

HISTORIC AND CURRENT USE OF MUSK OX  
BY NORTH SLOPE RESIDENTS, WITH SPECIFIC REFERENCE  
TO KAKTOVIK, ALASKA

by

Sverre Pedersen, Terry L. Haynes,  
and Robert J. Wolfe

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## Introduction

The Alaska Board of Game, a seven-member citizens' board appointed by the Governor, is authorized to establish regulations for the management of Alaska's game populations. As part of this authority, the Board determines whether particular public uses of game populations are subsistence uses. "Subsistence uses" are defined in statute as the "noncommercial, customary and traditional uses of wild, renewable resources by a resident domiciled in a rural area of the state for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation, for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter, or sharing for personal or family consumption" (AS 16.05.940). In statute, "subsistence hunting" is given a priority over hunting under "general regulations" ("sport regulations") by resident or non-resident hunters.

To make subsistence determinations, the Board considers information about the use of a game population, and decides if it meets particular customary and traditional use criteria established in regulation. One issue has been whether uses of introduced or transplanted game populations can qualify as subsistence uses. A number of wildlife transplants have occurred in Alaska (Table 1). The Board of Game has been assessing their subsistence status on a case by case basis.

At its June 1986 emergency meeting, the Board of Game found that use of musk ox by Game Management Unit (GMU) 26C residents did not meet the customary and traditional use test, designed by the revised subsistence law to distinguish between subsistence and non-subsistence uses. This decision was based primarily on the idea that, because they were transplanted to the eastern North Slope in 1969-70 and hunting had only recently been permitted, musk ox had not been in the area long enough to allow for the establishment of a customary and traditional use. Residents of Kaktovik, a predominantly Inupiat Eskimo community on the Arctic coast, subsequently expressed a desire for the Board to reexamine its 1986 finding based on more complete information on the history of musk ox use on the Arctic Slope.

TABLE 1. Introduced Wildlife and Their Subsistence Status as of October 1989

SPECIES	HISTORIC RANGE	LOCATION	TRANSPLANT SUBSISTENCE		
			GMU	YEAR	STATUS*
BISON	NO	COPPER RIVER	13	1950	NO
BISON	NO	DELTA	20	1928	NO
BISON	NO	CHITINA	11	1962	NO
BISON	NO	FAREWELL	19	1965	NO
CARIBOU	YES	KENAI PENINSULA	15	1966	NO
DALL SHEEP	NO	KODIAK	8	1965	NO
ELK	NO	KODIAK/AFOGNAK	8	1929	NO
MOOSE	NO	COPPER RIVER	6	1949	NO
MOOSE	NO	BERNER'S BAY	1	1958	NO
MTN. GOAT	NO	KODIAK	8	1952	NO
MUSK OX	NO	NUNIVAK ISLAND	18	1935	NO
MUSK OX	NO	NELSON ISLAND	18	1967	NO
MUSK OX	YES	BARTER ISLAND	26	1969	NO
MUSK OX	NO?	SEWARD PENINSULA	22	1970	NO
MUSK OX	YES?	CAPE THOMPSON	23	1970	NO
BEAVER	NO	KODIAK/AFOGNAK	8	1925	UNDET
CARIBOU	NO	ADAK ISLAND	10	1958	UNDET
DEER	NO	PRINCE WM. SOUND	6	1916	UNDET
FOX	NO	ALEUTIAN ISLANDS	10	1913	UNDET
HARE	NO	KODIAK/AFOGNAK	8	1934	UNDET
MARTEN	NO	PRINCE OF WALES ISLAND	2	1934	UNDET
MARTEN	NO	BARANOF ISLAND	4	1934	UNDET
MARTEN	NO	CHICHAGOF ISLAND	4	1949	UNDET
MTN. GOAT	NO	BARANOF ISLAND	4	1923	UNDET
MUSKRAT	NO	KODIAK	8	1925	UNDET
CARIBOU	YES	NUSHAGAK PEN.	17	1987	YES
DEER	NO	KODIAK/AFOGNAK	8	1924	YES
DEER	NO	YAKUTAT	5	1934	YES
SEA OTTER	YES	PRIBILOF ISLANDS	10	1955	YES**
SEA OTTER	YES	YAKUTAT	5	1966	YES**
SEA OTTER	YES	BARANOF ISLAND	4	1968	YES**
SEA OTTER	YES	PRINCE OF WALES ISLAND	2	1968	YES**

