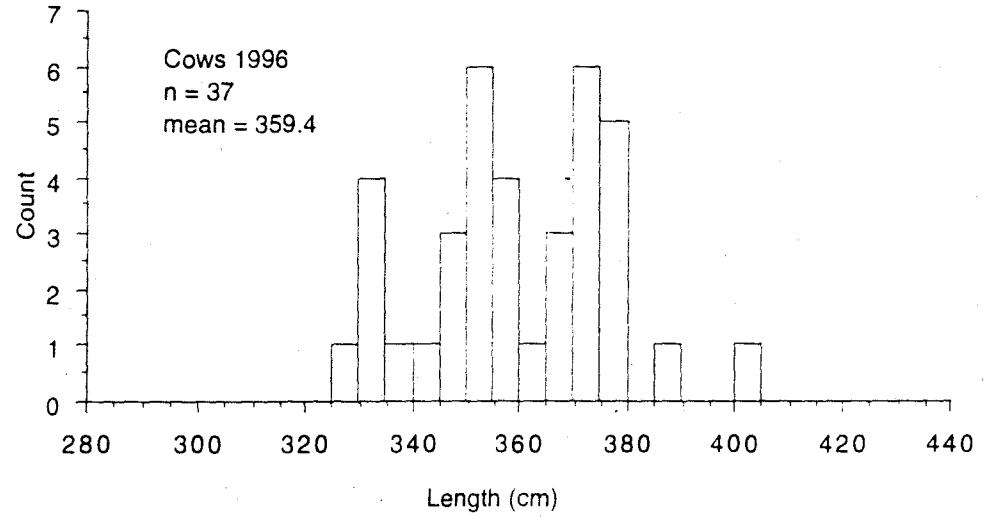


Figure 6 - The percentage of bluga whales within 10 cm length bins that were swimming independently (not in cow/calf configuration).



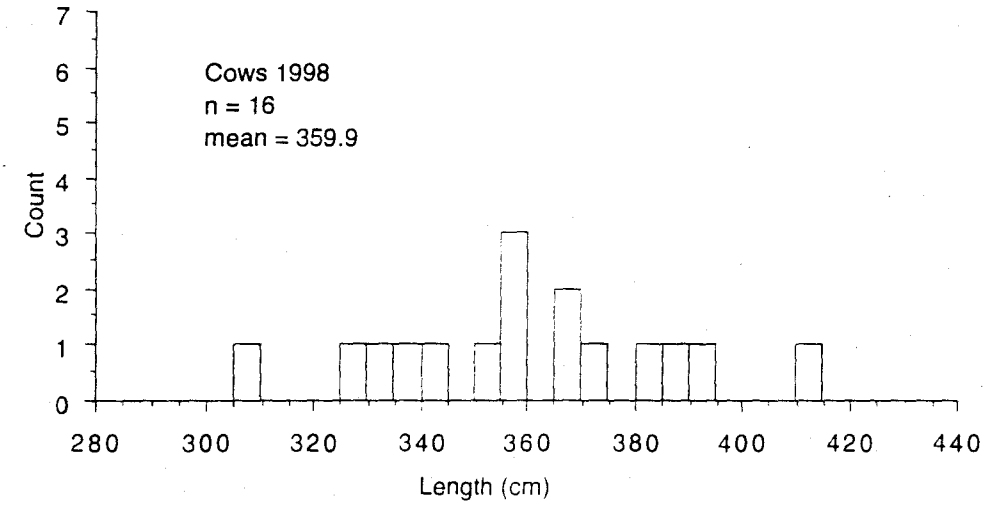


Figure 7 - Lengths of cows, defined here as the large white whales swimming in close association with a small dark whale, measured from vertical aerial photographs taken in 1996 and 1998.

