

Traditional Knowledge of the Ecology of Belugas, *Delphinapterus leucas*, in Cook Inlet, Alaska

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Introduction

Belugas, *Delphinapterus leucas*, are found throughout the Arctic and are hunted by indigenous peoples in nearly all portions of their range (Kleinenberg et al., 1964). An isolated population is found in Cook Inlet, Alaska (O’Corry-Crowe et al., 1997). Surveys conducted by NOAA’s National Marine Fisheries Service (NMFS) indicate a declining trend in the beluga population in Cook Inlet (Hobbs et al., 2000a). There is currently considerable concern about over-

Henry P. Huntington (hph@alaska.net) is with Huntington Consulting, 23834 The Clearing Drive, Eagle River, AK 99577. This paper is based on extensive interviews with the hunters of Cook Inlet beluga whales.

ABSTRACT—The population of belugas, *Delphinapterus leucas*, in Cook Inlet, Alaska, is geographically isolated and appears to be declining. Conservation efforts require appropriate information about population levels and trends, feeding and behavior, reproduction, and natural and anthropogenic impacts. This study documents traditional ecological knowledge of the Alaska Native hunters of belugas in Cook Inlet to add information from this critical source. Traditional knowledge about belugas has been documented elsewhere by the author, and the same methods were used in Cook Inlet to systematically gather information concerning knowledge of the natural history of this beluga population and its habitat. The hunters’ knowledge is largely consistent with what is known from previous research, and it extends the published descriptions of the ecology of beluga whales in Cook Inlet. Making this information available and involving the hunters to a greater extent in research and management are important contributions to the conservation of Cook Inlet belugas.

exploitation of the stock, other possible causes of the decline, the reliability of the population estimates and the trend analysis, impacts to subsistence hunters, and management options for the region (Hill and DeMaster, 1998; CIMMC and RurAL¹).

This study systematically documents the knowledge of hunters of Cook Inlet belugas and adds to the information available on the population. Similar studies have been done elsewhere in Alaska (Huntington et al., 1999), in Russia (Mymrin et al., 1999), in Canada (Kilabuck, 1998), and in Greenland (Thomsen, 1993). The participation of beluga hunters, including the appropriate use of their traditional knowledge, has been found useful in management in Alaska and Canada (Adams et al., 1993; Richard and Pike, 1993).

In the case of Cook Inlet, relatively little has been published concerning beluga ecology (Hazard, 1988; Moore et al.²). In response to concerns about the population trend, the NMFS has conducted aerial surveys and other investigations (Rugh et al., 2000; Hobbs et al., 2000b; Moore et al., 2000). This study adds ecological detail as well as giving insight into the perspective of the hunters of Cook Inlet belugas re-

garding the ecology of the animals they hunt. The information gathered from hunters is presented in the sections on “Distribution, Abundance, and Migration” and “Natural History.” The “Discussion” section reviews the hunters’ information in the context of published literature concerning belugas in Cook Inlet and elsewhere.

This study covers the area of upper Cook Inlet, from the Kenai River northward (Fig. 1). This is the area in which the participants hunt. Cook Inlet belugas are seen in the lower inlet at certain times of the year, but little information about that region was gathered in this study. Within upper Cook Inlet, little hunting takes place in Turnagain Arm due to the strength of tidal currents and winds, and so most of the information is centered on the region from the Kenai River across the inlet to Trading Bay and north to Knik Arm and Chickaloon Bay (Fig. 1).

Methods

I used the semi-directive interview to gather information from the participants (Nakashima and Murray, 1988; Nakashima, 1990) (a full discussion of this method is given in Huntington, 1998). It uses open-ended questions to start a conversation in which the topics selected by the researcher are covered, but the order of the topics and the discussion of the relationships among them are chosen by the participant. In addition, the open-ended format seeks a more comprehensive approach to the subject by allowing the participant to address factors and interactions that the researcher might not have anticipated in the list of topics. The initial interviews

¹ CIMMC and RurAL (Cook Inlet Marine Mammal Council and Rural Alaska Community Action Program). 1999. Summary report on the Symposium Forum on the Conservation and Sustainable Use of Cook Inlet Beluga, Anchorage, Alaska, March 10–11, 1999. On file at Cook Inlet Marine Mammal Council, P.O. Box 102456, Anchorage, AK 99510.

