

## Chapter 15

# Status of Belukha Whales in Cook Inlet

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### 15.1 INTRODUCTION

Belukhas are medium-sized whales which lack a dorsal fin, although a ridge is often present near the middle of the back. Birth pigmentation ranges from blue-gray to dark brown and gradually changes to light gray as whales become juveniles. Males become white at approximately 9 years, while females become white as early as 6 years of age but may retain some gray coloration for as long as 21 years. The belukha's complex acoustic behavior, thought to be the finest resolution biosonar yet discovered, is an adaptation which makes the belukha particularly well suited for survival in the turbid waters of Cook Inlet.

### 15.2 DISTRIBUTION

Belukhas have a circumpolar distribution in seasonally ice-covered arctic and subarctic waters. Several geographically separated stocks are recognized. In Alaska two stocks are recognized: the western arctic stock consists of belukhas that seasonally occupy waters of Bristol Bay and the Bering, Chukchi, Beaufort, and East Siberian seas; and the Cook Inlet stock, centered in Cook Inlet, occupies the northern Gulf of Alaska from as far west as Kodiak to Yakutat Bay (Fig. 15.1).

Cook Inlet is used throughout the year by belukhas. Seasonal concentrations and habitat partitioning occur. In general, concentrations occur in the upper inlet in the spring and early summer (April-June). Sightings of belukhas are common throughout the inlet in midsummer and through autumn (July-November). Belukhas apparently use the lower inlet more heavily in winter. Only one documented sighting of belukhas in the upper inlet has been made in the period from December through March.

Belukhas concentrate in northwestern Cook Inlet in the spring. Although the reasons for this behavior

are not entirely understood, several possible explanations become apparent when this stock is compared with belukha stocks from other areas. Belukha stocks commonly concentrate near river mouths in spring. Possibly, they gather at river mouths at this time to calve and breed. It has also been surmised that the warmer water temperatures found in estuarine areas in the spring are important to all segments of the belukha population, not just the reproductive age classes or neonates. Secondly, the concentration areas may afford some shelter from storms. Availability of an important food source may also be a cause of river mouth concentrations. This was not considered a major factor for belukhas concentrating in the MacKenzie estuary, because most of the whales harvested by Natives had empty stomachs. This is an important difference from the Bristol Bay stock and also, possibly, from the Cook Inlet stock. In Bristol Bay, belukhas do feed in estuaries in the spring and may be primarily drawn to the area by both downstream migrating salmon (*Oncorhynchus* spp.) smolts and returning adults and an early run of smelt (*Osmerus dentax*).

No definitive link has been shown between belukhas concentrating at the mouth of the Susitna River and an important food source. However, the arrival of several species of anadromous fish (similar to those found in Bristol Bay) concurrent with the build-up of belukhas in northwestern Cook Inlet is strong circumstantial evidence of such a relationship. One of the most important of these anadromous fish species (in terms of biomass) is the eulachon or hooligan (*Thaleichthys pacificus*) which arrives in the Susitna estuary in May and June and enters the river for spawning in two major migrations. Escapement in these two migrations has been estimated to be several hundred thousand fish in May and several million fish in June. It seems likely that eulachon in Cook Inlet could be analogous to smelt in Bristol Bay, which are considered to be important

in the diet of belukhas in early spring. This suggests that the belukha concentration in upper Cook Inlet in May and June occurs, at least in part, in response to the arrival of an important food source.

The question of whether the Cook Inlet belukha stock is isolated from the nearest stock, in Bristol Bay, has not been fully answered. Some evidence suggests that this stock is both geographically isolated and genetically different from other stocks. Fay (Univ. Alaska, Fairbanks, pers. commun.) analyzed available material and suggested the possibility of a differentiation in cranial morphology. However, the sample size of Cook Inlet belukha skulls was too small for a conclusive study when analyzed in 1978 and remains so today.

The lack of sightings of belukhas along the south side of the Alaska Peninsula south of Kodiak Island suggests that movements between the Cook Inlet belukha stock and the Bristol Bay stock are rare if they occur at all. However, belukhas are obviously capable of such movements. If belukhas move between Cook Inlet and Yakutat Bay, it certainly seems possible for them to move between Cook Inlet and the Bering Sea. Such movements would probably occur in winter, when observation is unlikely.

Belukhas are also found outside Cook Inlet, although not on a predictable basis. Sightings of belukhas have been made near Kodiak island in March and July and near the entrance to Prince William Sound in March. There have also been reports of sightings of belukhas at the Barren Islands, Marmot Bay on the northwest side of the Kodiak Archipelago, in Shelikof Strait, and off Montague Island. Approximately 200 belukhas were sighted in Prince William Sound in July 1983. Belukhas were first reported in Yakutat Bay in 1976.

