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Twentieth-Century Changes in Beluga Whale Hunting and Butchering by the Kaŋiġmiut of Buckland, Alaska

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ABSTRACT. Since the late 1920s, the Kaŋiġmiut of Kotzebue Sound have increasingly relied upon modern technology to hunt beluga whales (*Delphinapterus leucas*). This reliance has introduced changes in hunting practices and has coincided with changes in social structure, beliefs about man's relationship to marine mammals, and the symbolic value of the beluga. The beluga hunt continues to be characterized by the Kaŋiġmiut as an annual event during which hunters participate in a structured set of practices requiring the cooperation of nonhunting community members. Yet, in recent years, the beluga hunt has also incorporated a newer set of practices favoring non-cooperative actions and individualized decision making. These changes in hunting practices have coincided with a drastic reduction in the number of beluga in Eschscholtz Bay. Exploration of the historical development of beluga hunting and butchering practices by the Kaŋiġmiut suggests that while the adoption of new technology has contributed to changes in community structure, it has also led to a transformation of beliefs about the significance of hunting practices for animal behavior.

Key words: Alaska, beluga whales, *Delphinapterus leucas*, butchering, ethnology, Inuit, Iñupiat, Kotzebue Sound, marine mammals

RÉSUMÉ. Depuis la fin des années 1920, les Kaŋiġmiut de Kotzebue Sound se sont de plus en plus appuyés sur la technologie moderne pour la chasse au bélouga (*Delphinapterus leucas*). Cette dépendance a entraîné des changements dans les pratiques de chasse et a coïncidé avec des modifications dans la structure sociale, les croyances dans le rapport être humain/mammifères marins, ainsi que dans la valeur symbolique du bélouga. La chasse au bélouga continue d'être caractérisée par les Kaŋiġmiut comme un événement annuel au cours duquel les chasseurs participent à un ensemble de pratiques structuré qui exige la coopération des membres de la communauté qui ne chassent pas. Toutefois, au cours des dernières années, la chasse au bélouga a également intégré un nouvel ensemble de pratiques favorisant l'action non coopérative et la prise individuelle de décision. Ces changements dans les pratiques de chasse ont coïncidé avec une baisse radicale du nombre de bélougas dans la baie d'Eschscholtz. Une étude de l'évolution historique de la chasse au bélouga et des pratiques de dépeçage par les Kaŋiġmiut suggère que, si l'adoption d'une nouvelle technologie a contribué au changement dans la structure de la communauté, elle a aussi donné lieu à une transformation des croyances sur la signification des pratiques de chasse pour le comportement animal.

Mots clés: Alaska, bélougas, *Delphinapterus leucas*, dépeçage, ethnologie, Inuit, Iñupiat, Kotzebue Sound, mammifères marins

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INTRODUCTION

Sea mammals supply a major part of the subsistence take for the Inuit and Iñupiat throughout coastal Canada and Alaska. The Kaŋiġmiut, a group of Kotzebue Sound Iñupiat, have historically been identified with beluga hunting in Eschscholtz Bay (Lucier, 1954; Feldman, 1986). Explorers since 1816 have mentioned large encampments with associated piles of beluga bones on the bay, indicating that the Kaŋiġmiut have been conducting organized beluga hunts for some time (Beechey, 1831; Seemann, 1853; Ray, 1983).

Archaeological and ethnological studies typically focus on the historic and prehistoric use of seal, walrus, and bowhead whales (Lantis, 1938; Spencer, 1959; Nelson, 1969; Bockstoce, 1979; Worl, 1980), but tend to de-emphasize beluga use. However, mass kill sites in Alaska and Canada, where large concentrations of beluga provided a substantial portion of subsistence resources, are historically documented (Seemann, 1853; Hooper, 1880; Stefansson, 1914; Thornton, 1931; Whittaker, 1937; Nuligak, 1966). Beluga whales continue to be hunted in offshore leads during the bowhead hunt (Nelson, 1969), or in cooperative mass kills by Inuit and Iñupiat summering on the shores of shallow bays and estuaries (Fraker, 1980; Kemper, 1980; Feldman, 1986; McGhee, 1988; Frost and Lowry, 1990). They are also netted in deep waters. Research related to beluga-human interactions has focused on the economic importance of the beluga hunt (Moore, 1980; Feldman, 1986), 19th-century beluga hunting (Burch, 1994a; Lucier and VanStone, 1995), and, to some extent, human disturbance of beluga movements (Caron and

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Smith, 1990; Frost and Lowry, 1990). In Alaska, relatively little archaeological work has been undertaken on the prehistoric use of beluga and the time depth of beluga hunting is unknown, since reliable archaeological data are lacking for northwestern Alaska. A paucity of beluga bones from most Alaskan prehistoric sites seems to indicate that belugas were a relatively unimportant subsistence resource, although one could conclude that sites have been overlooked (Savelle, 1994) or that little faunal evidence remains because of patterns of transport, processing, and disposal (Wall, 1983; Lucier, pers. comm. 1995).

Beluga hunting methods and technology have changed during the 20th century at Eschscholtz Bay. The transformation in the patterns of use of Eschscholtz Bay, the structure of and community involvement in the beluga hunt, and the processing of beluga and the altered behavior of beluga in the bay have come about with the advent of motorboats and changes in worldview. Butchering practices and distribution of beluga are also very different today; they contrast with the traditional butchering practices of the Kaŋiġmiut, in which each part of the animal had a use.

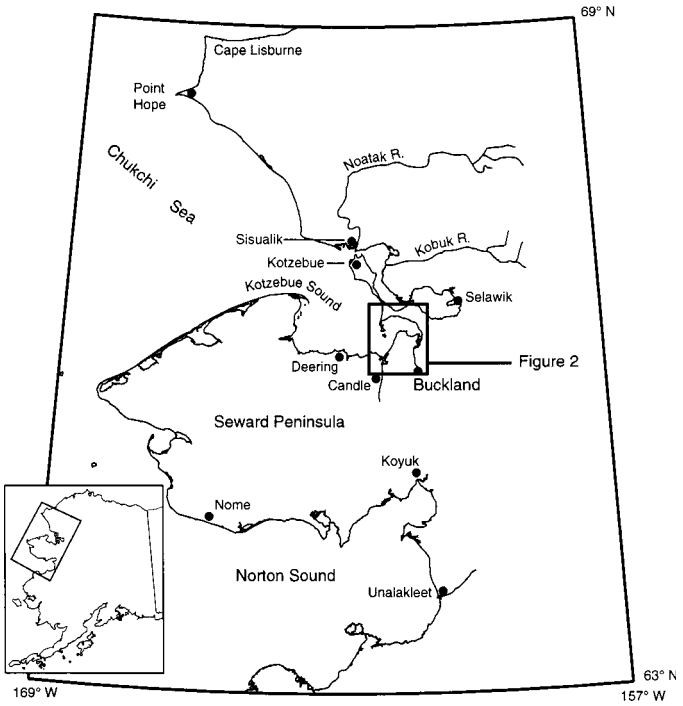

FIG. 1. Map of Northwest Alaska.

FIELDWORK AND METHODS

I conducted fieldwork in the communities of Buckland and Kotzebue (Fig. 1) and at Elephant Point (Siŋik) (Fig. 2) over the course of three visits from 1992 to 1995. During my first visit in June 1992, I gained community support for a research project on beluga whale hunting and knowledge. I interviewed a cross section of community members about beluga and camped at Elephant Point, where I observed and participated in activities and discussions about the hunt. That summer I was also able to participate in a small beluga hunt. The next year, I spent four months—from March to July—primarily in and around Buckland, gathering data on environmental knowledge of beluga and Eschscholtz Bay and on hunting and butchering practices. That year few beluga entered inner Eschscholtz Bay. Again, I camped at Elephant Point alongside hunting families, who spent long hours looking for the white spouts and backs of whales, but were unsuccessful in their hunt. I completed the research with a short trip in January 1995 to clarify some questions I had on butchering and place names. To respect the wishes of those people who asked that I not reveal their names, some quotes in the text are not referenced—these are from my field notes and state only where the interviewee was from.