² Moore, S. E., D. J. Rugh, K. E. W. Sheldon, B. A. Mahoney, and R. C. Hobbs. In prep. Synthesis of available information on the Cook Inlet stock of beluga whales. NMFS Alaska Fish. Sci. Cent. Proc. Rep.

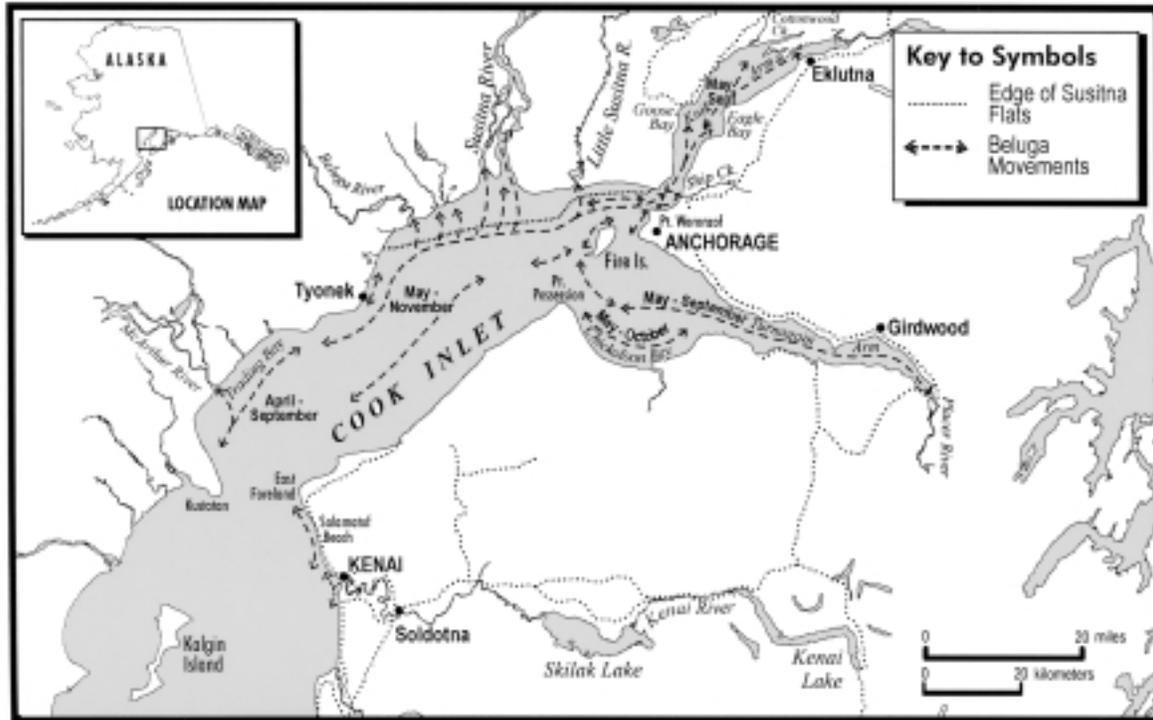


Figure 1.—Beluga movements in upper Cook Inlet, Alaska.

were held between November 1998 and February 1999.

Once the initial interviews were completed, I prepared a draft report with maps and circulated this to the participants and to others knowledgeable about belugas in Cook Inlet for review and comment. I then contacted each of the participants to go over the draft in as much detail as was necessary to ensure that the information described was accurate, complete, and not likely to harm the interests of beluga hunters. This process is in accordance with Federally established ethical principles for research (Interagency Arctic Research Policy Committee, 1992). The review stage took place in February 1999, and a final report was presented at a meeting concerning Cook Inlet belugas in Anchorage, Alaska, 10–11 March 1999.¹

The participants in the project were Percy Blatchford, Harold and Rachel Dimmick, Clyde Eben, Carl Jack, Fred Mamaloff, Roswell Schaeffer, Lenwood Saccheus, and two hunters who wished to remain anonymous. Participants were identified in cooperation with the Cook Inlet Marine Mammal Council, the Alas-

ka Beluga Whale Committee, and the NMFS, and they were selected on the basis of their experience in the region and their willingness to take part in the study.

