

Harvest History of Belugas, *Delphinapterus leucas*, in Cook Inlet, Alaska

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Introduction

Belugas, *Delphinapterus leucas*, are distributed throughout Arctic and subarctic waters of the Northern Hemisphere (Hazard, 1988). Belugas in Cook Inlet, Alaska, sometimes range between Yakutat Bay and Shelikof Strait (Fig. 1); however, sightings outside of Cook Inlet are infrequent and generally limited to small numbers (Laidre et al., 2000). Due to the absence of sightings south of the Alaska Peninsula (Laidre et al., 2000),

their presence year-round in Cook Inlet (Rugh et al., 2000), and evidence of genetic discreteness (O'Corry-Crowe et al., 1997), the belugas found in Cook Inlet appear to be isolated from beluga populations found in western and northern Alaska.

The apparent decline of this stock during the 1990's (Hobbs et al., 2000) has been attributed, in part, to overexploitation by hunters. Subsequently, Cook Inlet belugas were designated in 2000 as depleted under the Marine Mammal Protection Act of 1972 (MMPA) (NMFS, 2000a). This paper reviews and describes beluga use and harvest levels in the Cook Inlet region from prehistory to the present. Included are a summary of current efforts to manage the stock and a description of the steps that NOAA's National Marine Fisheries Service (NMFS) has taken to establish reliable harvest estimates.

Whaling Prior to the 20th Century

Alutiiq Eskimos and Dena'ina Athabaskan Indians have occupied the coastal areas surrounding Cook Inlet since prehistoric times (de Laguna, 1975). These hunting societies utilized many marine resources including belugas, seals, Otariidae and Phocidae; and porpoises, Phocoenidae. At prehistoric village sites in Kachemak Bay and near West Foreland (Fig. 1), researchers have recovered a few bones that appear to be from belugas (de Laguna, 1975; Lobdell, 1980; Workman et al., 1980). As is the case today, it is likely that blubber and meat were flensed from these whales on shore, near the places of harvest, so the small number of beluga bones in village middens may under represent the magnitude of the harvest (de Laguna, 1975).

Beluga hunters employed several techniques to capture these whales. Some techniques unique to the Dena'ina in Cook Inlet include a hunting platform or "yuyqul" (spearing tree), as well as fences, weirs, and moveable dams made of poles (Fall, 1981; Kari, 1987). Each apparatus was designed to take advantage of seals and belugas that entered streams and rivers on the flood tide. Dams and fences trapped the animals as they attempted to leave the stream or river on the ebb tide (Fall, 1981). A hunter in the "spearing tree" (Fig. 2), usually a spruce tree driven upside-down into the mud of the river at low tide, would harpoon an animal as it swam past during higher tides. The harpoon was fitted with a toggle point and a floating bladder (usually made of seal-skin) attached with braided sinew ropes.

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ABSTRACT—Belugas, *Delphinapterus leucas*, in Cook Inlet, Alaska, represent a unique and isolated marine mammal population that has been hunted for a variety of purposes since prehistoric times. Archeological studies have shown that both Alutiiq Eskimos and Dena'ina Athabaskan Indians have long utilized many marine resources in Cook Inlet, including belugas. Over the past century, commercial whaling and sport hunting also occurred periodically in Cook Inlet prior to the Marine Mammal Protection Act of 1972 (MMPA). During the 1990's, the hunting mortality by Alaska Natives apparently increased to 40–70 whales per year, which led to the decline of this stock and its subsequent designation in 2000 as depleted under the MMPA. Concerns about the decline of the Cook Inlet stock resulted in a voluntary suspension of the subsistence hunt by Alaska Natives in 1999.

The difficulty in obtaining accurate estimates for the harvest of these whales is due to the inability to identify all of the hunters and, in turn, the size of the harvest. Attempts to reconstruct harvest records based on hunters' recollections and interviews from only a few households have been subject to a wide degree of speculation. To adequately monitor the beluga harvest, the National Marine Fisheries Service established marking and reporting regulations in October 1999. These rules require that Alaska Natives who hunt belugas in Cook Inlet must collect the lower left jaw from harvested whales and complete a report that includes date and time of the harvest, coloration of the whale, harvest location, and method of harvest. The MMPA was amended in 2000 to require a cooperative agreement between the National Marine Fisheries Service and Alaska Native organizations before hunting could be resumed.