THE KAŋIĠMIUT

The Kaŋiġmiut are Iñupiat who occupy the northeast corner of Seward Peninsula and the shores of Eschscholtz Bay. Their traditional lands include the Buckland (Kaŋik), Kauk, and Kiwalik Rivers and the perimeter of Eschscholtz Bay out to Choris Peninsula and Motherwood Point (Fig. 2). Despite drastic changes in social and political organization, spiritual beliefs, and technology over the last 150 years, the Kaŋiġmiut retain a strong identity through a connection to their land and resources—especially to beluga whales.

The boreal forest of interior Alaska and the arctic tundra of the Seward Peninsula dominate Kaŋiġmiut lands. Spruce and hardwood forest, tussock and alpine tundra, and low-lying areas dotted with small lakes and marshes provide habitat for caribou, moose, furbearers and avian species. Eschscholtz Bay supplies an array of harvestable marine species including beluga, seal, and a variety of fish (Burch, 1994a).

The earliest accounts of the Kaŋiġmiut are from August 1816, when Otto Von Kotzebue sailed into Eschscholtz Bay. He was looking for a passage to the Arctic Ocean, but found instead an enclosed bay and evidence of abandoned summer campsites (Ray, 1983). Other 19th-century explorers met, traded with, and even battled groups of Iñupiat camped on the shores of Eschscholtz Bay; some of these may have been Kaŋiġmiut (Beechey, 1831; Kellett, 1850; Moore, 1851; Seemann, 1853; Anonymous, 1860; Hooper, 1880; Miertsching, 1967; Peard, 1973). However, explorers had little impact on the lives of the Kaŋiġmiut until the latter half of the 19th century, when firearms and other innovations began to appear more frequently in the material culture of the Kotzebue Sound Iñupiat (Ray, 1983; Burch, 1994a).

Population decline in the late 1800s was followed by the arrival of missionaries in 1897 in the Kotzebue area (Petroff, 1884; Bertholf, 1899; Nelson, 1899; Zagoskin, 1967; Ray, 1975, 1983; Jacobsen, 1977; Burch, 1994a; Ganley, 1995). In the span of a decade the Friends Church transformed the spiritual lives of the Kaŋiġmiut (Burch, 1994c; Lucier and VanStone, 1995). Commercialism—spurred first by the establishment of the gold mining town of Candle at the turn of

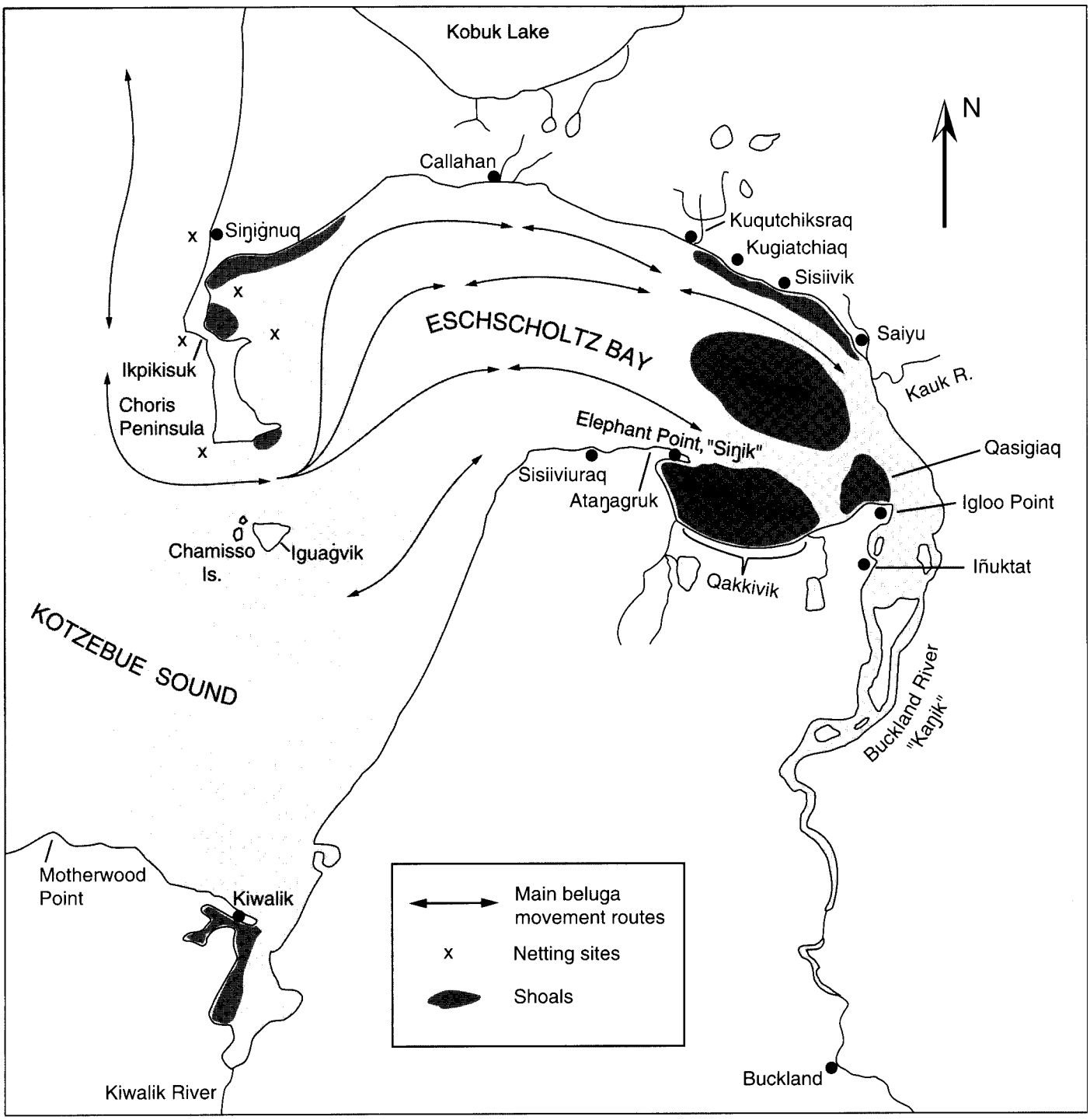

FIG. 2. Map of Eschscholtz Bay showing beluga movements, hunting camps, and netting sites.

the century and then by the reindeer herding industry in the 1920s and 1930s—accelerated the move to modern settlements and wage employment, taking people away from coastal activities of beluga and seal hunting (Ward, 1985; Lucier and VanStone, 1990). School, jobs, and the church restructured Kaŋiġmiut time and movements. The increasing availability of commercial goods and foodstuffs decreased Kaŋiġmiut reliance on the environment to supply their nutritional and material needs.

Today the Kaŋiġmiut participate in a mixed economy, the result of a continued reliance on subsistence resources while participating in the market economy through jobs and government transfer payments (Wolfe and Walker, 1987; Langdon, 1991). While people have settled in the village of Buckland, use modern equipment and materials, and purchase store-bought foods, the land continues to supply fur for clothing, and meat, fish, oil, greens, and berries that every family needs for their diet and well-being. Knowledge of the

environment remains extensive, especially for actively pursued resources.