Time constraints prevented the inclusion of more hunters, but comments I have received from several other hunters on the final report indicate that little additional information is likely to have been gathered in subsequent interviews. Thus, while further studies may be useful, I am reasonably confident that the information contained in this paper is an accurate reflection of the knowledge of Cook Inlet beluga whale hunters. None of the hunters who participated in the study or reviewed the final report indicated disagreement with the contents of that report, which is the basis for the results given in the next section.

Traditional Knowledge

Distribution, Abundance, and Migration

Between April and November, beluga whales may be found in the upper part of Cook Inlet, north of the Kenai River

and Kustatan (Fig. 1). Small numbers of belugas may appear as early as mid April. More typically, they arrive in late April, following the run of lake whitefish, *Coregonus clupeaformis*. While in the upper inlet, the belugas' movements are associated with fish and tide. They follow the fish into the area and feed on successive runs (as described in detail below). Their daily movements follow the ebb and flow of the tide and can be affected by severe weather.

In the Kenai River area, belugas are present from April to November. In the 1930's, belugas would come up the river in groups of up to 50 animals, including calves, chasing fish. Belugas still come up the Kenai River in this way, though the numbers of animals seems to have decreased over the decades, perhaps in response to the increase in human activity in the area. Belugas have been seen off Salamatof Beach, north of Kenai, in March. The animals in this group were all white³, and were feeding on Pacific

³ Neonate belugas are dark gray. As they age, their skin lightens progressively, becoming white at maturity, or 5–8 years.

herring, *Clupea pallasii*, or looking for fish, scouting for the rest of the belugas. There were many belugas in the group, but not as many as are seen in May.

In Trading Bay, up until 10–15 years ago, there were great numbers of belugas in June and July (a quantitative estimate of the numbers was not given by the hunters). They would often be found going up the McArthur River in groups large enough that boaters had to be careful not to hit them. Today, only a few are seen in the area. By Tyonek and in the flats by Beluga River, belugas arrive in late April, following the whitefish and then the eulachon, *Thaleichthys pacificus* (also known as hooligan or candlefish), and Pacific salmon, *Oncorhynchus* spp. Belugas go up Beluga River, which is shallow with a rocky bottom, and there are reports of them going as far as Beluga Lake over 30 mi (50 km) upstream. Fewer belugas are seen now in the Beluga River area. Formerly, only white belugas would be seen here, but recently gray ones are seen occasionally, too. Belugas will also go up the smaller creeks and rivers between Beluga River and the Susitna River, feeding on hooligan and king or chinook salmon, *O. tshawytscha*, during high tide when the water in the channels is deep. Belugas are also seen in the area near Tyonek in November, feeding on tomcod, *Microgadus proximus*.

Along the Susitna Flats, belugas are present beginning in late April or early May, and stay throughout the summer. They are typically found in large groups, perhaps 100–200 animals, mixed white and gray. The majority of belugas currently in the upper inlet are in this area, but at times when there are no fish here, such as between fish runs or in years of poor fish returns, the belugas will be elsewhere, often in Chickaloon Bay. They have been seen in the area until November, even when the sea ice is forming. Once in this area, they follow the tide in and out across the flats and into the Susitna River.

Once the tide begins to ebb, the belugas head right for deeper water, rarely getting stranded by accident. In the east channel, they will go upstream as far as the powerline about 5 mi (8 km) from the mouth and beyond on a spring tide,

on occasion as far as 30–40 mi (50–65 km) upstream, beyond the influence of the tide. They will also go up the west channel, but not as far as the powerline. The channels in this area are constantly changing, and the ones used by belugas will depend on the configuration in a given year.