\* FROM ALASKA GAME REGULATIONS NO.30, 1989

\*\* RECOGNIZED UNDER FEDERAL REGULATION FOR ALASKA NATIVES

Adapted from: Burriss and McKnight 1973

Several proposals concerning customary and traditional determinations and management of the GMU 26C musk ox herd were submitted to the Board of Game for consideration at its November 1989 meeting (proposal numbers 25-43 and 45). At that meeting, the Board of Game reexamined the evidence and determined that use of musk ox by residents of GMU 26C did qualify as a subsistence use. This decision has led to changes in the regulatory management of the musk ox herd. In this report is the information presented by the Division of Subsistence to the Board of Game as it considered the aforementioned proposals. It provides information about (1) past Board decisions concerning transplanted game populations, (2) the historic presence and use of musk ox in northern Alaska, (3) the contemporary pattern of subsistence activities in Kaktovik, and (4) the management regime regarding musk ox hunting in GMU 26C.

#### Wildlife Transplants and Subsistence Uses

While not common, wildlife transplants have been conducted from time to time in Alaska. Major transplants of big game and furbearers that have resulted in harvestable populations are listed in Table 1. Fish transplants and enhancement of wild fish stocks through hatchery programs are relatively more common than big game transplants, and occur throughout Alaska's coastal areas where there are significant fisheries.

Prior to allocating the harvestable surplus of a fish stock or game population, the Alaska Board of Fisheries or Board of Game determines whether there are customary and traditional subsistence uses of that stock or population. If subsistence uses are found to exist, then reasonable opportunities for subsistence uses are provided in regulation by the Board, prior to providing harvest opportunities for other uses, such as resident sport use, non-resident sport use, and commercial use. Each board examines fish stocks and game populations on a case by case basis and reviews factors contained in the eight criteria to determine if there are traditional uses of that stock or population.

The subsistence use determinations for major Alaskan game and furbearer transplants are listed in Table 1. In certain cases, the Board of Game has found customary and traditional subsistence

uses exist, while in other cases the Board has found that no customary and traditional subsistence uses exist. This is due to the differing character of use between the cases.

Subsistence uses of introduced species have been found in several instances. The Board of Game has found that there is a customary and traditional subsistence use of deer on Kodiak Island. Deer, introduced in 1934, developed into large, healthy populations on Kodiak Island and were quickly incorporated into the regular pattern of hunting and fishing activities of rural Kodiak communities. The pattern of use of deer was similar to the subsistence uses of other wild resources, so it was recognized as a subsistence use even though the deer had been introduced.

In another case, Alaska Natives are recognized by the federal government as having subsistence use of sea otters in southeast Alaska, where they were reintroduced after 1966. Sea otters had been eliminated from southeast waters by commercial harvesting in the early historic period. The transplanted sea otters once again are being incorporated into the patterns of wild resource harvest and use by southeast Natives.

In a third example, caribou were reintroduced to the Nushagak Peninsula in 1987, a traditional area from which they disappeared after the 1880s. Rural villages in GMU 17 currently have subsistence uses of caribou in GMU 17 where other caribou herds exist, particularly in the Mulchatna and Nushagak river drainages. This means there are customary and traditional uses of this newly transplanted population in GMU 17, although hunting is currently closed until a harvestable surplus exists.

In a fourth example somewhat analogous to newly introduced species, the Board of Game recognizes the customary and traditional subsistence uses of moose in GMU 22, 23, and 26. Since the 1940's, moose have naturally expanded their range into these areas and have been incorporated into the pattern of hunting activities of rural villages. In the 1800s and early 1900s moose were only occasional immigrants to northern Alaska and adjoining areas, but not in sufficient numbers to become established there (Coady 1980).

Customary and traditional subsistence uses have not been found to exist on transplanted game populations in several instances. For example, the Board of Game has not recognized subsistence uses

of bison transplants near Delta, Chitina, Farewell, and the upper Copper River valley (see Table 1). Bison were not indigenous to the transplant areas of interior Alaska during the historic period. These herds have grown slowly, and limited hunts have been allowed under a restricted drawing permit. The Board determined that no pattern of use had yet developed on these populations to warrant a positive customary and traditional finding.

In two other instances, mountain goat and Dall sheep were transplanted to Kodiak Island in 1952 and 1965, respectively. These are areas where the two species did not exist previously. The Board of Game has determined that, unlike deer, there are no customary and traditional uses of these transplanted populations. Other examples of transplanted populations with no customary and traditional uses are moose in the Copper River Delta (transplanted in 1949) and moose in Berner's Bay (transplanted in 1958). The Berner's Bay area is used by residents of Juneau, which had no subsistence uses because of its non-rural status in 1990.