Seasonal Round

The seasonal round of today is shorter than that of pre-20th century Kaŋiġmiut. During the 19th century, Buckland River Iñupiat spent the winter inland, hunting caribou and small game and living off resources stored from the previous summer. Just after the river ice broke up and the brief spring smelt run had been harvested, families moved down the river to Eschscholtz Bay, hunting and collecting eggs of migratory birds along the way. Summers were spent at the bay, hunting beluga and seal, fishing, and gathering plant foods. The beluga hunt lasted only two or three weeks until the beluga catch was stored; then family groups dispersed around the bay to seine for salmon and whitefish. In late summer, berries, fish, seals, and young geese were harvested until it was time to move upriver. At this time beluga oil, *maktak* (skin with blubber attached), and other stored foods were transported to winter residences (Lucier, 1954; Armstrong et al., 1990). Of course, there were always subsistence options. Large caches of a variety of foods were necessary to sustain families and dogs through the winter. Beluga, seal, caribou, and fish were the mainstays; a poor catch of one resource might be remedied by more aggressively hunting others, or through reciprocal arrangements and familial obligations (Bockstoce, 1979; Uhl and Uhl, 1980; Sheppard, 1986; Lucier and VanStone, 1995; Mason and Gerlach, 1995). Today people continue roughly to follow this subsistence cycle—working out of their homes in Buckland during the school year and, for those who have time and resources, moving to Siŋik (Elephant Point) in mid-June and berry-rich areas in late summer.

BELUGA MOVEMENTS IN ESCHSCHOLTZ BAY

The beluga migration into Eschscholtz Bay was once a reliable summer event, and Kaŋiġmiut could count on the rich resource's arrival even if they could not necessarily count on a substantial harvest. However, the large pods that once seasonally occupied the bay are no longer evident.

Beluga whales (*Delphinapterus leucas*), called *sisauq* by the Kaŋiġmiut, and also referred to as "white whales" or "belukhas," inhabit arctic and subarctic waters where temperatures are below 15˚C (Gurevich, 1980). These small, white, toothed whales, 4–5.5 m long, are the most abundant arctic cetaceans. Although beluga thrive in cold waters, they frequent warm waters in spring and summer to molt and nurture calves (Finley, 1982; Doidge, 1990; Smith et al., 1990, 1994; Watts et al., 1991).

Unique geographic features in coastal areas make it possible for Inuit hunters to capture belugas that are seeking shallow, warm water. Constricted bays with shallow water and river mouths that attract beluga are ideal trapping sites. Points of land jutting out into the deep channels traveled by beluga create optimal sites for beluga netting. While hunting activity and noise cause the beluga to flee an area and avoid that specific area for several days, whales still tend to return to the same area year after year, providing a stable resource for many Inuit populations (Caron and Smith, 1990; Finley et al., 1990; Frost and Lowry, 1990; O'Corry-Crowe, 1994). Despite this apparent site tenacity, recurrent noise and disturbance from motorboat traffic, aircraft, electrical generators, vehicles, and other sources may be driving beluga whales from near-shore areas in many parts of their range (Frost et al., 1983; Seaman et al., 1985; Caron and Smith, 1990; Frost and Lowry, 1990).

Eschscholtz Bay, the shallow southeast extension of Kotzebue Sound, is a focus for Kaŋiġmiut, in part because of the summer concentration of beluga (Fig. 1). Two large shoals at the eastern end of the bay, called Aatqataiyaġvik ("where they take their mittens off") and Qiqitaġnaq ("island"), are nearly exposed at low tide or when the east wind drives the water out of the bay (Fig. 2). A third shoal, Qasigiaq ("spotted seal"), creates a mud flat just west of the Buckland River mouth. Qiqitaġnaq is referred to as "Qasigiaq" by Lucier and VanStone (1995) and "Kasigiaq" by Burch (1994a); however, in the summer of 1993, elders and hunters identified the central shoal as Qiqitaġnaq, and Qasigiaq as the small shoal along the bank to the south, as shown in Figure 2. At low tide only two channels are navigable around the shoals—a small shallow channel running past Siŋik and a larger channel on the bay's north side. The east-southeastern extent of the bay is easily used as a trap for beluga.

Most belugas enter Kotzebue Sound from the north, after the ice goes out in mid-June. They first aggregate near Sisualik (Fig. 1), a Nuataaġmiut (Noatak people) beluga hunting area near Kotzebue, and later move down the coast, around Choris Peninsula, and, at high tide, into Eschscholtz Bay (Fig. 2). If not deterred, they will come into the shallow eastern end near the mouth of the Buckland River on every high tide for about four weeks. Belugas may later return in smaller numbers to the bay, where "they may feed on salmon in late July and August" (Lowry et al., 1985:17; Frost and Lowry, 1990). Buckland residents have also observed beluga calving in the bay. Beluga are highly sensitive to tidal fluctuations (Kleinenberg et al., 1964), and when the tide ebbs, leaving the eastern end of the bay too shallow, the northern channel serves as their escape route.

This pattern of beluga movement has changed in the last few decades. Whereas Buckland villagers speak of once seeing Eschscholtz Bay filled with hundreds of beluga, the whales now remain offshore; only a few make tentative forays into the bay (Frost and Lowry, 1990; Burch, 1994a). Residents of Kotzebue Sound believe that noise during incoming tides (and especially low-flying jets, which, as one resident told me, "shake the whole bay all the way to Sisualik") frightens beluga attempting to enter the bay. From their own observations of calving, and after learning from biologists that females may be site-tenacious, some Buckland hunters worry that pressures from boat traffic and hunting in the 1970s have disrupted the behavior pattern of females trying to return to their birthplace. Kaŋiġmiut express concern that

"people talk too much" about beluga or that they "talk like they own them," which encourages beluga to stay away. While nobody from Buckland seems to remember beluga being absent from the bay until the recent decline, they speak of times when killer whales (*Orca orca*) have chased beluga from the area. Charles Lucier (1951) collected one story of a time when the beluga did not return to Eschscholtz Bay until the power of *Angatkoks* (shamans) brought them in.

THE BELUGA HUNT

While we know the beluga hunt has been going on for the last two hundred years, changes in technology and hunting methods in the 20th century have resulted in a beluga hunt that would be nearly unrecognizable to kayak hunters of the 1800s. In the 1990s, even though beluga populations of the eastern Chukchi Sea thrive, few beluga enter Eschscholtz Bay (Frost and Lowry, 1990). Elders recall that changes in beluga movements started in the 1920s and 1930s, when motorboats were first introduced (Hazard, 1988). Kayaks were replaced first by four-horsepower inboards in the 1920s and 1930s and then by more boats with more powerful outboard motors in the 1940s (Elders Conference Tapes, 1976). From the 1930s through the 1950s, the hunt was transformed from a cooperative drive to a more individualized pursuit of beluga.

Pre-rifle Beluga Hunting Techniques

Kayak hunts were remembered into the 1990s (Lee et al., 1990, 1992). They were well-coordinated, community efforts. The first few times the beluga swam into eastern Eschscholtz Bay, they were allowed to enter and leave undisturbed. At subsequent tides the numbers would increase until the bay was "just filled with the white backs and spouts of beluga." Then it was time to hunt. The fastest, most expert boatmen were chosen to lead the hunt. As the tide came in, the men waiting at Siŋik and Sisiivik were ready with their loaded kayaks, and everyone in the camp was quiet, watching for beluga (Armstrong, 1990; Geary, 1992). Certain activities were prohibited, and the children had to keep the dogs watered and—with sticks in hand—prevent them from barking. After the beluga had swum east of Siŋik and the tide had receded about 60 cm, the hunters would go out into the bay in their kayaks to block the whales from escaping out the large channel on the north and the smaller channel between the Qiqitaġnaq and Aatqataiyaġvik shoals. One elder remembered kayak hunts in the 1920s having only about 20 to 25 kayaks. They would quietly follow the whales to the shallow southeastern part of the bay, where they could trap them behind or strand them on the nearly exposed shoals. Stranding at Aatqataiyaġvik was facilitated by a large snowbank along the southern shore (Qakkivik, or "where [seals] go up"). Hunters are aware that panicked beluga will try to escape under pack ice and believe that the frightened beluga, cut off from access to the deep channels, mistake the snow bank for pack ice (Finley et al., 1990).