If there are many belugas in the area, not all will go upriver. Some will remain at the mouth, feeding there. At low tide, the belugas gather at the edge of the flats in the deeper water or swim farther down the inlet. Along the edge of the flats, they feed on the salmon that are waiting to go upstream with the tide. Belugas will block the entrances to the channels through the flats in order to catch the salmon. Groups of gray belugas, with no white ones, have been seen off the mouth of the Susitna River, in an area where belugas have also been seen stranded in groups of up to 200 animals.

The Little Susitna River has a distinct channel, and some belugas may enter it even at low tide. Solitary large male belugas are sometimes seen along the edge of the flats between the Little Susitna River and Knik Arm and to the southwest of Point Woronzof, moving back and forth with the tide.

In Knik Arm, belugas arrive in early May and remain all summer, moving in and out with the tide. They tend to come in greater numbers later in the summer, moving from the Susitna Flats area over to Knik Arm. They gather in Eagle Bay and elsewhere on the east side of the arm, and sometimes in Goose Bay on the west side at low tide. Few belugas go as far as the upper end of the arm, though some females and calves use the area. Belugas are also seen by the mouth of Ship Creek when there are fish there and on the west side of Fire Island, but not on the east side of Fire Island.

In Chickaloon Bay, belugas are present all summer, but they are most plentiful in this area in the fall when silver or coho salmon, *O. kisutch*, runs attract them to the area. There are few other fish runs in Chickaloon Bay to attract large numbers of belugas for extended periods of time. They will swim up the Chickaloon River to the place a few kilometers upstream where the river

narrows sharply. Sometimes during the summer, belugas are found in Chickaloon Bay rather than in the Susitna Flats area, probably due to fish distribution. Chickaloon Bay is very shallow, so the belugas move in and out with the tide.

Belugas will travel to the upper end of Turnagain Arm, after hooligan in May and silver salmon in fall. They will travel past the Seward Highway bridge over the Placer River. Hunters do not go into Turnagain Arm due to its strong winds and currents.

During storms, belugas will go south of Tyonek to await better weather. The inlet can get very rough even in 15–25 mi/h (25–40 km/h) winds. Groups of mixed white and gray belugas have been seen gathered at Fire Island Shoal at low tide in rough water.

In addition to their detailed knowledge of the upper inlet, some hunters had seen belugas in Kachemak Bay and other parts of the lower inlet. In late March, small groups of belugas may be seen in the Fox River flats area at the head of the Bay. Once, a young beluga < 2.5 m long (< 1 yr old) was seen by itself in the mouth of the Fox River. Belugas are also seen in larger groups along the northwest shore of Muddy Bay. A few belugas may be present in Kachemak Bay all summer. Belugas are also found at the mouths of rivers in the lower inlet, along both shores, wherever there are fish to eat. Some may stay in the deeper water of the lower inlet throughout the year.

Where belugas go during winter is unknown, and is a topic of great interest to the hunters. Whether they migrate to the lower inlet, into the Gulf of Alaska, or beyond is a significant question. Belugas are seen occasionally as far away as Yakutat in the eastern Gulf of Alaska and may also be seen in Kodiak. It is not clear whether these animals are part of the population that summers in Cook Inlet, whether these areas are part of the regular migratory route, or whether the animals have strayed far from their usual waters.

The distribution and abundance of belugas in upper Cook Inlet have changed in the past several years. For example, in 1998, the fish runs were early and

small, and belugas were seen in the Anchorage area in April. The belugas were not found as they usually are by the mouth of the Susitna River, but were by the mouth of the Little Susitna and in Knik Arm. This may be a result of changes in fish numbers and patterns, or it may be caused by hunting pressure in the Susitna River area.

Some of these changes may be a continuation of long-term changes that began as early as 1950, perhaps in response to greater levels of human activity in the area. But the majority of the changes are more recent and due in part to substantial changes in the fish runs that draw belugas to upper Cook Inlet. In addition to changes in the distribution of belugas, some hunters note that fewer belugas have appeared in the upper inlet in recent years. Over-hunting may be a factor, and some hunters note an increase in the number of struck-and-lost belugas washing up on shore in summer, particularly on the west side of the inlet. The specific details of hunting, other causes of mortality, and changes in the timing and size of fish runs require more attention to come to a common understanding of the various factors affecting belugas in upper Cook Inlet.