Subsequent sightings have been made in Yakutat Bay, including a report by a local fisherman that they are sighted annually. Those reports appear speculative, and could not be substantiated in discussions with other residents of the area. The relatively small number of animals sighted at any one time, always less than 30, suggests a group of visitors rather than a self-sustaining population. Most likely, the belukhas seen in Yakutat Bay are occasional visitors from the Cook Inlet stock.

### 15.3 POPULATION SIZE

The Cook Inlet stock was first surveyed by the Alaska Department of Fish and Game in 1964–65 and estimated at a minimum of 300 to 400 whales.

In subsequent aerial survey/sighting combinations, the highest minimum direct count I have obtained for a single day was 479 animals on 21 August 1979. Some investigators have speculated that three times as many whales are present as are counted in this type of survey. Using a correction factor of 2.7 to account for submerged whales (which was developed for estimating belukha whales in similar conditions in Bristol Bay) yields a minimum estimate of 1,293 whales in Cook Inlet in August 1979.

### 15.4 FOOD HABITS

All five species of North American Pacific salmon return to Cook Inlet to spawn. Outmigrating salmon smolt are found in many river systems in Cook Inlet in the spring. As in Bristol Bay, belukhas most likely eat outmigrating smolts and adult salmon in Cook Inlet. The only information currently available on food habits of belukhas in Cook Inlet concerns the consumption of salmon.

In January 1986, 12 Floy spaghetti tags and one Floy anchor tag were taken from the stomach of an adult, male belukha found dead on the beach near Windy Point in Turnagain Arm of upper Cook Inlet. All of the recovered spaghetti tags that were identifiable had been placed on adult salmon migrating up the Susitna River at river miles 20, 22, and 80, in conjunction with the Susitna River hydroelectric studies (Mike Thompson, Alaska Department of Fish and Game, pers. commun.). The Floy anchor tag had been applied to an adult sockeye salmon (*Oncorhynchus nerka*) by the Cook Inlet Aquaculture Association.

The species composition of the 13 adult salmon and the locations where the salmon were taken by the belukha are unknown. Belukhas readily ascend rivers, occasionally traveling several hundred kilometers. However, sightings of belukhas in the Susitna River are uncommon. Tagging crews stationed on the Susitna River during 1983 through 1985 reported no sightings of belukhas above river mile 3. It is possible that the fish could have moved downstream, below river mile 3, although salmon would be unlikely to return nearly 80 miles downstream after tagging. The belukha could have consumed dead or dying salmon which had spawned and subsequently were flushed downstream, but belukhas have not been known to scavenge on dead or dying fish.

The whale was nearly 4.5 m long and appeared to be old, judging from its size and the wear on its teeth. This could mean that it was in poor physical