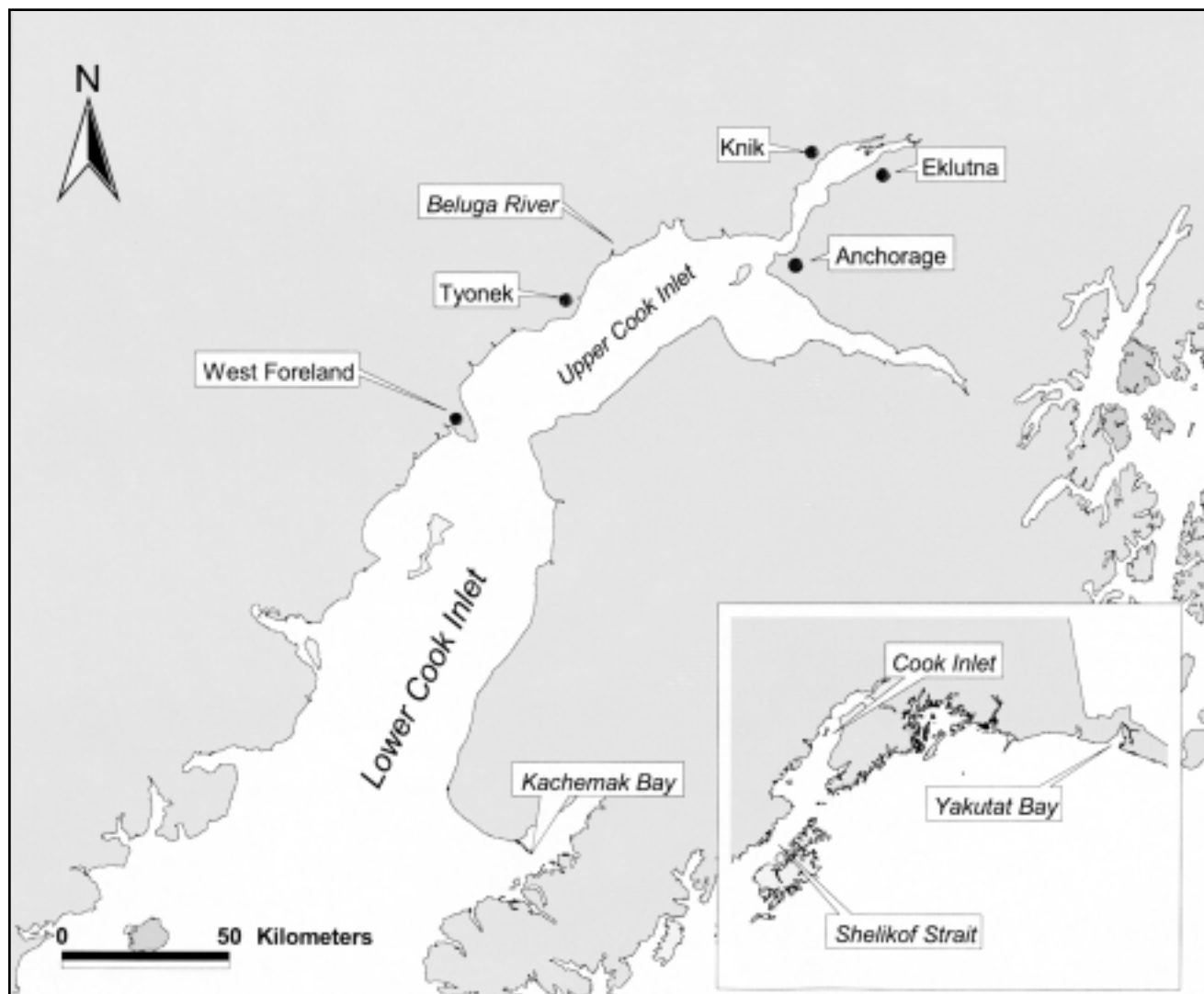


Figure 1.—Cook Inlet and the Gulf of Alaska with place names mentioned in text.

Hunters in kayaks or baidarkas would then pursue the struck whale, subsequently killing it with a lance (Wrangell, 1970). Hunting platforms were still in use in Cook Inlet during the 1830's (Wrangell, 1970).

Wrangel (1989) further described Native beluga harvest and use in the mid 1800's, noting that the women "try out" oil from small fish and belugas which were captured as follows: "The men implant posts in places where beluga go in search of small fish, such as low water close to shore or in streams. The men sit near these posts and watch the fish. As soon as one comes close to a post, the

Kenaits will shoot an arrow at the fish, or actually, an arrowhead, which is fastened to a cord 1.5 sazhen long, with a bladder attached to the other end of the cord. The arrow becomes embedded in the beluga, which quickly thrashes off; the bladder shows its location; another fisherman in a baidarka pursues it, grabs the cord, stabs the beluga several times and pushes the dead creature ashore...These activities last until the end of July." The author added that the "Kenaits" called themselves "Tnaina," numbered about 460 families, and "who lived along the shore and in environs of Kenai Bay . . ."