Natural History

In the Kenai River, tomcod arrive in February and are present until the end of summer. Herring come to the area in late April and early May. King salmon usually appear in May, but have been known to arrive in late April. They are rarely present after late June. Hooligan arrive at roughly the same time as herring and king salmon. Towards the end of the king salmon run, the first run of red or sockeye salmon, *O. nerka*, begins in late May and early June. These red salmon are locally known as "blue-blacks," and are followed by a second run of darker red salmon, which the hunters call "sockeye," in the first half of July. After the sockeye runs, humpback or pink salmon, *O. gorbuscha*, and then silver salmon enter the river. The main run of silver salmon is in later July and early August, but they are present in the river through late November, attracting bald eagles, *Haliaeetus leuco-*

cephalus, to the river in late fall. Few dog or chum salmon, *O. keta*, are found in the Kenai River. They arrive from the west side of the inlet in mid July when they are seen. In mid winter, there are "sucker fish," *Catostomus* spp., in the river. The numbers of all fish in the river have been declining, however, as they have throughout the inlet. The timing and structure of the various runs may have changed, too, over the past several decades.

Belugas come up the Kenai River with the salmon, especially the red salmon. They enter with the flooding tide and stay as long as there are fish. They may be in the area from April to October. The whales go as far up the river as Eagle Rock, about 5 mi (8 km) from the mouth. Belugas will eat any fish they can, including starry flounder, *Platichthys stellatus*. Once a beluga was found thrashing around in shallow water with a flounder stuck in its throat. In the 1930's and 1940's, when fish traps were used near the mouth of the Kenai River, beluga would occasionally be caught in them. (When this happened, the cannery workers would give the beluga to local Native families to use.) During the fish runs, large numbers of belugas would be seen near the mouth of the river, their blows stretching out into the inlet.

The waters of the creeks and sloughs along the lower part of the Kenai River are now browner than they used to be. The discoloration is the result of more beaver, *Castor canadensis*, in the area, which submerge more alder limbs and leaves in the water for winter food. Whether this change has any impact on the fish or the belugas is not clear.

Belugas arrive in the upper inlet with the first runs of fish. First to appear are whitefish in late April or early May, followed by hooligan in great numbers. Shortly after the hooligan arrive, king salmon start going up rivers to spawn, in May. After the king salmon come red salmon, pink salmon, and dog salmon. Silver salmon remain in the area until November, and there are reports of silver salmon in rivers in January. Belugas also feed on a variety of other fish in the inlet and in the rivers, including "lingcod" or burbot, *Lota lota*; steelhead trout, *On-*

corhynchus mykiss; whitefish; northern pike, *Esox lucius*; and Arctic grayling, *Thymallus arcticus*.

Belugas feed intensively, especially on hooligan and salmon. When feeding on hooligan, the belugas are often in a frenzy and will chase the fish up dead-end channels where they are trapped and the belugas can gorge on them. Belugas have been observed chasing salmon, as they zero in on one fish from up to 200 yd (183 m) away.

Belugas swallow fish whole, and 4 ft (1.3 m) long king salmon have been found in their stomachs. On one occasion, 19 king salmon were found in the stomach of an 18 ft (5.5 m) beluga. Another hunter found 9 king salmon in the stomach of a beluga.

Summer feeding is very important to Cook Inlet belugas. When they arrive in the upper inlet in spring, the belugas are thin and sink easily. Their skin is thin, and their blubber is only about 2–3 in (5–8) cm thick. By fall, belugas may have blubber up to 1 ft (30 cm) thick.