Several transplanted game and small mammal populations have not yet received a customary and traditional use determination (see Table 1). These include particular transplants of beaver, fox, hare, marten, muskrat, caribou, and mountain goats.

To summarize, the Board of Game makes decisions about customary and traditional uses of particular game populations on a case by case basis. Decisions are based on the particular characteristics of each case. Uses of transplanted game are recognized as being subsistence uses in certain cases, and not in other cases, depending upon these facts.

#### Musk ox in the Alaskan Arctic.

The paleontological record shows that the musk ox (*Ovibus moschatos*) occupied much of unglaciated interior, western and all of northern Alaska during the Pleistocene (Harrington 1961; Hone 1934; Tener 1965). No precise documentation is available for the cause of its gradual range reduction, but by the 19th century only northern Alaska still harbored musk oxen (Bee and Hall 1956; Hone 1934; Hornady 1911). The most complete listing of recent Alaskan musk ox specimens (Bee and Hall 1956) and of recent archaeological finds near the arctic Alaska-Yukon boundary (MacNeish 1956 and 1958,

in Campbell 1962; Steensby 1917, in Hone 1934) are all from the Arctic Slope west of modern day Wainwright to the lower Firth River in the east. Casual observations of musk ox skins, skulls, and meat and accounts of harvesting activities from this period are also confined to arctic Alaska (Bee and Hall 1956; Brower and Hornady 1911; Gubser 1965; Hone 1934; Ingstad 1951; McKennan 1965 in Renewable Resources Consulting 1974) and Herschel Island eastward along the arctic coast of the Northwest Territories where Alaskan Inupiat hunted musk ox from time to time (Gubser 1965; Hone 1934).

#### Records of Local Use of Musk ox.

Musk ox were harvested south of Barrow by local Inupiat hunters as late as 1858 (Brower and Hornady 1911), in the Chandalar Lake area in 1897 (or 1898), and by Alaskan Nunamiut Inupiat in Canada in the very late 1800s (Gubser 1965). Murdoch (1885:98) mentions that although none were harvested while he wintered over in Barrow in 1884, one skull was brought into the community and he notes that,

"the natives knew the animal well, and called it by nearly the same name as the eastern Eskimos, but none had ever seen it alive."

Russell (1898:235) stated that,

"(muskox) were formerly common between the Mackenzie and Behring straits, as evidenced by the remains scattered over the tundra. The oldest natives at point Barrow say that their fathers killed muskox which were then abundant."

Turner (1886:203) writing about his work in northeastern Alaska stated that,

"...the northern Inuit (Eskimos) and Indians are so well acquainted with it, there can be no doubt that it has but recently disappeared, if scattered individuals do not yet inhabit the region north of the Rumiantzof mountains near the arctic coast."

Nunamiut Inupiat queried on the subject of musk ox hunting by Ingstad in the late 1940s and by Gubser in the early 1960s readily recalled that musk ox were at one time numerous and highly valued for their meat and skin. Musk ox were always fat, they were told, the meat tasted like that of mountain sheep (considered highly desirable), and skins were used for clothing, bedding, and shelter. Informants reported musk ox being hunted often and described specific musk ox hunting methods and

pertinent natural history information. Several common hunting locales on the mid- and lower-Colville River were pointed out to Gubser (1965). When conducting his fieldwork in the Anaktuvuk Pass area in 1951, Rausch found that the Nunamiut Inupiat had no problem identifying the skull of a musk ox (Rausch 1951).

According to Gubser's informants, musk ox numbers dwindled due to hunting pressure in northern Alaska during the early 1800s. This drove the animals to the east, where at least one informant recalled having hunted them again in the late 1800s.

Musk ox have been incorporated in the mythology of the Nunamiut Inupiat, and both Ingstad (1951) and Gubser (1965) recorded stories about musk ox hunting and taboos associated with musk ox hunting. This suggests that musk ox played more than a passing role in the Nunamiut economy and culture.

On the North Slope today, musk ox are still considered by many Native hunters to be part of the region's fauna, even though it has been absent from the area for nearly a hundred years. That is, musk ox is considered a subsistence species, alongside caribou and sheep. This is due in part to the endurance of the oral tradition pertaining to animals and hunting in Inupiat culture, and to a common Inupiat observation that species periodically fluctuate in abundance, disappear temporarily from an area and then reappear once again. According to Inupiat tradition, these disappearances are sometimes governed by changing natural factors and sometimes by spiritual factors. For instance, misconduct by hunters (such as wasteful practices) can result in the disappearance of game from an area, but game can reappear once again if the hunters are penitent and reform their practices. These beliefs may also account for why many residents today consider musk ox to be a subsistence animal.