Whaling in the 20th Century

Dramatic changes took place in the Cook Inlet region during the 20th century. Anchorage grew after the completion of the Alaska Railroad in 1923, during military expansion through the 1940's and 1950's, and with oil and gas development during the 1960's and 1970's (Atwood, 1957; Haycox and Haycox, 1977; Alaska Geographic, 1983, 1996).

While the Dena'ina in Tyonek, on the west side of Cook Inlet, continued small-scale hunts of belugas during the century, the beluga population was also subjected to periodic, large-scale com-



Figure 2.—A “spearing tree” once used by Dena’ina Athabaskans to hunt marine mammals in Cook Inlet, Alaska. Illustration by K. Laidre based on a drawing by L. Savage in Kari (1987).

mercial harvests and smaller harvests by non Native hunters. Many of the beluga hunters from communities outside of Cook Inlet moved to the area during these times of economic growth, either for paid employment (Stanek, 1994) or as part of the military. Demographically, the hunting community in Cook Inlet changed substantially.

Commercial Whaling

Commercial whaling has occurred periodically in Cook Inlet during the

last 100 years. The Beluga Whaling Company operated for 5 years at the Beluga River in upper Cook Inlet, where the company harvested 151 belugas (9, 42, 0, and 100 during 1917–20, respectively) before going bankrupt in 1921 (Bower and Aller, 1917, 1918; Bower, 1919, 1920, 1921). Long-time residents interviewed by Alaska Department of Fish and Game (ADFG) personnel recalled a commercial hunt of 100 belugas on the Beluga River in the 1930’s (Klinkhart, 1966; Fall et

al., 1984; Lowry, 1985; Stanek, 1994); however, no record of this hunt exists in the Alaska fishery and fur-seal industries documents for this time period (Bower, 1931–41).

Beluga products were sold in Anchorage during the 1940’s and 1950’s by residents of the lower Susitna Basin and the villages of Knik and Eklutna (Stanek, 1994). Some of these products (such as muktuk and meat) were sold to the Alaska Native Medical Center, which opened in 1953, in an effort to

Beluga Offer Top Big Game

Big Game Hunters: prospect of a new quarry is in the offing. The game is the 10 to 20 foot beluga, or white whale.

Several Alaskan guides have said that hunting the beluga whale is by far the most exciting big game hunting ever done.

The Beluga Whale Hunt Club has one and four-day beluga whale hunts available for the season.

The big game sport of beluga hunting begins at sea in an open dory about 20 feet long. Three or four hunters man each dory.

Weapons utilized in each hunt are high powered rifles, Eskimo-style harpoons, and a Norwegian whaling gun.

The dory crew works the boat into a herd, or pod, of whales.

A pod can be up to five miles long and contain hundreds of whales.

One whale is cut out of the pod. The dory rides herd on it and edges it toward shallow water.

The whales are hunted in shallow water because of the difficulty of tracking in deep water. In shallow water, the whale can be followed by its foaming wake.

After an hour or more of tracking, with more than 100 rounds of ammunition spent, the whale is usually fatigued enough to allow the dory to come within harpoon-throwing distance.

Hardier hunters use the 10.15-mm Norwegian harpoon rifle, as it really packs a punch.

A float is attached to the harpoon line making any further tracking of the whale an easy matter, even in deeper water.

Once secured, the whale is towed back to camp.

Figure 3.—Advertisement for guided beluga hunts published in “Alaska Outdoors, A Thursday Feature” of the Anchorage Daily Times newspaper (1 July 1965 edition, p. 21).

supply traditional foods to the patients (Stanek, 1994).

Sport Hunting

In the summer of 1963, the Kenai Chamber of Commerce sponsored the organization of The Beluga Whale Hunt Club, in part to attract tourists to the Kenai area. The club advertised beluga hunting as one of the most exciting big game sports in Alaska (Fig. 3). The beluga hunt and subsequent whale barbecue of “beluga-burgers” were featured events at the Kenai Days fair from 1963 through 1965 (reported in

the local newspaper, The Kenai Peninsula *Cheechako News*). In 1963, the Chamber offered a \$100 prize for the first whale landed at the fair (*Cheechako News*, 1963a). A “practice” whale was harvested on 21 July 1963 at the mouth of the Beluga River (Table 1), and about 150 lb of meat were transported to Kenai with a piece of hide measuring 6 ft × 6 ft. Hunt organizer, John Hulien, reported that “other portions of the whale were too full of bullet holes to make a good hide” (*Cheechako News*, 1963b). In 1964, hunting began 1 May and continued through the