Predation by killer whales, *Orcinus orca*, appears to be uncommon. Killer whales are rarely seen near belugas, though they will eat them on occasion when hungry. Belugas avoid killer whales whenever possible. Belugas will stay in Knik Arm even at low tide if killer whales are in the area around Fire Island. Killer whales have been seen chasing belugas to the southwest of Point Possession. When they are in the upper inlet, killer whales are usually found along the tide rip that extends from the north of Fire Island across towards Tyonek then south through the channel between Kustatan and the East Foreland. On rare occasions, killer whales have been seen at the mouth of the Susitna River. Killer whales are occasionally seen in Turnagain Arm, as far up as Girdwood. Killer whales are also seen in the lower inlet, outside Kachemak Bay.

Belugas calve from April through August. Their calving areas include the northern side of Kachemak Bay in April and May, the areas off the mouths of the Beluga and Susitna Rivers in May, and Chickaloon Bay and Turnagain Arm during the summer (Fig. 2). Belugas with near-term fetuses have been caught in the Susitna Flats in May, and dark-

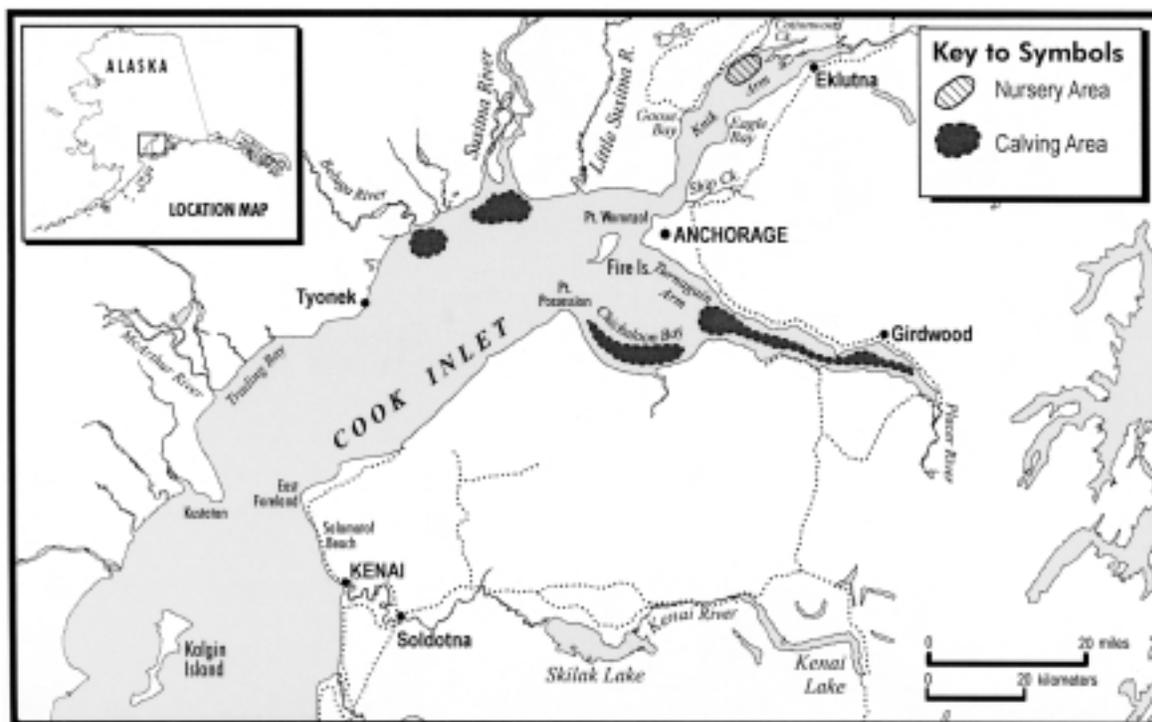


Figure 2.—Beluga calving and nursery areas in upper Cook Inlet, Alaska.

skinned newborn belugas are seen in the area, usually in May though also at other times during the summer. Belugas are sometimes seen with their heads straight up out of the water, and these are thought to be cows giving birth. Cows with newborn calves are sometimes seen in deep water in the upper part of Knik Arm, near Cottonwood Creek, using the sheltered area as a nursery.