#### Use of Musk Ox by Kaktovik Residents

In 1969 the Alaska Department of Fish and Game (ADF&G), with assistance from the United States Fish and Wildlife Service (USF&WS) and the residents of Kaktovik, released 52 musk ox on Barter Island. The objective was to re-establish this species to part of its historic range in Alaska (Jennings 1970). The transplanted musk ox established themselves in several smaller groups within the

Arctic Wildlife Range (now called Arctic National Wildlife Refuge, or ANWR) then expanded and began dispersing east and west out of the Refuge (Golden 1989). Musk ox are now found in northern parts of the Yukon Territory, in GMU 26B and in eastern portions of GMU 26A.

The transplanted musk ox fall within the traditional hunting territory of the community of Kaktovik, and most local interest in hunting the herd comes from Kaktovik. Kaktovik is the easternmost community in the North Slope Borough (NSB) and is the only community within GMU 26C (Fig. 1). The village is located on the northeast end of Barter Island, the largest of a series of barrier islands on the Beaufort Sea coast, approximately 360 miles east of Barrow, 130 miles east of Prudhoe Bay, 90 miles west of the Canadian border, and about 650 miles northeast of Anchorage.

The name Kaktovik is derived from the Inupiaq word meaning "seining place," referring to the abundant fish that may be netted in the nearby Kaktovik Lagoon. Barter Island, as its name implies, served as an Inupiat and Indian trade center until late in the nineteenth century when traditional Inupiat trade patterns began to deteriorate, probably due to the influences of commercial whaling, increasing fur demand and prices, and coupled with a general decrease in the caribou population. Permanent settlement on Barter Island during the recent historic period began about 1922 when a small trading post was established on the western side of the island, and several families built dwellings in its vicinity. As settlement increased, the community location gradually shifted to a sand spit on the northeastern side of the island (near the current village location) where an ancient village site and historic seasonal hunting camp were located.

An Office of Indian Affairs census in 1938 set the Barter Island population at 61, and the total population, between Flaxman Island in the west and Demarcation Point in the east, at 196. Many families living in the vicinity gradually moved in to Kaktovik, but even into the 1950s several large family groups still resided in seasonal camps along the coast from Prudhoe Bay to Herschel Island.

Today the village boasts a population of about 220 persons in 63 households. It is predominantly Inupiat (91 percent), with Inupiaq spoken by more than 80 percent of residents. Over three-fourths of the community residents (85 percent) were born and raised on the North Slope.