Kenai Days fair held in late August. At least two whales (female with calf) were harvested prior to the Kenai Days fair (*Cheechako News*, 1964a) (Table 1). A whaling station was proposed, and attempts were made to develop beluga products such as whale oil soap (*Cheechako News*, 1964b) and canned meat (*Cheechako News*, 1965a). Hunts were not always successful, and at least in one case “about 250 rounds of ammunition [were expended before] the hunters gave up the chase” (*Cheechako News*, 1965a). After 1965, the hunt and barbecue were no longer part of

Table 1.—Records of beluga whales taken in Cook Inlet, Alaska. Multiple entries in a given year are indicative of different sources; the counts are not additive. Number taken represents a minimal estimate of the number of belugas killed unless noted otherwise.

Year	Number taken	Description	Source
1930's to early 1940's	6-7 annually	Tyonek Native subsistence harvest.	Fall et al. (1984)
1940's and 1950's	Unknown	Hunted by trappers and homesteaders in lower Susitna Basin and Natives in Knik and Eklutna; most products sold in Anchorage.	Stanek (1994)
1950's, 1960's and 1970's	"Virtually nil"	Tyonek Natives shifted hunting effort to terrestrial mammals, primarily moose.	Fall et al. (1984); Interagency Task Group (1978)
1963	1	Killed at the Beluga River by members of the Beluga Whale Hunt Club based out of Kenai. Unknown how many whales were injured or killed but lost during this and other hunts undertaken during the summer of 1963.	<i>Cheechako News</i> (1963a,b)
1964	2	A female (14 ft, 1,400 lb) and its calf (5 ft) were harvested by members of the Beluga Whale Hunt Club. Number of animals killed or injured but lost is not known for the 1964 hunting season.	<i>Cheechako News</i> (1964a,b)
1965	1	At least one kill by members of the Beluga Whale Hunt Club is inferred from a news article on "Beluga-Burgers." About 250 rounds of ammunition were expended during one unsuccessful hunt. Number of animals killed or injured but lost is not known for the 1965 hunting season.	<i>Cheechako News</i> (1965a,b)
1979	3	Tyonek Native subsistence harvest.	Fall et al. (1984)
1980	5–7	Most taken incidental to commercial salmon fishing.	Burns and Seaman ¹
1981	1 killed, 4 SL ²	Tyonek Native subsistence harvest.	Fall et al. (1984)
	3–6	Most taken incidental to commercial salmon fishing.	Burns and Seaman ¹
1982	1 killed, 2 SL	Tyonek Native subsistence harvest.	Fall et al. (1984)
	3–6	One taken by a Tyonek hunter; the rest were taken incidental to commercial salmon fishing.	Burns and Seaman ¹
1983	1	Tyonek Native subsistence harvest.	Fall et al. (1984)
	3–6	Most taken incidental to commercial salmon fishing.	Burns and Seaman ¹
1984–86	No data		
1987	8 killed, 1 SL	Reported from 4 hunting households.	Stanek (1994)
1988	12 killed, 3 SL	Reported from 5 hunting households.	Stanek (1994)
1989	11 killed, 2 SL	Reported from 9 hunting households.	Stanek (1994)
1990	7 killed, 2 SL	Reported from 5 hunting households.	Stanek (1994)
1991	No data	Households not contacted due to lack of research funding.	Stanek (1994)
1992	9 killed, 1 SL	Retrospective estimates from 8 hunting households surveyed in 1993.	Stanek (1994)
1993	13 killed, 4 SL	Reported from 16 hunting households.	Stanek (1994)
	30	This estimate includes the minimum estimate of 17 reported in Stanek (1994) in addition to the number of households not surveyed (3) and hunters not from Cook Inlet (10).	Hill and DeMaster (1998)
1994	19 killed, 2 SL	Reported by P. Blatchford, D. Owens, and R. Stanek to the Alaska and Inuvialuit Beluga Whale Committee (ABWC)	ABWC ³
1995	60 killed, 14 SL	Harvest records collected by the Cook Inlet Marine Mammal Council (CIMMC) and reported to the ABWC. Tally includes 24 landed, 8 killed but lost, and 5 SL between April and June; 26 landed and 9 SL between July and October; and 2 taken by a hunter from Kotzebue.	ABWC ⁴
	50 killed, 22 SL	NMFS combined killed but lost with SL and excluded the 2 whales harvested by the Kotzebue hunter in its report.	Hill and DeMaster (1998)
	42 killed, 26 SL	No explanation was provided for why this harvest was revised in the NMFS 1999 stock assessment.	Hill and DeMaster (1999)
1996	49 killed, 49-98 SL	Harvest records collected by the CIMMC and reported to the ABWC. CIMMC representatives (A. Nuglene and D. Alex) believed the reported SL was overestimated.	ABWC ⁵
	49 killed, 49-98 SL	NMFS estimated a total take of 123 belugas (range 98-147) based on the reports from the CIMMC.	Hill and DeMaster (1999)
1997	35-75	Reported by CIMMC representative A. Nuglene to the ABWC. Includes estimated number landed (35) and estimated total killed (65-75), but no estimate of SL.	ABWC ⁶
	35 killed, 35 SL	NMFS calculated a minimum estimate of 70 belugas taken based on information presented to the ABWC.	Hill and DeMaster (1999)
1998	21 killed, 21 SL	NMFS estimated SL lacking a complete harvest report from CIMMC. Does not include an unverified report of 20 beluga taken in one weekend in June.	Ferrero et al. (2000), NMFS unpubl. data ⁷
1999	0	Alaska Natives propose a moratorium on Cook Inlet beluga hunting and suspend the 1999 hunt.	Ferrero et al. (2000)
2000	0	Although a harvest quota of 1 whale was approved for the Native Village of Tyonek, the hunts were not successful.	NMFS unpubl. data