The trapped beluga could either be lanced after being stranded, sometimes even after a hunter had gotten out of his kayak, or they could be pursued by kayaks in water that was too shallow for the beluga to dive. Spearing while in pursuit required the hunter to be quick and strong. Kayaking right behind the beluga, a good kayaker could surf, the wake from the whale pushing him along. Riding almost on top of the whale, he could spear it until he made the kill (Elders Conference Tapes, 1976; Burch, 1994a). The technique in shallow water was to use the lance "to penetrate and pull back out until you kill the beluga" (Elders Conference Tapes, 1976). After the hunt, the men would build a fire to signal the women to paddle over and help begin butchering and hauling the beluga back to shore (Armstrong, 1990; Geary, 1992).

Kayak hunters in Eschscholtz Bay used lances for shallow-water beluga hunting, but the evidence for prehistoric use of toggling harpoons with floats or barbed harpoon darts is ambiguous. Burch (1994a) suggests that beluga hunters used harpoons in the late 1800s. In contrast, elders explain that there had been a change in hunting technology within their lifetimes and that lances, not harpoons, were formerly used: "The difference is nowadays they do have a barb spear with rope and a float on it. But then [when they hunted with kayaks], the ones they had had just a sharpened point" (Elders Conference Tapes, 1976:14). Norton Sound and Sisualik, two nearby areas that had considerable contact with the Kaŋiġmiut in the 1800s, used both lances and toggling harpoons, depending on water depth (Foote, 1960; Sheppard, 1986; Lucier and VanStone, 1995).

Since a stranded beluga could no longer swim, it could be lanced or even killed with a knife. In shallow water, where the animal could swim but not dive, a harpoon with attached float may have been necessary to locate a struck animal. Lucier's informants at Sisualik in 1951 mentioned using lances in shallow water and either the barbed harpoon dart or the toggling harpoon with floats in deeper water (Lucier and VanStone, 1995). Both of these harpoon types had points with an attached float that detached from the handle. Sheppard (1986) provides the most comprehensive description of different strategies for harvesting beluga in Alaska and the corresponding technologies used. His research focused on subsistence in Norton Sound between 1920 and 1930, when people still hunted from kayaks. Deep-water hunts in kayaks were accomplished with a variety of weapons:

> A rifle or a small spear called the *ningiqpak* [was] tossed with a throwing board or *nuqsraq*. When the hunters could get close to the animal, they speared it with the *qavluniin*, a longer spear that embedded a toggling harpoon point into the animal's hide and dragged behind it an inflated bladder float. [In shallow-water drive hunts] the animals were dispatched with the *kappun* [lance]. (Sheppard, 1986:141)

Like any hunt, the beluga hunt was not a guaranteed success for everyone. Many came away empty-handed and had to rely on others to share meat and *maktak*, or they had to try again at the next high tide (Elders Conference Tapes, 1976). The weather often determined whether a hunt would take place, as even small whitecaps in the bay can make it impossible to see the dorsal ridge of a beluga, and choppy water or high winds can make it difficult to manage a kayak (Burch, 1994a; Lucier and Vanstone, 1995). Wind also obscured the effects of tides, as a steady east wind will expose the shoals on the eastern bay, while a west wind will push water into the bay and cover shallow areas. Apparently, however, beluga reliably swam into Eschscholtz Bay each June and July to shed their skin and feed, and the Kaŋiġmiut were able to conduct organized mass kills to procure meat, oil, sinew, and *maktak* for the year.

Beluga Hunting Sites at Eschscholtz Bay

The locations of past and present beluga hunting camps give evidence of the boat technology used. Shifts in camp location have occurred, along with changes in boat and motor size, regardless of whether these were optimal sites, or technologies, for launching the beluga hunt. Many historic campsites around Eschscholtz Bay reflect specialized methods of taking beluga. Sites in the inner bay were located where the bay narrows and the shoals begin—at the place where the bay begins to form a trap. Sites at Choris Peninsula were near points of land off which nets were set. Abandonment of some sites on Eschscholtz Bay over the last two centuries was necessitated by technological changes; modern boats, which draw more water than skin boats, made landing at sites with offshore shoals difficult or impossible during low tide. Participants now concentrate during the hunt at Elephant Point, the one site accessible to motorboats.

Sites that were historically used during beluga hunts or for butchering include Siŋik and Sisiiviuraq on the southern side of Eschscholtz Bay and Sisiivik, Saiyu, Kugiatchiaq, and Kuqutchiksraq on the northern shore of the bay (Fig. 2) (U.S. Bureau of Indian Affairs, ANCSA Office, 1989; Burch, 1994a; Lucier and VanStone, 1995). Accounts differ as to the uses of these sites, but it must be remembered that the best sites for marine mammal, fish, and plant resources might shift as the summer progressed and from year to year. A few hunters from Selawik and the Kobuk River (Fig. 1) would come for beluga and camp west of Sisiivik. Those from Selawik would drag and carry their kayaks over the narrow isthmus between Kobuk Lake and Eschscholtz Bay (Fig. 2). Burch (1994a:369) writes: "About two thirds of the people went to Elephant Point (Siŋik), while the rest were across the bay at Sisiivik." Burch's time frame is the mid-1800s, prior to 1870. Published sources and elders today convey the impression that during that period the main camp, with women and children, was on the northern part of the bay, near or at Sisiivik. The hunt commenced from there, except for hunters who kayaked or boated across to start from Siŋik (Lee et al., 1990, 1992). The elders say that noise and activity at Siŋik frighten beluga from entering the eastern end of the bay and especially from going near Aatqataiyaġvik, the shoal where hunters used to strand them.

Written and oral sources agree that after the kill, Siŋik has generally been the primary butchering site. It may also have been a site where people from the larger region met. A description from 1820 reads: "A large settlement of a hundred or more conically-shaped skin tents [stood] on a long sandspit extending from the high shores for about a mile and a half inside the bay.… Opposite each on the beach lay a *baidara* turned upside down" (Ray 1983:34). Burch (1994a) suggests that a celebration prior to the late summer dispersal, when family groups traveled to harvest other resources, may have concentrated the Kaŋiġmiut at Siŋik after the beluga hunt. However, Kaŋiġmiut used hemispherical, not conical, tents, and 100 tents would have held hundreds of people. Lucier (pers. comm. 1995) suggests that the encampment described in the 1820 account was rather a trade fair gathering of many different groups of people from Kotzebue Sound and the larger region.

Another old campsite on the south side of the bay is at Sisiiviuraq, west of Siŋik, where the beach is rocky, and a small grassy area and a clear running stream make camping ideal. Thomas (1987), indicating an area west of Siŋik, explained that "those people [who] want to stay on site, they stay down here. Right here—Seseevik [sic]." Thomas (1987) explains that the beluga would not come all the way into the bay if people were camped at Sisiiviuraq and made noise. It was not until the use of motorboats made landing in front of Sisiivik difficult, because of a large shoal, that people started camping exclusively at Siŋik (Elders Conference Tapes, 1989). They continue to use the stream at Sisiiviuraq for water. After the advent of motorboats, some families continued to camp at Saiyu (just west of Sisiivik), even though they then had to go across for the hunt, and then wait at Siŋik for the next high tide to get back. Exclusive use of Siŋik as the beluga hunting site began sometime in the 1940s.