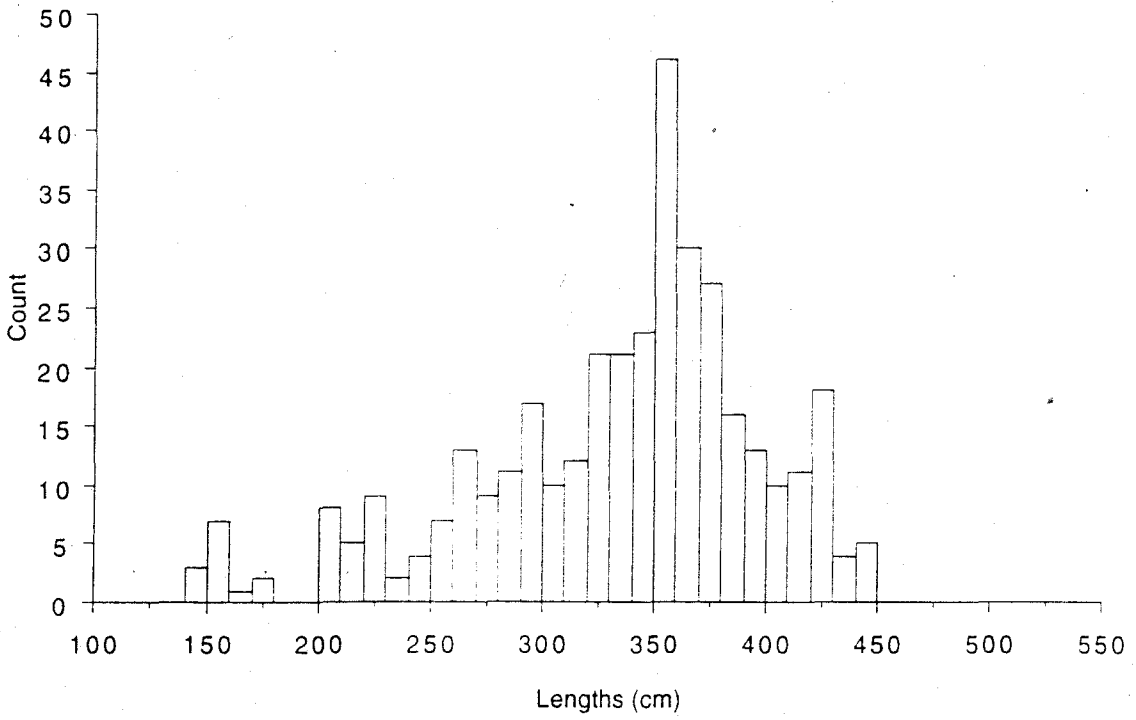


Figure 8 - Lengths of all beluga whales measured from vertical aerial photographs taken in 1996 and 1998.

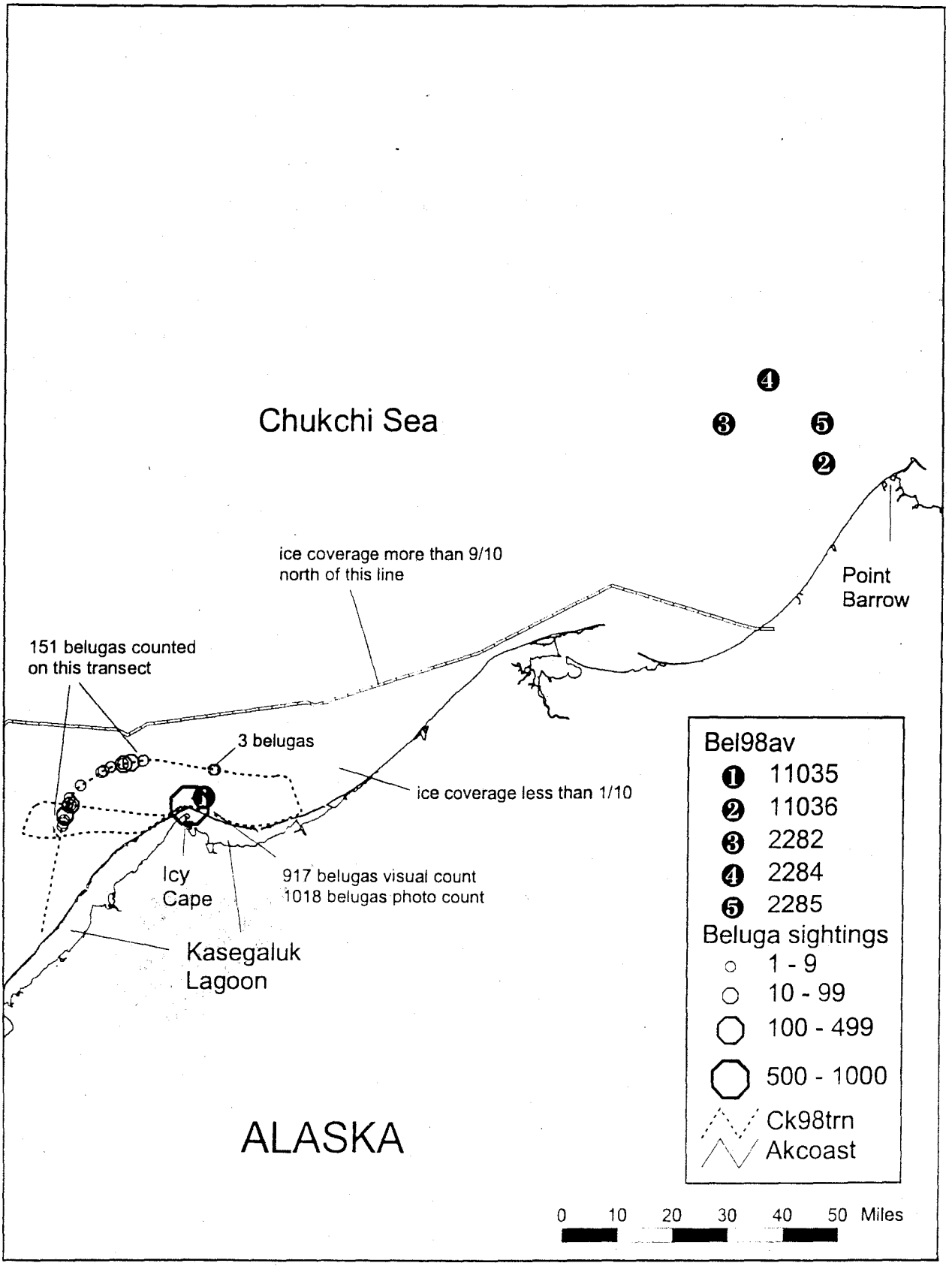


Figure 9. Map of the northeastern Chukchi Sea showing flight lines and beluga sightings made on 6 July 1998, and the average locations of five satellite tagged beluga whales on 6 July (numbers in circles).