¹ Burns and Seaman, text footnote 1.

² SL = struck and lost, not known if the beluga died.

³ ABWC, text footnote 4.

⁴ ABWC, text footnote 5.

⁵ ABWC, text footnote 6.

⁶ ABWC, text footnote 7.

⁷ Data on file at NMFS Alaska Reg. Off., Protected Resour. Manage. Div., Anchorage.

the scheduled Kenai Days fair, and the club's activities were no longer featured in the local paper.

Sport and commercial whale harvests in U.S. waters were banned by the Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. 1372 § 102(f)). Only subsistence harvests undertaken by Indians, Aleuts, or Eskimos residing in Alaska or along the coasts of the North Pacific or Arctic Ocean are exempt from all MMPA provisions (except those under § 109, described in the Legislation and Harvest Monitoring section).

Subsistence Whaling

The Dena'ina in Tyonek harvested about 6 or 7 whales per year in the 1930's and early 1940's (Fall et al., 1984). During the 1940's, hunters began to focus their efforts on terrestrial mammals, in particular moose, *Alces alces gigas* (Fall et al., 1984). Interest in beluga hunting renewed during the late 1970's, but data are not available on the number of whales taken between 1940 and 1979 (Table 1). Hazard (1988) suggested that on average 5 whales were harvested per year with an annual total take of 10 (including struck but lost animals). However, this is potentially misleading, as the average was based on subsistence hunting reports from 1980 to 1984 (Burns and Seaman¹) when the majority of whales were taken incidental to commercial Pacific salmon, *Oncorhynchus* spp., fishing rather than by subsistence hunting (Table 1). And the annual take of 10 was a number proposed as a sustainable harvest level by the Interagency Task Group (1978), rather than the actual harvest, which at that time was reported to be "virtually nil" (Interagency Task Group, 1978). Fall et al. (1984) reported at least 20 Tyonek residents participated in hunts between 1981 and 1983, with at least one beluga retrieved each year (Table 1).

By the end of the 1980's, Alaska Native subsistence hunting had experienced a resurgence. North Slope oil

revenue contributed to growth throughout the state during the 1970's and 1980's, firmly establishing Anchorage as a hub of transportation and commerce in Alaska (Alaska Geographic, 1983, 1996; MOA²). In 1980, the Alaska Native community numbered roughly 9,000 in Anchorage (about 14% of all Alaska Natives in the state) (MOA³). By 1990, the community numbered a little over 14,500, with Eskimos comprising the single largest ethnic group in Anchorage (6,034) followed closely by American Indians (5,985) (MOA³). Eight years later the Native population had increased to 20,531, representing 20% of all Alaska Natives in the state (MOA³).

Ease of air travel between rural villages and Anchorage since the 1970's (Alaska Geographic, 1983, 1996) has made Cook Inlet accessible to nonlocal beluga hunters. Contemporary beluga hunters in Cook Inlet include: 1) the Dena'ina who continue to hunt belugas near the village of Tyonek; 2) Alaska Natives who have moved to Anchorage, the Matanuska Valley, or Kenai Peninsula from other areas of the state; 3) and Alaska Natives who visit Cook Inlet to hunt and then return to their communities.