# North Slope

## GMU 26

Area Shown

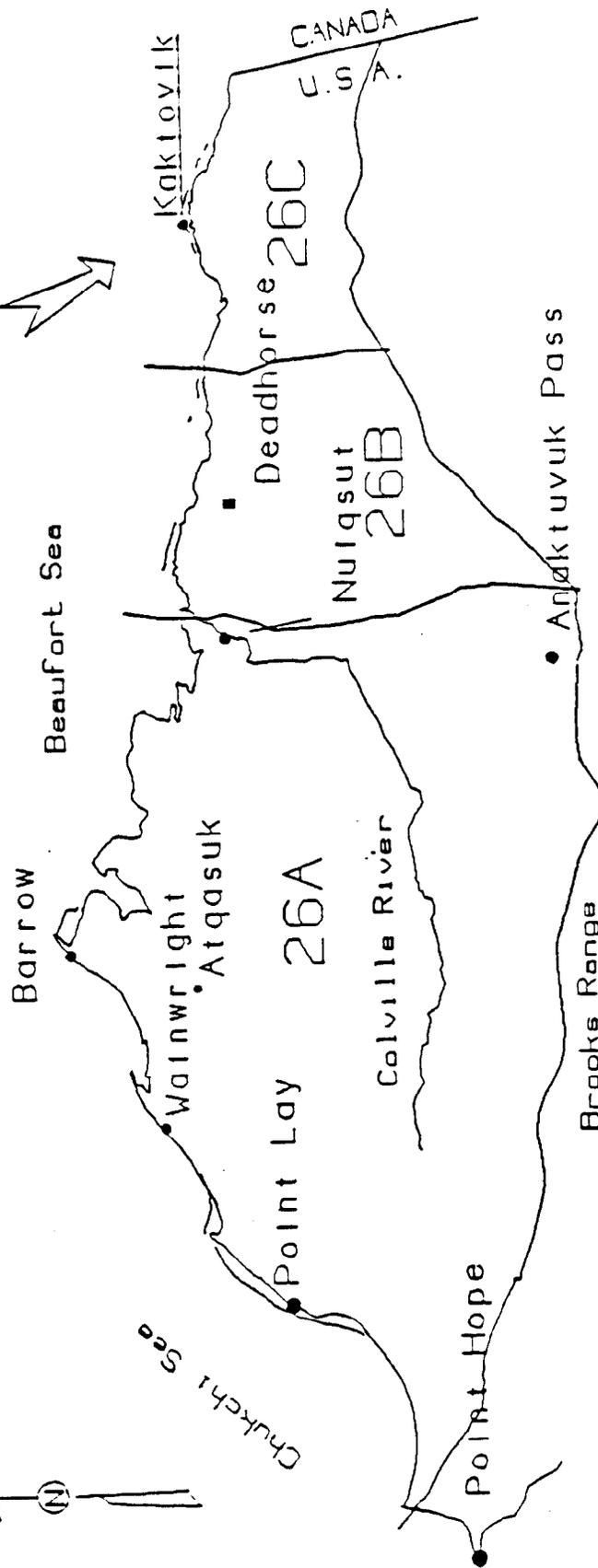
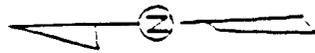
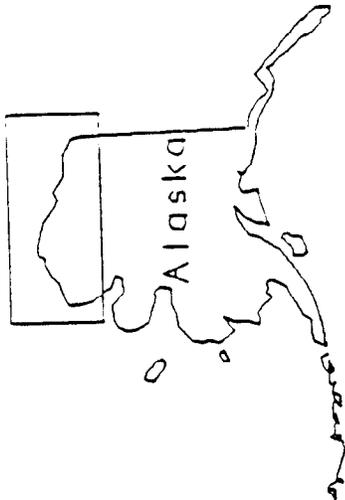


FIGURE 1. Location Map with GMU 26 Sub-unit Boundaries

About 15 percent of residents were born in seasonal settlements from Flaxman Island in the west to Herschel Island in the east, and 93 percent of community households had a relative living in the eastern Alaskan arctic before Kaktovik was established as a community.

Residents of the community refer to themselves as "Kaktovingmiut" ("people from the seining place") and trace their heritage to the eastern region of the North Slope. Many have relatives living in Aklavik, Inuvik and Tuktoyaktuk to the east in Canada and in Anaktuvuk Pass, Nuiqsut, Barrow and Wainwright to the west. Thus, even though the Kaktovingmiut occupy a relatively small part of the Alaskan arctic, they have sharing, trade and family ties and obligations over a far larger area much as did their ancestors.

The community has a mixed, subsistence-cash economy. Families participate in a complex pattern of fishing and hunting activities throughout the year, producing a substantial portion of the community's food supply. Most food is produced by the members of core households in the community. The subsistence products are then distributed to other households through lines of kinship and affiliation. Families earn income through a variety of wage employment opportunities primarily funded by regional or state government revenues. More details of this mixed, subsistence-cash economy are provided in the appendix of this report.

Musk ox hunting has recently become reintegrated in the annual pattern of subsistence activities as the herd has grown to allow a harvestable surplus in 1983. The community has responded by incorporating musk ox into the local pattern of activities in five distinct ways:

1. direct participation in the harvest;
2. inclusion of musk ox as a desirable source of locally produced meat;
3. indirect participation in the hunt by providing transportation and outfitting services to nonlocal sport hunters for cash and a share in the harvest;
4. use of musk ox hides and horns in the local manufacture of arts and craft items for trade, barter and cash;  
and
5. gradual community acceptance of musk ox meat and skin donated from non-local hunters and the distribution of these among community households.

Kaktovik hunters actively regard musk ox as a source of meat for community consumption, limited self-employment, and as a source of cash. From the time of the transplant to 1983, local hunters did not harvest any musk ox, although they repeatedly asked the ADF&G and the USF&WS when hunting could commence.

According to our records, expectations in Kaktovik were that once harvesting was deemed biologically justified, local residents would finally reap some benefits after all the years of musk ox being absent in the traditional dietary regime and abstinence from illegal harvest. Kaktovik hunters had participated actively in the transplant, in monitoring the status and distribution of the various herds which developed, in advising the ADF&G of the occurrence and location of dead and sick animals, and in collecting tag information from dead animals found in the field. Kaktovik hunters were interested in and enthused about the reappearance of a species which had historical roots in the area and in their culture and economy.