The ambiguity surrounding the use of sites reflects the extensive use of Eschscholtz Bay for gathering subsistence resources other than beluga. Sisiivik and Choris were among the good places to seine salmon (Thomas, 1987), and Saiyu provided access to an ample supply of berries and fish. Families may have used all of these sites extensively, before or after the beluga hunt, for fishing or berry-picking. It is unclear whether all of the northern sites were used during beluga hunting, but apparently Sisiivik and Kugiatchiaq, which are only about one mile apart, were both used. Saiyu was a large site with precontact house pits, cabins, and a reindeer corral (U.S. Bureau of Indian Affairs, ANCSA Office, 1989). At least one family camped at Saiyu into the 1940s.

All the beluga hunting sites are at the base of hills or cliffs that rise at least 20 m above the water and provide good views out into the bay. All are near streams or springs except Siŋik, which at one time also had a spring (Ataŋagruk) nearby.

Although residence each summer at Siŋik was short, permanent structures were relatively substantial in the 1800s.

Drying racks and small, raised storage huts or caches made of wood and sod stood in a row on the spit (Beechey, 1831; Seemann, 1853; Kotzebue, 1967). Siŋik is an ideal place for a storage because of its proximity to the winter encampments inland along the river and the permafrost, which kept foods cold.

In 1899, Nelson (1899:264) reported signs of house pits and permanent settlement "on Elephant Point, at the head of Kotzebue Sound." Elephant Point is not geographically at the head of Kotzebue Sound. Half a century later, Charles Lucier worked among the Kaŋiġmiut during a short period when they lived in wooden buildings at Siŋik. He wrote that Siŋik appears to lack any old house ruins, as the spit was only "slightly above high water mark and must be completely submerged at times of high tide and storm" (Lucier, 1950:14). Lucier maintained that Nelson miswrote this passage, and must have meant Igloo Point, which can be said to be geographically "at the head" of Kotzebue Sound. Only a few years after Lucier's observation, storms washed the few remaining wooden buildings off the spit.

Prehistoric and historic sites that were used to obtain beluga were Igloo Point, Kiwalik, and Choris Peninsula (Fig. 2). Igloo Point and Kiwalik are at river mouths where beluga sometimes entered. The method of catch at these sites prior to the use of rifles is unknown, although extant shoals and narrow channels would allow for beluga to be trapped. Historically, some families would go to Choris Peninsula after the beluga hunt to fish and hunt, often meeting families from Kotzebue. Choris was also an alternative if the beluga hunt was unsuccessful—people could net beluga, seals, and salmon later in the summer and then bring the products back to the Kiwalik or Buckland Rivers. With a fair east wind and outgoing tide, a loaded umiak could sail from Sisiivik to Choris in a few hours.

Netting Beluga

On both the western outer side and the eastern inner side of Choris Peninsula, points of land extend into the deep channel that the beluga follow when they enter Eschscholtz Bay heading for shallow waters (Fig. 2). These points are excellent beluga netting sites. Changes in netting practices illustrate some of the regional conflicts surrounding beluga hunting and the general change in hunting practices. No one interviewed in Buckland had netted beluga in recent years. A few people from Kotzebue continue to set beluga nets at both Choris Peninsula and up in the northern part of Kotzebue Sound, with some success near Kotzebue. However, beluga will avoid areas where one of them has recently been netted. Thus a conflict has arisen between northern sound Iñupiat and Kaŋiġmiut, because Kaŋiġmiut believe that nets set at Choris frighten beluga trying to swim farther into the bay.

It is unknown when beluga netting began at Choris. One elder remembered nets only since the Sami reindeer herders came to the Buckland area, after 1910 (Lopp, 1912; Stern et al., 1977; Elders Conference Tapes, 1989). She described the nets made of heavy twine, with "ropes in the middle and edges. They put heavy rocks in between and then down the end—and some in the middle, I think, because I used to work those when I was a teenager." She also remembered seeing her father making sealskin "rope" for nets, probably in the early 1920s. A deep channel runs close to shore around Choris Peninsula and bluffs provide lookouts so that when a beluga is caught a boat may be immediately dispatched. Nets set in turbulent or murky water are more successful, as the animals cannot see them as easily. Wind and dark skies also help obscure the nets (Kleinenberg et al., 1964).

Evidence exists of earlier beluga net use by people from other areas. Beechey (1831:405), who was at Choris in 1826, expressed his amazement at the many people and goods "crammed" into two umiaks headed south for Cape Prince of Wales. Amongst the household wares, dogs, and foodstuffs were "some immense nets, made of hides, for taking small whales and porpoises." He collected a beluga net made of sealskin line, possibly from Cape Thompson or Port Clarence (Bockstoce, 1977). Sometime around 1880, E.W. Nelson (1899) collected two shuttles for beluga nets, one from Little Diomede and one from Norton Sound. At Unalakleet, the mesh size for beluga nets was determined with "the tips of the extended thumbs…placed together and the measurement taken on the palmar surface across both extended hands along the line of the thumbs" (Nelson, 1899:233).

Nelson wrote a general description of how beluga were netted, probably from near St. Michael, on the south coast of Norton Sound, where he was living at the time:

> During the latter part of August and early part of September nets are set near rocky islets or reefs to catch white whales. These nets are similar to those intended for seals, except that they have larger meshes and are longer and wider. Whales enter them and are entangled exactly as fish are caught in gill nets, and, being held under water by the weight of heavy anchor stones, are drowned. (1899:131)

This technique is similar to the one Buckland and Kotzebue residents describe for Choris Peninsula today.

Present-day Beluga Hunting Techniques

Attempts to execute coordinated hunts have continued into the 1990s, but with decreasing success. Two periods dominate post-kayak hunting. From circa 1930 until the 1960s, the most obvious detriments to mass hunts were motorboats, disparity in motorboat power, and lack of hunters. Since the 1960s, lack of hunters and boats has not been a problem, but hunters relate that the adverse consequences of outboard motorboat use have increased. They explain that the use of outboards may reduce the success of the beluga hunt in three ways: 1) the speed and noise scare the beluga, 2) differences in horsepower and boats mean that smaller boats cannot keep up and the hunt coordination is lost, and 3) the draft needed for large engines encourages deep-water hunting (Elders Conference Tapes, 1976). Of course these problems are not inherent in bigger, faster boats and new

technology per se. In the Mackenzie Delta, for example, the beluga hunt continues to be successful despite modern technology (Fisheries Joint Management Committee, 1991).

Until the 1960s, many men and women had given up the beluga hunt to pursue wage labor jobs at Candle or in other parts of Alaska. This often left Siŋik short of able hunters, especially since four-horse inboards required two people for every boat: a driver and a shooter. Women started driving the boats during the hunt, but it was still often impossible to get enough people, outboards, and seaworthy boats together for a cooperative hunt (Lucier, pers. comm. 1994). For example, in 1951 people had a hard time organizing drives, as there were few working motorboats at Siŋik during the June-July beluga hunting season. It is estimated that 25 beluga were landed:

> All [were] taken from powered boats on or near Qasigiaq (Qiqitaġnaq) Shoal, shooting with rifles at close range, and harpooning with a line float attached to mark the carcass location. There was no coordination between the few boats that were hunting. (Lucier and VanStone, 1995)

But there were other years when hunters were organized and numerous enough to conduct cooperative hunts. The camp was kept quiet and boats were loaded and ready before the high tide so as not to frighten the incoming beluga. Boats left the beach one by one to form a line across the bay behind the beluga. Those with faster boats tried to maintain coordination by going out first to block off the main channel. Meanwhile, the rest of the boats went slowly behind the beluga, following them into shallow water to make the kill. However, despite efforts to maintain cooperation among hunters, problems developed.