Hunting methods have changed dramatically since the mid 1800's. Hunters now approach belugas in shallow water using motor-driven boats; individual whales are singled out from a group, pursued, shot with a high-powered rifle, then gaffed or harpooned and towed to shore by running a rope through the lower mandible or around the tail stock (Fall et al., 1984; Stanek, 1994; Lerczak et al., 2000). The flippers and tail, considered a delicacy by some hunters, are removed first; then the skin and blubber layer (also called muktuk) is cut away (Fig. 4). Sometimes meat is collected as well (usually the backstrap and ribs),

and bones and teeth are used for handicrafts (Stanek, 1994).

ADFG Division of Subsistence, with support from the Alaska Beluga Whale Committee (ABWC) and NMFS, initiated a study in 1987 to document subsistence use of belugas in Cook Inlet by Alaska Natives (Stanek, 1994). Several, but not all, hunting households were contacted and interviewed most years between 1987 and 1993 (Table 1). Some belugas were likely taken by hunters who were not surveyed as some of these hunters have since reported active hunting during this time period. Therefore, the harvests reported from 1987 to 1993 were undoubtedly minimal estimates (Stanek, 1994).

In 1994, a group of local hunters in Anchorage joined together to form the Cook Inlet Marine Mammal Council (CIMMC). Although the CIMMC has kept records of ongoing harvest since 1995 (Hill and DeMaster, 1998; ABWC^{4,5,6,7}) (Table 1), many Alaska Native hunters in Cook Inlet were not affiliated with CIMMC and did not give them harvest data, thus these estimates were also minimal.

The difficulty in obtaining accurate estimates for the Alaska Native harvest of beluga whales in the Cook Inlet region is due to the inability to identify affiliations of the harvesters and in turn the size of the harvest. In particular, it is difficult to account for those Natives who hunt in Cook Inlet only when visiting relatives or friends in the Anchorage area, or for the one-time experience of hunting from an urban area, or when the hunting season in their area is unproductive (Stanek, 1994). The available information is insufficient to deter-

¹ Burns, J. J., and G. A. Seaman. 1986. Investigations of belukha whales in the coastal waters of western and northern Alaska: II. Biology and ecology. U.S. Dep. Commer., NOAA, Natl. Ocean Serv., Anchorage, Alaska, Final Rep., Res. Unit 612, 129 p.

² MOA. 1987. The Municipality of Anchorage, 1982–1987: the growth years. Publication of the Municipality of Anchorage (MOA) available through the Anchorage Municipal Library (Call Number: N 352.07983 ANCHORA).

³ MOA. 2000. Anchorage indicators 2000. Rep. avail. at Municipality of Anchorage website [<http://www.ci.anchorage.ak.us/services/departments/com/research/index.html>] accessed March 2001.

⁴ ABWC. 1994. Minutes of the Alaska Beluga Whale Committee, 15–16 November, 11 p. Avail. from ABWC, General Delivery, Barrow, AK 99723.

⁵ ABWC. 1995. Minutes of the Alaska Beluga Whale Committee, 30 November–1 December, 10 p. Avail. from ABWC, General Delivery, Barrow, AK 99723.

⁶ ABWC. 1996. Minutes of the Alaska Beluga Whale Committee, 5–6 December, 13 p. Avail. from ABWC, General Delivery, Barrow, AK 99723.

⁷ ABWC. 1997. Minutes of the Alaska Beluga Whale Committee, 20–21 November, 10 p. Avail. from ABWC, General Delivery, Barrow, AK 99723.

mine the precise harvest level changes through time. However, it appears that at least 30 belugas were taken annually by subsistence hunters during the mid-to late-1990's (Table 1), a period in which the population declined (Hobbs et al., 2000).

The harvest levels discussed so far include only the number of belugas landed. They do not reflect the total kill, partially because of the potential for under reporting but also because whales were struck and lost. The struck and lost estimates (Table 1) were not accurate because: 1) surveys within the hunting community have been sporadic, 2) hunters have stated their reluctance to report "struck and lost" whales (CIMMC⁸), 3) surveys have not been conducted until after the hunting season, relying on hunters' memories of multiple events, and 4) some hunters were not known to NMFS or CIMMC and were not included in the surveys.

In the 1990's, hunters have observed increasing numbers of whale carcasses along the west shore of Cook Inlet during the summer months (Huntington, 2000). However, the ratio used to estimate struck and lost (1–2 times the recorded harvest (CIMMC⁹)) has been considered by some to be too high for the entire harvest (Table 1).