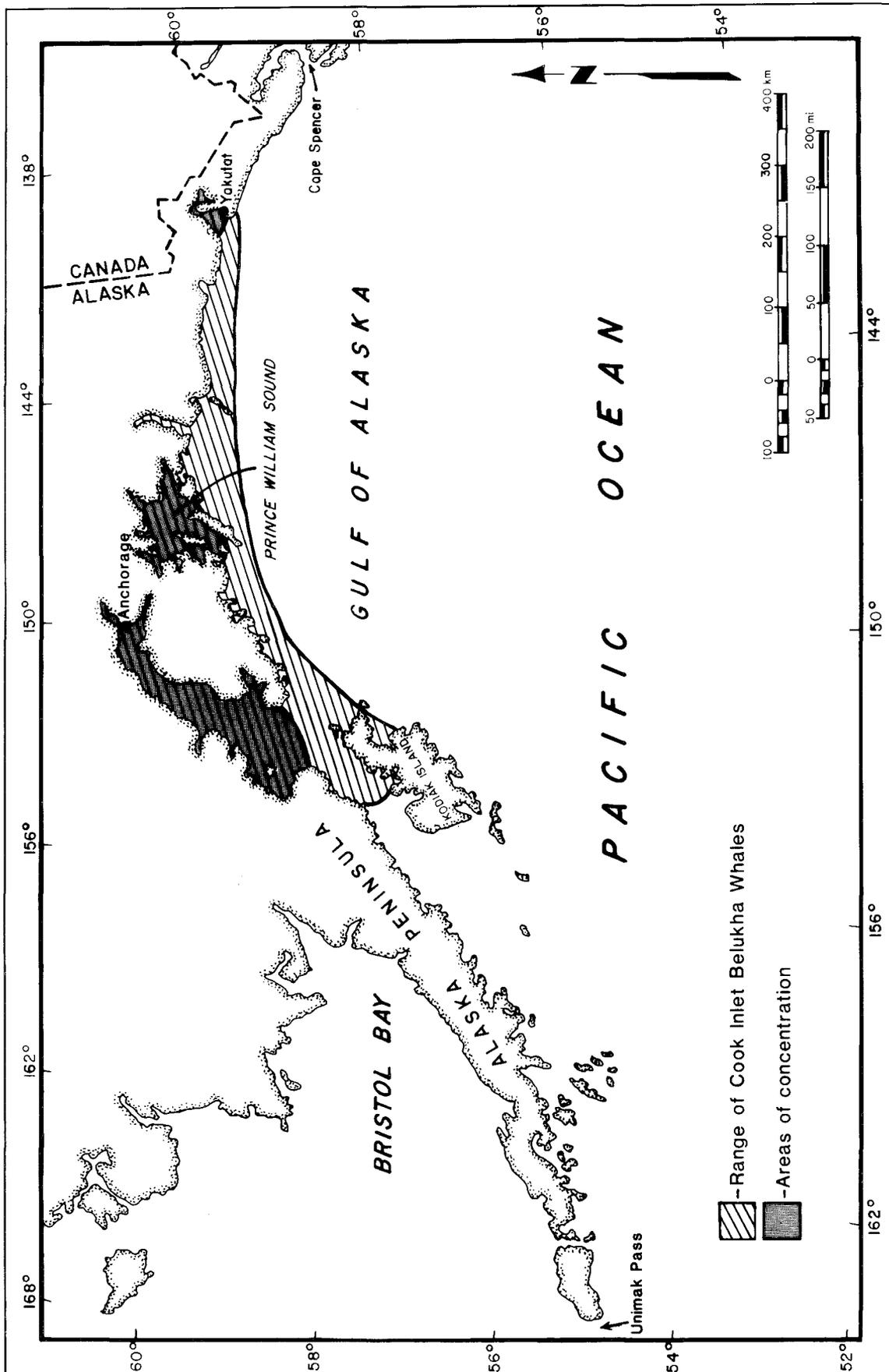


Figure 15.1.—Range of belukha whales in the Gulf of Alaska.

condition prior to its death and was attempting to utilize more easily available food sources.

Belukhas feed in the upper 10 m of the water and are known to consume at least 100 different species of fish and invertebrates in other parts of their range. Common in the diet are smelt, capelin (*Mallotus villosus*), eulachon, herring (*Clupea harengus*), and saffron cod (*Eleginus gracilis*). Many of these species are found in Cook Inlet and may be important in the diet of belukhas. Pacific tomcod (*Microgadus proximus*) may take the place of saffron cod in Cook Inlet. It is possible that belukhas may feed on tomcod in Cook Inlet in autumn and winter, when salmon and eulachon are not available.

Pollock (*Theragra chalcogramma*), shrimp, octopus, and sculpins are important in offshore areas in other parts of the belukha's range. These food sources are all found in areas adjacent to Cook Inlet, particularly the Kodiak area, Prince William Sound, and the Yakutat area. These species are likely to be important to belukhas when they are outside of Cook Inlet.

## 15.5 REPRODUCTION

Because almost no information on breeding and reproduction is available specifically for Cook Inlet belukhas, it must be inferred from studies in other parts of the range. Normally, a triennial reproductive cycle appears to be common. Females generally first breed in the spring just prior to their fourth or fifth birthday, whereas males initially breed at

8 years of age. Gestation is estimated to last 14–15 months and births occur in June or July. Lactation may last for up to 2 years, although the duration of dependant nursing may be considerably shorter. Breeding can take place while the female is still lactating.

Calving in Cook Inlet probably takes place while the belukhas are concentrated at the mouths of rivers in the upper inlet (from the Susitna River to the Belukha River) during May and June. It appears common for belukhas to take advantage of warmer water temperatures in many estuarine areas during this period. Thermal advantage would be particularly important to neonates during the first few days of life because of their relatively small surface to volume ratio and limited fat deposits.

## 15.6 RECOMMENDATIONS

If we are to truly understand the status of belukha whales in Cook Inlet, several important studies should be undertaken. The following recommendations are in order of priority: develop a realistic, statistically sound estimate of the total Cook Inlet belukha stock; develop a method for monitoring trends in abundance; determine the taxonomic status of this stock; determine seasonal movements, distribution, and habitat use patterns; identify the use and importance of food species; define the sex and age composition of the herd; and monitor subsistence harvests.

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