The impression given by hunters today is that the hunt became much more individualized with the use of power boats; differences in horsepower and hunting method disadvantaged people with slower boats and made them dependent on others. While some people talk about large, successful hunts in the 1970s, one elder (Elders Conference Tapes, 1976) explained:

> Today they don't hunt as good as they used to. Nowadays even though they [elders] try to advise them, they don't wait until they round them up. They just try to get them on their own; they don't give people who aren't as strong a chance to catch them. If they rounded them up into the shallow water, even the old and not as strong would have a chance. We end up getting shares from someone else.

With the use of faster powerboats and high-powered rifles, strikes tend to be made in deeper water when the beluga surface to breathe. Deep-water hunting undermines the cooperative communal hunt. People agree that beluga must swim east of Saiyu (Fig. 2) before they can be trapped or hunted in shallow water, where they cannot dive to escape. Stranding the animals and hunting in shallow water facilitated successful hunting for everyone since less adept hunters could take stranded animals. In contrast, deep-water hunting favors steady shooters with fast boats. At some point, hunters started heading out to the deep-water area by Callahan shelter cabin before the beluga had had time to reach Saiyu (Fig. 2). As people got more powerful boats, hunters stopped trying to strand the animals on shoals or shoot them in shallow water. Instead, they tried to herd them into small embayments, where the water was deep enough for their bigger boats. Eventually, when the beluga were tightly grouped, the boats would move in and each boat would go after a beluga trying to escape. The custom among Buckland people was that if one boat was in pursuit, other boats would leave that animal alone.

Hunters have observed that, when cornered, beluga will try to dive and hide in murky water until boats have moved away. Often the animals turn, dive, and try to flee the bay. They can outmaneuver the slower boats, but the faster boats remain in pursuit. A few times the strategy of driving west toward Callahan resulted in a good harvest, because boats were able to trap a large pod in the bay on the east side of Choris Peninsula; but often this tactic sends the pod out of the bay.

When Kotzebue area residents started coming to Siŋik in the 1970s because beluga were becoming rare near Sisualik, the hunters became even less well organized and the hunt became a free-for-all. Kotzebue hunters, accustomed to their own practices, did not understand or respect the local "one boat-one beluga" rule. Attempts to organize a more cooperative hunt have met with limited success (Northwest Arctic Nuna, 1984). However, the general attitude among Kaŋiġmiut about deep-water hunting and chasing beluga is that a few succeed at the expense of everyone else: "We used to be of one mind," one hunter said to me about the lack of cooperation and sharing that exists today.

Harpoon design was also modified during this period to facilitate deep-water hunting. Although toggle harpoons are still used, many harpoons today do not have detachable points. A new type of harpoon is made of a heavy steel rod or rebar with an attached point that will penetrate a submerged beluga. These deep-water harpoons have longer lines (about 10 m rather than 3 m) connecting the floats so that the beluga can be found and, if necessary, hooked up off the bottom of the bay with a gaff connected to a long pole. Harpooning with an attached float is necessary to locate injured or dead beluga, which sink rapidly in summer months. Prior to rifle hunting, animals with any chance to swim away were always harpooned; today however, the animals are often not harpooned before shooting—a technique that increases the loss rate (Fisheries Joint Management Committee, 1991).

BUTCHERING AND PROCESSING BELUGA

Regardless of how the kill was made, the beluga had to be brought to shore at the end of the hunt. According to Lulu Geary (1992:199), "in those [kayak-hunting] days, everyone hunted as a team at Sisiivik. They then divided all the meat. No one was ever left out, so all our ancestors were able to store and preserve beluga *maktak*." In contrast, Burch (1994a:371)

notes that in the late 1800s, "each hunter kept what he killed, and there was no general division of the harvest." Lucier and VanStone (1995:118) clarify the actual practice by explaining that while a hunter may have preferred to keep what he killed, he belonged to an extended family and "his obligations to others actually resulted in the distribution of beluga products to virtually everyone in the society." The discrepancy in the interpretation of who had rights to a beluga may be explained by realizing that during successful kayak hunts, virtually all hunters were able to get enough for themselves and members of their extended families. Apparently the hunt was relatively equitable so that sharing was not an issue per se. With increased fire and motor power, the hunt became more individualized. After herding the beluga pod into an area, each hunter would begin pursuit and subsequently had rights to the beluga he was following. Every hunter had identification marks on his harpoons and could identify which beluga was rightfully his.

Beluga successfully taken by the Kaŋiġmiut were transported to a central location for initial and secondary butchering. Processing and storage took place at Siŋik. Except for flippers and ribs, bones were separated from edible products and eventually burned on the shoreline or hauled out into the bay.

The following description of butchering practices comes from elders interviewed during fieldwork from 1992 to 1995. The description reflects how people remember butchering beluga from the 1920s to the 1950s. Since the 1960s, a decreased need for dog food and an increased reliance on store-bought foods and equipment has meant that less of the beluga is utilized. Today only meat, *maktak*, and blubber are typically used. The description of the first stages of butchering covers both pre-motorboat and recent butchering practices.

Depending on where the kill was made, the beluga were towed either to the nearest shore, where butchering would begin, or to Siŋik. One woman, born in 1909, explained that as the tide came in after the hunt, the women and boys would launch their umiaks and paddle to the men. If the animals were to be butchered at the kill site, while the women were bringing the skin boats, the men would cut off the *maktak*, flukes, meat, and any organs that were to be used. The partitioned beluga would be loaded into the skin boats.

To tow a dead beluga intact, a line was attached to the animal by cutting through the upper cheek on both sides and then passing the line through the slits and over the snout of the beluga so that the snout was in a noose. Men in kayaks and women and boys in umiaks then pulled the beluga head first through the water to shore. Since the advent of large powerboats, beluga have been dragged whole to Siŋik by boats before being butchered on the shoreline.

Beluga spoils quickly if left in the sun, so there was a sense of urgency to the processing, especially if the weather was warm and there were many beluga. Butchering was done by both men and women, although men tended to remove bulky heavy parts and carry them up onto the grass to be further processed by women. Everyone helped out and worked hard until the meat and *maktak* were hung and the rest of the animal was processed. Jobs were allocated not so much by gender,

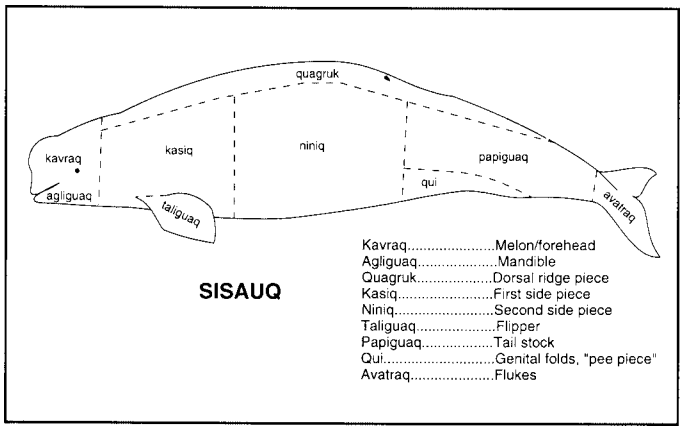

FIG. 3. Traditional beluga butchering by Kotzebue Sound Inupiaq.

but according to the size and composition of the family unit. A large family could afford specialization of labor along gender lines, but a smaller unit had to put everyone to work when the beluga were brought in. Kaŋiġmiut distinguish themselves today by saying that Buckland men help butcher, unlike the Nuataaġmiut at Sisualik. Elders emphasize that the entire beluga was used for food, oil, storage containers, skin ropes, and, if nothing else, dog food.