In 1995, concerns were raised about the sale of Cook Inlet beluga muktuk by Native hunters to local markets (ABWC⁵). While the Marine Mammal Protection Act does prohibit the commercial harvest of whales in U.S. waters, an exemption for Alaska Natives allows the selling of edible portions of marine mammals in Native villages and towns in Alaska (16 U.S.C. 1371 § 101 (b)(2)). One Anchorage retailer estimated selling about 3,000 lb of beluga muktuk annually, roughly equivalent to 15 adult belugas (NMFS, 2000b). By the spring of 1999, concerns about the decline of the Cook Inlet stock and its continued

⁸ CIMMC. 1996. Native harvest and use of beluga in the upper Cook Inlet from July 1 through November 15, 1995, 3 p. Avail. from Alaska Reg. Off., NMFS, 222 West 7th Ave., Anchorage, AK 99513.

⁹ CIMMC. 1997. Native harvest and use of beluga in Cook Inlet from April throughout November 1996, 5 p. Avail. from Alaska Reg. Off., NMFS, 222 West 7th Ave., Anchorage, AK 99513.



Figure 4.—Cook Inlet beluga hunters removing muktuk from a female harvested 15 July 1996. Additional information is provided in Table 2.

exploitation led to the voluntary suspension of the subsistence hunt by the Native community and to a number of legislative actions.

Legislation and Harvest Monitoring

After reviews, NMFS determined in 1999 that reporting regulations (under MMPA § 109(i)) were necessary to es-

tablish reliable beluga harvest estimates (NMFS, 1999a). While NMFS drafted these reporting regulations during the spring and summer of 1999, Alaska Sen. Ted Stevens introduced emergency Federal legislation amending the MMPA to allow hunting during the 1999 and 2000 seasons only if a cooperative agreement was in place between NMFS and Alaska Native organizations (P.L. 106–31 §

3022). The legislation was to remain in effect until 1 October 2000.

On 1 October 1999, NMFS published a final rule amending 50 C.F.R. 216.23 to require that Alaska Natives harvesting belugas in Cook Inlet collect the lower left jaw (with teeth intact) and deliver the jaw to the NMFS Anchorage Field Office within 72 h of returning from a hunt (NMFS, 1999b). A complete report from each whaling captain or vessel operator is due within 30 days of the hunt. The reporting forms include the date and time of the harvest, coloration of the whale, harvest location, method of harvest, and other comments such as stomach contents and any unusual physical or behavioral observations. Once obtained by the NMFS Anchorage Field Office, this information is made available to hunters, Alaskan Native organizations, and the public.

Without such a program, NMFS had been able to collect data on harvested animals only opportunistically (Table 2, Fig. 5). The teeth and attached flesh are used to determine the animal's age and sex. Removal of the lower left jawbone also marks and therefore distinguishes carcasses as a subsistence harvest rather than "struck and lost" or death by other causes. In the past, the cause of death of belugas found stranded in Cook Inlet had been difficult to determine (Moore et al., 2000) except where flensing was obvious (Table 2). Without accurate and timely information on the subsistence harvest, NMFS would not be able to execute its Federal mandate to conserve this stock effectively.

On 23 May 2000, NMFS entered into an interim cooperative agreement with CIMMC to comanage the Cook Inlet beluga stock. The interim agreement allowed for the harvest of 1 beluga during 2000, noting that any whale that was struck but lost also counted against this harvest limit. The harvest was allocated to the Native Village of Tyonek by the CIMMC, however, no whale was taken. The agreement expired on 31 December 2000.

On 31 May 2000, one week after entering into the cooperative agreement with CIMMC, NMFS promulgated final regulations designating the Cook Inlet beluga stock as depleted under the

Table 2.—Data collected on beluga whales harvested by subsistence hunters in Cook Inlet, Alaska, 1992–98. Teeth collected in 1997 and 1998 have not yet been aged.