This enthusiasm was dampened in 1983 when the Board of Game opened hunting of GMU 26C musk ox without any substantial input from the local state fish and game advisory committee and made it a random drawing permit hunt with a \$500 tag fee. Kaktovik hunters expressed strong dissatisfaction to ADF&G staff over this allocation method for a resource with so much local interest and potential. No Kaktovik resident ever applied for these drawing hunts.

After a concerted effort by local residents, cooperation from ADF&G, and in response to the revised subsistence law, the Board of Game changed the GMU 26C musk ox hunt to a \$25 tag fee registration hunt in 1986, with five permits issued in Kaktovik on a first-come, first-served basis. Then in 1988 the number of permits was increased to 10, with five issued in Kaktovik and five in Fairbanks. At this time the concept of hunt zones was also implemented, though Kaktovik permittees could hunt anywhere in the unit. The registration hunt accomplished the goal of having the permit distribution on a local level. However, it did not anticipate the level of interest among sports hunters. In 1989, sport hunters from outside the region flew to Kaktovik to stand in line several days before the registration, and only one of the permits went to a local resident (a non-native short-term resident). The conflict between resident hunters and non-local sport hunters during the permit issuance was substantial

enough to receive news coverage. Still, local hunters by and large think it both unnecessary and demeaning to have to stand in line for hours (in 1986 and 1987) or days (1988 and 1989) to obtain a permit in direct competition with outside sport hunters.

Table 2 summarizes the distribution of GMU 26C musk ox permits since 1983. Kaktovik residents have been successful in acquiring some permits each year since they were made available locally (1985-86 season). Records indicate that 15 of 35 (43 percent) permits issued in Kaktovik between 1986 and 1989 went to community residents. For the 1989-90 season, however, only one of 10 permits (10 percent) went to a Kaktovik resident (a non-native public safety officer), causing quite a stir in the community. This precipitated an avalanche of musk ox regulation revision proposals from concerned Kaktovik residents.

TABLE 2. Allocation of GMU 26C Musk ox Permits, 1982-1989

Year	Total Number of Permits	Kaktovik Permittees	Other GMU 26 Permittees	Non-local Permittees
1982-83	5	0	0	5
1983-84	5	0	0	5
1984-85	5	0	0	5
1985-86	5	3	0	2
1986-87	5	4	0	1
1987-88	5	2	0	3
1988-89	10	5	0	5
1989-90	10	1	1	8
Totals	50	15	1	34

The permit hunt from 1985-86 to 1987-88 (three years) limited the hunting season to March, a time of cold temperatures, high winds and frequent snowstorms on the coastal plain, Kaktovik hunters utilized seven of nine musk ox permits issued during that time. Particularly inclement weather prevented two Kaktovik hunters from being successful during the 1986 season. Even with the fall hunt option (Aug. 15 to Sept. 15) available beginning in 1988-89, Kaktovik hunters have selected to hunt during the spring (March 1-31) season when access to the coastal plain and foothills is far easier and parallel hunting activities bring people to where the musk ox generally can be found. In 1988-89, all five locally available registration permits were issued to community residents, and four animals were harvested during the spring of 1989.

Kaktovik hunters typically employ the same equipment (snowmachine, sled and rifle) in a musk ox hunt as they use for caribou at this time of the year, and they often travel in small hunting groups of 2-3 snowmachines. The musk ox herd locations are well known to Kaktovik hunters. When weather conditions are sufficiently good they access either the Jago or Sadlerochit River group depending on how far they want to travel. Commonly a musk ox hunt is combined with searching for caribou and furbearers.

Musk ox groups typically stand their ground and form a defensive circle when approached by snowmachine, and it becomes a matter of waiting until a desired bull steps out of the group, and provides a clear target, before shooting. This can be quite challenging for the hunter in blowing snow conditions, as the herd is constantly moving around and the opportunity to fire a clean shot does not last long. Harvested musk ox are field dressed and then brought back to the community for final processing, division among hunting partners, and general distribution in the community. Generous sharing of any game, fish, or fowl is still regarded as a prerequisite for being a successful hunter.

Community subsistence harvest surveys in 1985-86, and again in 1986-87, found that Kaktovik hunters shared harvested musk ox widely in the community (Pedersen 1989). In 1985-86, when Kaktovik hunters harvested two musk ox, 42 percent of community households received a direct share. In 1986-87, Kaktovik hunters again harvested two musk oxen and the successful households shared their musk ox harvest with over 66 percent of local households. No quantitative information has been

gathered on local distribution of musk ox in other years, but observations in the community indicate that the interest in, sharing of, and sociocultural importance of musk ox is increasing in the Kaktovik subsistence economy. This interest is indicated by the number of musk ox regulation change proposals the Board of Game received from the community.