Maktak, the skin with blubber attached, was taken off in large sheets (Fig. 3). First a cut was made around the base of the head. Then two cuts were made up the back from the tail to take off the *quagruk*, the thick skin and blubber along the dorsal ridge. This piece was pennant shaped, wider near the head and tapering toward the tail. The flipper (*taliguaq*) was removed at the proximal end of the humerus. Next the first side piece of blubber (*kasiq*) was removed by cutting down the side behind the flipper and peeling it back to the stomach midline. The second sheet, *niniq* ("a share"), was taken off in the same way. The *maktak* in the tail stock (*papiguaq*) was removed by making a horizontal cut parallel to the dorsal cut about two-thirds of the way down. This separated the lower abdomen (*qui*) containing the genital folds from the side *maktak*. The flukes (*avatraq*) were removed in two halves. Unlike flippers they have neither bones nor cartilage; yet they are well vascularized (Kleinenberg et al., 1964; Green, 1972), and therefore had to be kept out of the sun to avoid spoilage.

In the traditional butchering method, the next step was to disarticulate the head in front of the first vertebra. The *maktak* on the top of the head and the melon (*kavraq*) were removed as one piece and kept separate from the body *maktak*. The blubber from the mandible was removed, the tongue taken out, and then the jaw bone (*agliguaq*) separated from the skull. If it was going to be eaten immediately, the brain (*qaqisaq*) was removed also.

The back meat and sinew were considered as a unit (*uliusriniq*). Two long strips of meat were taken off from the back (*uliusringan niqaa*) and the underlying sinew (*ivalu*) was removed to be used for sewing. A third and fourth strip of meat were taken from the stomach or front part (*aqianan nigaa*). Under these four strips of meat, the large, flat muscles along the belly were removed. Two sections of the spine with

meat attached, the tail stock (*papiguaq*) behind the abdominal cavity and the neck meat (*kiniagaaq*), were used immediately to feed the camp during the hunt or given to the dogs. Ribs (*tulimaaq*) were taken off as a unit and hung to dry after the intercostal muscle was cut from alternating sides so that the ribs made a zigzag pattern.

After the bulky parts had been taken off, they were further processed on shore. Beluga parts were divided into winter and summer food, or food that was amenable to long-term storage and food that would not survive the summer heat. Although Siŋik is known for its excellent storage facilities because of the permafrost layer, not all parts of the beluga could safely be preserved. Stored food consisted primarily of *maktak*, oil, and black meat. These foods were either dried, preserved in oil, or fermented and then stored.

Beluga skin is from 11 to 13 mm thick, and the blubber is from 37 to 66 mm thick, depending on the age and condition of the animal (Doidge, 1990). Body blubber accounts for 90% of the fat on a beluga. Another 4% is in the head and tail, while the bones contain only 1.7% of the total fat. Studies by Kizevetter (in Kleinenberg et al., 1964) showed that fat could be divided into three types: from body, head, and jaws. Each type has a unique structure and specific physical and chemical properties. Fat from bones is of a fourth type. The Kaŋiġmiut have made their own observations about beluga fat, and have specific treatment and uses for blubber, oil within the jawbone, and skin and blubber in the tail and melon.

The Kaŋiġmiut also make a distinction between the outer skin (epidermis), skin (dermis), and blubber. The outer skin is thought to be analogous to the feathers on a bird. *Maktak* is both epidermis and dermis with a layer of blubber attached. The skin layer can easily spoil if left on the animal in the sun or lying skin side up with the blubber attached. It must be trimmed of excess blubber and hung to air-dry soon after the animal's death. The Kaŋiġmiut hunt beluga just prior to the molt, when the epidermis and dermis are thick and soft. When cooked, the adult animals yield highly valued, thick, creamy-white *maktak*. People who hunt beluga in the fall obtain a thinner-skinned, tougher *maktak* that is not so highly valued by the Kaŋiġmiut.

Most of the stored oil and maktak came from the large sheets taken off the sides of the whales. A thin, vascularized membrane covering the blubber on the sheets of *maktak* was removed first. This could be used to start fires. Blubber was then trimmed off so that a 2–3 cm thick layer remained attached to the skin. The excess blubber was put into storage containers so that the oil would render. The back strip (*quagruk*) was scored latitudinally so that it would not curl and hung to dry. The remaining *maktak* was then cut into long strings of connected diamond shapes and hung to dry for two to three days. After the drying period, *maktak* was taken off the racks, submersed in boiling water until soft enough to be easily pierced by a fork or sharp object, drained on grass mats or mesh grilles, cut into individual squares, and then wiped dry or laid out on grass or grass mats until dry. The clean, dry pieces were then put into oil for storage.

The flukes and the melon were treated similarly. These areas have a markedly thicker dermis than the rest of the body (Kleinenberg et al., 1964). Flukes comprise thick bundles of collagenous fibers in the long axis, a thick layer of tendons, and about 26% fat (Kleinenberg et al., 1964). There are no bones in the flukes, as they are neomorphic structures (Colbert, 1978). Flukes were preserved in oil—raw, cooked, or fermented along with the melon. The flukes were cut in small strips and boiled until they curled "like bacon." If fermented in oil, they were cut into pieces and placed in a container along with the melon (*kavraq*). Fermentation took place in a cool, dark place. Flippers were removed with the humerus, radius, ulna, metacarpals, and phalanges intact. Bones in the flipper are spongy and lack a tubular marrow cavity (Kleinenberg et al., 1964). Shallow cuts in a crosshatch pattern were made in the thick part of the flippers before they were hung by a hole in the tip. The cross hatches allowed oil and blood to drain off. After hanging, flippers could be either fermented or cooked. If flippers were to be cooked, they were put into the boiling water only after the *maktak* was cooked, since the blood and muscle from the flippers would contaminate the water. They were considered good traveling food.

Meat from the tail stock was consumed during encampment, but the long back and side strips were cut into long thin strips or large flat pieces and hung to dry. Later some of this was added to oil and stored and the rest was tied into large bundles for storage.

Heart, brain, lungs, and the head were used for summer food. Heart could be boiled fresh; or sliced, then hung until half dry before cooking. Lungs were sliced thinly, hung until half dry, and then put in oil to be eaten soon afterwards. They could not be stored long in oil because they would rot. The brains could be fried and eaten fresh, but not stored. If there were too many to eat, the bulk of them went to the dogs along with the rest of the head.

Before the use of 55-gallon drums for storage, containers were made from the stomach, pericardium, intestines, and esophagus. The hide of preferably young belugas could also be used. To make a bag from the stomach, the outer muscle membrane and the inner lining were carefully trimmed off to reveal a balloon-like bag, which was inflated, dried, and then filled—often with berries. To make containers from the hide, the blubber was first trimmed off and then the skin was covered until the epidermis fermented and could be scraped off. The thick, strong dermis could then be stretched, dried, and sewn into storage containers. The fermented epidermis was eaten as a delicacy. Beluga sinew and grass were used to sew the beluga skin bags so they would not leak.

Bones disarticulated at Siŋik were treated in five different ways: 1) preserved with tissue still attached (flippers and ribs), 2) used in cooking at the camp site (tail and sternum), 3) removed for oil extraction (mandibles), 4) given to the dogs, or 5) burned. Skull bones on the average contain 10.4% fat; ribs contain 3.9%; and vertebrae have 1.6% fat (Kleinenberg et al., 1964). Lucier (pers. comm., 1995) writes that there is no historical evidence that beluga bones were used in tool making or otherwise saved. The mandibles were

disarticulated from the skull, scraped clean, and hung in the sun until they were either broken or sawn open in order to extract a fine, light blue oil. Jaw bone oil could be used as gun oil or as a medicinal rub to relieve congestion. Vertebrae were sometimes used for fuel or chopped for dog feed before any remaining and unwanted bones were burned or thrown into the sound at the end of the season. Skulls, once trimmed, were a nuisance, drawing flies and stinking until they were disposed of (Lucier, pers. comm., 1995).