Date	Sampling location	Sex	Vital statistics	
			Length	Growth layers ¹
1992 4 June	Susitna River, Big Island	?		
28 Aug.	Susitna River mouth	?		23
1993 30 June	Little Susitna River, upstream	M ²	141" (358 cm)	34
1 July	Beluga River	M	150" (381 cm)	
1994 22 July	Susitna River, Big Island	F	10' (305 cm)	
23 July	Susitna River, Big Island	M	15.5' (472 cm)	
		F	10' (305 cm)	
1995 20 Apr.	Kachemak Bay	F	240 cm	4
3 May	Susitna River	M	409 cm	22
9 May	Susitna River, Big Island	F	360 cm	19
1 June	Susitna River, Big Island	F	353 cm	22
5 June	Susitna River, East Fork	F ³	368 cm	28
19 June	Susitna River	M	422 cm	25
27 June	Beluga River	M	377 cm	19
28 June	Beluga River	M	391 cm	18
11 Aug.	Susitna River, Big Island	M	413 cm	
22 Sept.	Knik Arm, W. of Eagle River	F ⁴	96" (243.8 cm)	
13 Sept.	Anchorage, E. of Point Woronzof	M	455 cm	28
13 Oct.	Chickaloon River	M	>10' (305 cm)	
		F	<10' (305 cm)	
1996 18 June	Susitna River, Big Island	F ⁵	367 cm	23
15 July	Susitna River	F ⁶	356 cm	22
29 July	Susitna River, Big Island	F ⁷	359 cm	21
1 Aug.	Susitna River mouth	?	366 cm	17
29 Aug.	Knik Arm, Point McKenzie	F ⁸	377 cm	
7 Oct.	Chickaloon River, about 1 mile upriver	M	415 cm	
		M	429 cm	19
		M	367 cm	14
1997 27 May	Susitna River, Delta Island	M	450 cm	
26 June	Anchorage, Ship Creek	M	420 cm	
27 Aug.	Anchorage, Westchester Lagoon	M ⁹	315 cm	
1998 22 Apr.	Susitna River, Big Island	F ¹⁰	320 cm	
13 May	Susitna River, Delta Island	F ¹¹	~320 cm	
		M	450 cm	
16 May	Susitna River, Delta Island	M ¹²	433 cm	
15 June	Susitna River, Big Island	F ¹³	350 cm	
11 Aug.	Fire Island	M ¹⁴	335 cm	
1 Oct.	Chickaloon River	?		

¹ Usually two growth layers equal one year (IWC, 1980).

² Partially digested Pacific salmon, *Oncorhynchus* sp., found in the esophagus.

³ Pregnant with female fetus (142.5 cm, >100 lbs (45 kg)).

⁴ Missing flukes.

⁵ Pregnant with small fetus (2.5 cm by 0.5 cm with hind limb buds), multiparous, and lactating.

⁶ Multiparous.

⁷ Lactating and multiparous.

⁸ Apparent lactation, but lab analysis suggests this is a very young primiparous animal.

⁹ Struck and lost, recovered 4 bullets.

¹⁰ Pregnant with female fetus (126 cm, 39 kg), multiparous.

¹¹ Lactating.

¹² Extremely upturned pectoral fins, a sign of old age (Leatherwood et al., 1982).

¹³ Lactating.

¹⁴ Missing flukes.

MMPA (NMFS, 2000a). With belugas listed under the MMPA, any major Federal action also became subject to the requirements of the National Environmental Policy Act (NEPA). Although the interim cooperative agreement and harvest limit remained valid until 31 December 2000, all subsequent harvest plans now constitute a major Federal action. To meet NEPA requirements, an Environmental Impact Statement (EIS) presenting 6 alternatives for the sub-

sistence harvest was drafted September 2000 (Balsiger¹⁰). As part of the harvest regulations, NMFS also proposed prohibiting the sale of Cook Inlet beluga products (NMFS, 2000b). A public hearing before an Administrative Law Judge

¹⁰ Balsiger, J. W. 2000. Federal actions associated with management and recovery of Cook Inlet beluga whales. Draft Environmental Impact Statement, 88 p., avail. from Alaska Reg. Off., NMFS, P.O. Box 21668, Juneau, AK 99802.



Figure 5.—National Marine Fisheries Service scientist (B. Mahoney), assisted by Cook Inlet beluga hunters, performing a necropsy on a female harvested 22 April 1998. Additional information is provided in Table 2.

was held on 5 December 2000 to determine final regulations for setting harvest quotas (MMPA § 101(b)).

On 15 December 2000, Sen. Stevens introduced legislation removing the 1 October 2000 deadline from Section 3022 in P.L. 106–31, this passed into law on 21 December 2000 (P.L. 106–553). Thus, the taking of a Cook Inlet beluga under the exemption provided in section 101(b) of the MMPA continues to be a violation of the Act unless approved within a cooperative agreement between

NMFS and affected Alaska Native organizations (P.L. 106–553).

Concern over the high level of human-caused mortality on this stock of whales has prompted environmental organizations to petition NMFS to list these belugas as endangered under the Endangered Species Act (NMFS, 1999c). However, harvest alone might not have been the only factor behind the decline of this stock. There is evidence of changes in distribution throughout the estuary, as animals are no longer found in areas

they once commonly occupied (Rugh et al., 2000; Huntington, 2000), and a large number of habitat questions have yet to be answered (Moore et al., 2000). Regulating the harvest and obtaining accurate counts of the number of animals taken each hunting season will be an important first step towards conserving this unique population of whales.

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