Beluga cows and calves are very close. A calf will accompany its mother at all times, and can be seen riding in the eddy on the back of the mother, being drawn along with little effort. Usually, a cow gives birth to a single calf, but twins are seen occasionally.

Today, there are few white (fully mature) adult belugas left in the inlet. The majority of whales are gray (young), and as a result the belugas are becoming sexually mature while still gray, so that gray cows with gray calves are sometimes seen. Hunters regarded this as abnormal, a recent response to changes in the population structure.

Cook Inlet belugas are distinct from other stocks, the largest being larger than belugas found elsewhere, due pri-

marily to better food in the inlet. There are four types of belugas in the inlet, distinguished by size and other characteristics. One type is particularly large, up to 20 ft (6 m) long. There is also a small variety, of which the adults are only 7–8 ft (2.1–2.5) m long. Their age is shown by the wear on their teeth, and they are fast swimmers. The two other types are of intermediate sizes.

The large belugas are sometimes seen at the edge of the deep water off the Susitna Flats in May. They do not enter the channels like the smaller belugas. The large ones have a black stripe at the edge of their flukes that is visible from a distance. Other belugas have a thin stripe, but it is only visible once the beluga has been caught.

Belugas tend to associate in family groups. Groups of mixed white and gray belugas are families traveling together.

Belugas can surface with only their blowhole above the surface, so that they cannot be seen from above the water. They often do this when they are being hunted.

Belugas may lie on the bottom for an extended period at certain times. They

can often be found doing this in 2.5 m of water, off the edge of the Susitna Flats at low tide. They will wait for boats to go by, but when disturbed they will surface together and make the water boil with all their activity.

In the Kenai River area, the increase in human activity may have affected beluga distribution and abundance in the river and the nearby waters of the inlet. This activity includes development on the shore, increases in fishing and recreational boating, and airplane takeoffs and landings. The decline in fish in the area is another possible cause of these changes. When feeding in the river, belugas are not afraid of people. In the 1930's, belugas coming up the river after fish would race with boats powered with a 9-horsepower outboard. The belugas were faster. They never attempted to flip or otherwise harm a boat, though on occasion they bumped into a fishing dory in the river.

Belugas have become warier of hunters, but can still be caught when they are busy feeding in the shallows and ignore the hunters' approach. In the Susitna River area, belugas have been seen fol-

lowing boats, even when the outboard is running. Female belugas in the Susitna River have gotten used to one hunter who does not hunt females, and so they do not flee at his approach, though they will flee from other boats. When hunted, belugas will dive and swim away. At other times, they will approach people who are fishing or just sitting in their boats. How they can tell when people are going to hunt them is not known.

When one beluga is being chased, it may use a second whale as a decoy, swimming past the second whale to make it more difficult to follow. On one occasion, hunters began chasing a white beluga, but soon noticed they were chasing a gray beluga, because the white one had successfully used it as a decoy. This behavior has also been noticed as an attempt to divert attention from a cow and calf pair. Before the hunters realized they were following a cow and calf and turned away, another beluga attempted to draw the hunters away by swimming near the cow and calf and then going in another direction while breathing so it could be seen.

Related Observations

The number of fish in Cook Inlet has declined over the past few decades, with sharp declines the past few years. Changes in the abundance of fish and other aspects of the food chain is a major factor in changes of beluga distribution and abundance in the inlet.

Fish in the upper inlet in the summer of 1998 had a number of deformities, including sores on their lips, face, and head, as well as crooked spines.

More and more garbage is washing up on beaches around the inlet. There is also more foam along the water's edge, and along the flats there is a bad smell that has gotten worse in recent years. There is concern about the effluent from oil rigs in Cook Inlet, as well as pollution from other sources in the area, which may be affecting the health of the fish and other inhabitants of the inlet.

Discussion

The information gathered from hunters is largely consistent with published reports (Calkins, 1983; Fall et al., 1984; Hobbs et al., 2000a, b; Rugh et al., 2000;

Moore et al.²). Fall et al. (1984) derived at least some of their information from interviews with hunters in the village of Tyonek, and so the overlap is not surprising. While the geographic scope of the results above is more limited than the scope of aerial surveys and other research covering the entire inlet, the description of the ecology of belugas for the region of the upper inlet familiar to hunters adds considerable detail to certain aspects of natural history.