Musk ox have been incorporated further into the Kaktovik economy through local provision of transportation and outfitting services to non-local musk ox hunters. The March season is demanding physically on hunter and equipment, for it takes place at a time in the eastern arctic when temperatures are still extremely low, winds are strong, and blinding snowstorms are commonplace. Non-local hunters often have found themselves unprepared for these conditions and have waited long periods for decent weather when a rented snowmachine or a local hunter could transport the hunter to the nearest herd of musk ox. Non-local hunters have by and large stayed in a non-locally owned and operated commercial facility while in Kaktovik, but relied heavily on local expertise and equipment to facilitate the hunt. Providing non-local musk ox hunters with gear and transportation has brought some households a welcome financial boost. On the whole, the general community has not embraced this new economic activity, as it is still seen as unnecessary competition for a resource that is not satisfying local demand.

Non-local musk ox hunters rarely utilize all the available meat from animals they harvest. In the case of Kaktovik-supported hunters, the meat is usually donated to the assisting household. This arrangement seems to have worked fairly well, and is now considered as an acceptable source of meat. Non-local hunters who have successfully hunted musk ox unsupported and who have tried to donate meat to Kaktovik households have met with mixed success. Because the meat and carcass are not always treated in ways acceptable to local households, some donations have been passed by. Donations of meat from accidentally killed musk ox also have been rejected at times, largely due to the way in which the processing was done or the donation was made. However, some meat enters the community food-sharing system from non-local sources and is selectively accepted.

Use of musk ox horn and hide in the local manufacturer of arts and crafts items is just beginning, and several households are making a small number of craft items for sale. Musk ox horn was

formerly carved into a variety of culturally relevant artistic forms, including decorative ladles, and some carvers are now beginning to revitalize these Inupiat items. Skins and hair are used in the manufacture of skin masks and groundcover for camping. Some Kaktovik artists are experimenting with musk ox skulls and jawbones to create craft items.

Musk ox have been part of the Inupiat culture in northern Alaska for many years. Although musk ox disappeared from this part of their range in the mid- to late 19th century, and despite the gap in their active use of this resource, present day Inupiat have maintained their cultural connection to the resource and quickly closed the gap once the resource was deemed harvestable. The success story of the transplanted musk ox in northeast Alaska and the revitalized musk ox hunt in Kaktovik can be viewed as an example of what can be accomplished through scientific wildlife management and local Inupiat cooperation.

#### Board Actions at the November 1989 Meeting

In November 1989 at its regular fall meeting, the Board of Game heard staff reports and public testimony before deliberating on several musk ox regulation proposals submitted by Kaktovik residents. The Division of Wildlife Conservation (ADF&G) presented an historical overview and biological status report on Alaskan musk ox herds, and reviewed the history of the GMU 26C musk ox permit hunt from 1982-83 to 1989-90. The Bureau of Land Management updated the Board on its proposed transplant of musk ox from Nunivak Island to the central North Slope, while the USFWS discussed the status of musk ox in and near the ANWR. Information on the historic and current use of musk ox was presented by the Division of Subsistence (ADF&G).

Although only a few persons testified before the board, their views reflected the diversity of public opinion concerning the proposed designation of musk ox as a subsistence resource. North Slope residents described current uses of musk ox and believed a customary and traditional pattern had developed. They noted the participation of Kaktovik residents in the 1969 transplant and their agreement not to hunt the animals until a harvestable surplus existed. Fairbanks residents objected to GMU 26C musk ox being classified as a subsistence species and thought it should be managed for sport

uses. Both sides agreed with the board and management agencies that continued growth of the musk ox herd was desirable, which requires a conservative management regime.

After deliberations, the board concluded that Kaktovik had a customary and traditional use of musk ox in GMU's 26B and 26C, and that a subsistence hunt should be provided for in which only Kaktovik residents qualified. Several issues were discussed during deliberations, listed below.

(1) Can there be a customary and traditional use of an introduced or transplanted species?

The answer was "yes," depending on the facts in the particular case. Previous determinations on other transplanted game species were made on a case-by-case basis and yielded both positive and negative findings, as was noted earlier in this report. After weighing the available information and listening to the tape of a 1986 meeting at which the board found there were no subsistence uses of musk ox in Alaska, the present board initially moved to find that there was a subsistence use of musk ox in Kaktovik only if a harvestable surplus was present. This motion was withdrawn when the board was advised that subsistence determinations must be made independent of whether or not a harvestable surplus exists.