My own information about burning or dumping bones into the bay concurs with Lucier's, although early explorers wrote about seeing discarded bones at Siŋik. In 1831 Beechey (1831, Vol. 1: 354–355) described this scene: "In front of [the huts] was a quantity of drift-wood raised upon rafters; and around them there were several heaps of bones, and skulls of seals and grampuses (beluga)." Again in September of 1849, after the Kaŋiġmiut would have headed inland, a crew anchored off Siŋik saw abandoned skulls and vertebrae of recently butchered beluga (Kellett, 1850; Anonymous, 1860:249).

Near the end of the century Hooper, Captain of the U.S. Revenue Steam Cutter *Corwin*, wrote:

> When the whaling is completed they collect the bones and burn them; those who can afford it burn the clothes worn while whaling, the poorer natives pay tribute to the "God of the White Whale" by cutting off and burning a small piece of some garment. (Hooper, 1881:25)

Hooper was at Siŋik on July 16, which must have been near the end of beluga season. His report concurs with 20th-century accounts that beluga bones are either to be burned or hauled into the bay after the season's hunt is over (Lucier, 1951; Lucier and VanStone, 1995). Hooper's visit, however, came at a low point in the population density of the Buckland River due to the 1870s caribou crash and resulting famine and outmigration, and about fifteen years after the rifle became available (Ray, 1983; Burch, 1994b). Stockpiling bones for later oil rendering would make more practical sense in hard times, so the burning of beluga bones in the 1880s does not seem consistent with the activities of people recovering from starvation. However, ideological reasons may have governed bone disposal (Nelson, 1899; Lantis, 1938).

These divergent accounts of the treatment of bones at Siŋik are ambiguous, but may indicate a change in people's behavior in the later part of the 1800s. In 1951, beluga bones were used for fuel or chopped for dog food, and the rest were burned (Lucier, pers. comm. 1995). That was one of the last years of year-round occupancy of Siŋik, when the driftwood supply was depleted throughout the bay. Dumping bones into the bay or burning them became accepted practice by the 1960s. At one time in the 1970s, so many carcasses were dumped into the small bay behind Siŋik that it was covered with a layer of oil, and the beluga would not go near it.

Recently a faster way of butchering beluga has been used. The flukes are removed, a cut is made around the head and down the dorsal ridge and the skin and blubber is taken off in three or four sheets on each side. One method for the first piece is to remove the flipper, skin and blubber all in one piece and then disassemble these pieces on shore. The bulk of the meat is then taken off in two large strips along the backbone and the rest of the carcass is discarded into the bay.

As new materials came to the Buckland River, cotton and synthetic thread and even dental floss replaced beluga sinew for sewing thread; wooden kegs, steel buckets and drums, and later, plastic containers replaced those made of intestine, stomach, pericardium, and skin. The use of the beluga for production of material goods was diminished, and the work in producing those goods became unnecessary. While elders today complain that people no longer use the whole animal, the generation that grew up with a variety of ready-made containers sees the situation differently—many beluga parts have lost their use value. Foods produced from beluga have also been simplified. Rarely are fermented flippers or dried lungs made. The soft, white *maktak* and blubber for oil are taken first, and—if possible—the meat is removed. Freezers provide quick storage unavailable previously, so traditional methods of preservation are not needed.

CONCLUSION

With the advent of the 20th century, Alaskan natives have been affected by increased integration into the larger society of the United States. Introduced technologies, wage labor, and Christianity are among the influences that have contributed to myriad changes affecting social relationships, behaviors, and beliefs. Additionally, subsistence practices have undergone dramatic transformations due to a reliance on modern technology (such as motorboats, snowmachines, and rifles). The Kaŋiġmiut of Buckland have not been immune to these changes. The study of how their beluga whale hunting practices have changed in this century offers a unique understanding of how outside influences affecting communities throughout the state have become manifest and contribute to the transformation of the social organization of a community.

As Lucier and VanStone (1995) have described, the beluga hunt was a cooperative hunt conducted with kayaks in the 19th century. Despite the adoption of motorboats in the 1920s, the beluga hunt continued to be a cooperative effort, much like the traditional kayak hunt. However, during the period of the 1930s through the 1960s, the hunt began to change as available technology improved and people increasingly entered the wage labor market. Participation in a market economy, often at jobs located outside of the village, oriented the Kaŋiġmiut away from the annual event that brought the community together as a cooperative unit. In addition, disparities between the level of technology available among hunters increased while the traditional leader's role diminished. Organization of a cooperative hunt, then, became more difficult and hunters often hunted individually. Today, the current cohort of hunters, children of those socialized during this period of increased reliance on wage labor, often prefer hunting on their own.

Orientation toward an individualized hunt was not only a manifestation of this entrance into the wage labor market. The use of new technology changed the nature of the hunt—away from driving pods of beluga into shallow bays to chasing them in deep water from high-speed boats. Traditionally, kayak hunters trapped beluga whales in shallow waters of the inner bay where they were able to follow the animals and spear them. With the advent of deep-hulled motorboats, hunters could no longer follow beluga into shallow waters without risk of running aground. Additionally, trapping the beluga behind shoals was no longer necessary, as modern equipment allowed hunters to make kills in deep water. Hunters' ability to traverse the bay in pursuit of beluga at speeds exceeding the capacity of non-motorized watercraft also helped change the way villagers participate as a cooperative group during the hunt.

This change to an emphasis on individual hunting can be looked upon as the waning of an important communal event which brought the Kaŋiġmiut together each year. However, it might also be seen as a continuation of what was always essentially an individual effort. If Burch (1994a) is correct that beluga were not shared, but owned by the hunter and, as elders have expressed, that unsuccessful hunters had to rely on others for beluga products, then the beluga hunt could be looked upon as an essentially individual pursuit—cooperatively conducted because technology that would allow individual hunting methods was lacking.

Concurrent with 20th-century changes in social organization and technology, Kaŋiġmiut beliefs about the influence of human actions on beluga whales also changed. Traditionally, hunters and people on shore directed their behavior based on the belief that their actions affected beluga movements. These ritualized actions conveyed a respect toward the animal and were thought of as a necessary procedure if beluga were to avail themselves to hunters. The cooperative hunt and accompanying beliefs and actions were maintained while watercraft was limited to kayaks and slow motorboats. Improved technology, in the form of faster boats, high-powered rifles, and deep-water harpoons, allowed people to capture beluga whale while ignoring the traditional proscriptions. Successful hunters, now operating as individuals, also gave people the perception that the structured set of rules and many of the beliefs surrounding the beluga hunt were no longer necessary. A fast boat could make up for the quiet and stealth needed for the kayak hunt.

I suggest that beliefs and accompanying action based on traditional knowledge were traded for technology at a time when transmission of traditional beliefs and knowledge was disrupted as young men spent time away from the village. Younger hunters were told about the proscriptions, yet did not internalize them though practical experience. For a time in the 1970s it worked—beluga continued to come to Eschscholtz Bay in large numbers, and fast boats could catch up to them. Today, however, beluga are scarce in Eschscholtz Bay. As I indicated previously, neither biologists nor residents of Buckland can give a clear reason for the lack of beluga in Eschscholtz Bay. While some hunters wonder if the resource was overhunted, they also attribute the scarcity of beluga to the increased volume of noise from airplanes, motorboats, and on-shore noise around Kotzebue Sound. Elders maintain, however, that improper behaviors while beluga are in the area scare them away. Ignoring proscriptions and the lack of intra- and inter-village cooperation show a lack of respect and have fractured the relationship between animals and humans, causing beluga to avoid the Kaŋiġmiut. Although some of these beliefs may still have a practical application, hunters using modern technology, for the time being, have not acknowledged their possible importance to a successful hunt.

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