The stated arrival of belugas in the upper inlet in mid April extends the observations of Fall et al. (1984) and Hazard (1988), who reported that belugas arrive in the area in May. It is possible that this represents a change in the past decade, as the participants noted that the timing of fish runs has changed over time. Movements of belugas in the upper inlet as reported by hunters appear largely consistent with aerial observations, although the reliability of patterns such as the gradual shift from the Susitna Flats into Knik Arm from May through the summer may not be reflected in aerial survey data.

Beluga use of estuaries and rivers elsewhere is well documented (Smith et al., 1990), and some researchers have attributed this behavior to feeding (Sergeant, 1973; Watts and Draper, 1988; Huntington et al., 1999). In Cook Inlet, Calkins (1983), Hazard (1988), and Moore et al. (2000) report that belugas frequent estuaries and rivers in Cook Inlet, where prey availability is likely to be high. Descriptions of the extent of beluga use of rivers gathered in this study go further than those available previously.

There are also few descriptions of beluga feeding behavior in Cook Inlet in the published literature. Calkins (1983) observed that when belugas are feeding they are aligned randomly relative to one another. Huntington et al. (1999) and Mymrin et al. (1999) reported similar feeding behavior in the Bering and Chukchi Seas. Cooperation among belugas to block the channel through the Susitna Flats and to drive fish into dead-end sloughs have not been reported for Cook Inlet, though Mymrin et al. (1999) reported belugas driving prey to shore in Chukotka, Russia.

Beluga prey have been reported in some detail in other regions (Kleinenberg et al., 1964; Seaman et al., 1982). Reports for Cook Inlet have noted the fish available in various areas of the inlet during different seasons (Calkins, 1983; Fall et al., 1984; Hazard, 1988), but few direct observations of feeding and stomach contents have been reported. The results above attribute greater significance to summer feeding for Cook Inlet belugas than has been noted elsewhere.

Reports of calving in Cook Inlet in April contradict Calkins (1983) who observed no calves during aerial surveys in mid June. A calving period from April to August is consistent with that reported for other stocks of belugas (Burns and Seaman, 1986; Hazard, 1988). Distribution of calving over time and visibility of calves in turbid water are factors that may help explain the apparent discrepancies.

Beluga response to noise has been documented extensively in other areas. Stewart et al. (1983) and Richardson et al. (1995) reported varying degrees of habituation and avoidance, apparently correlated to the absence or presence of hunting and noise associated with hunting. Huntington et al. (1999) and Mymrin et al. (1999) reported similar findings. Thus, the responses in Cook Inlet, ranging from full avoidance to apparently full habituation are consistent with reports from other areas. Attempts to distract or misdirect a pursuing hunter, as reported above, also appear not to have been reported previously.

Sergeant and Brodie (1969) reported that belugas most often attain the largest average sizes for a stock at the southern end of their range, and they attributed differences in size to marine productivity. Several of the participants in this study have hunted belugas elsewhere in Alaska, and they were able to confirm that belugas in Cook Inlet attain the largest size of belugas in the state. Reports of other morphotypes, including very small belugas, suggest a need for further investigation of the morphometrics and growth rates of belugas in Cook Inlet to determine if in fact there are distinct subpopulations with distinctive characteristics.

In addition to adding considerable detail to available information about belugas in Cook Inlet, the participants in this study were able to provide information from the 1930's to the present, a far greater temporal span than exists in the published literature. Changes over time in beluga populations and distribution, in the size and timing of fish runs, and other significant factors affecting belugas are important to document as conservation measures are developed for the region. While confirmation of data on population size and trends is an urgent research priority, attention must also be given to the ecology of Cook Inlet and the potential effects of other factors on the health of the beluga stock. The involvement of hunters and their knowledge is an important step in understanding the belugas of Cook Inlet and in conserving them for future generations.

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