The written goals of musk ox reintroduction to Nunivak Island and the North Slope did not at that time include providing for subsistence uses, although "domestic use" and "restoration of the species to its historic range" were among the objectives.

The board discussed whether the long absence of musk ox from the North Slope meant that two subsistence criteria ("a long-term, consistent pattern of use" and "the handing down of knowledge between generations") could not be established. The board found that the pattern of musk ox use in Kaktovik was distinctly different from that occurring on Nunivak and Nelson islands. Use of musk ox on the North Slope was interrupted by population declines, which were beyond the control of area residents. Some public participants dispute this position and believe Inupiat hunters were at least partially responsible for the extirpation of musk ox from the North Slope. Although not currently harvested in large numbers, due in part to regulatory constraints, musk ox are considered an important resource in Kaktovik. Information on historic use patterns presented elsewhere in this report was not

disputed by the board. The board concluded that the facts weighed in favor of finding a subsistence and traditional use.

(2) What constitutes a "reasonable opportunity" for Kaktovik residents to hunt musk oxen? In view of the limited data available on the harvest and use of musk ox in the late 1800s, and because the current hunt is managed on a permit basis, the board had to determine what would be a reasonable opportunity for Kaktovik residents to harvest musk ox. The Department of Law advised that the discretion of the board to set allocation levels increases as the amount of historical or comparable information declines.

ADF&G management staff recommended that the harvest be distributed throughout the current range of musk ox in GMUs 26B and 26C. They proposed a maximum harvest of 5-10 bulls from the Kaktovik area, and an overall harvest ceiling of 14-15 musk ox (5 cows and 10 bulls). One Kaktovik representative testified that 10 musk ox probably would provide local residents with a reasonable opportunity and still leave some for sport hunters. The board evaluated this recommendation in the context of actual actual harvest levels and determined that an allocation of seven would provide Kaktovik with a reasonable opportunity. This exceeded previous allocations and left 50 percent of harvestable surplus available for non-subsistence hunters.

(3) How should the GMU 26 musk ox hunt be managed? The board raised five general issues concerning management: (a) What rate of herd growth is desired? (b) How will the Kaktovik permits be allocated? (c) How will the non-subsistence harvestable surplus be managed? (d) What will be the seasons of harvest? and (e) Should the tag fee remain unchanged?

Herd growth at the rate of the past three years was considered desirable. Staff said the harvest allocation of 14-15 musk ox would not affect the long-term population objective, although closing the season altogether might hasten the rate of growth. However, in the absence of a population problem and given the desire to make available musk ox harvest opportunities to the public, no serious consideration was given to closing the season.

The board considered delegating the authority to issue registration permits to a legal entity in Kaktovik, but was advised that it lacked this authority. Additionally, the Department of Law

questioned whether issuing a limited number of registration permits would provide reasonable opportunity to Kaktovik hunters. They questioned whether biological considerations might justify this approach. The Division of Wildlife Conservation (ADF&G) noted that a brown bear registration permit hunt in GMU 9D set the maximum number of permits at the total allowable harvest, thereby minimizing the risk of overharvest. The general consensus was that Kaktovik residents could best determine how to apportion the seven registration permits.

The resident/nonresident season was established by the board as a drawing permit hunt, with seven permits to be issued for bulls only. The open season for both the subsistence and resident/nonresident seasons was set as October 1-31 and March 1-31. A September season was rejected due to concern for the damage that might be caused if all-terrain vehicles were used, especially in and near the Arctic National Wildlife Refuge.

Finally, because the board adopted a proposal authorizing a registration permit hunt for local subsistence hunters in GMUs 26B and 26C, a \$25 tag fee had to be established to conform with Alaska Statute 16.05.346, which requires such a fee. It should be noted that the \$500 tag fee still applies to any drawing permit hunt in the area.

#### Summary

Government agencies have carried out over 30 game transplants in Alaska. The Board of Game has made subsistence evaluations on some of these transplanted species on a case by case basis. Musk ox in the Arctic Region were classified as not having subsistence status at the June 1986 Emergency Board of Game meeting. This initial finding was based on partial information. Residents in the Eastern Arctic, where there has been some limited musk ox hunting opportunities since 1983, proposed that the finding be re-evaluated with additional information and the hunt be made more suitable to local circumstances. In November 1989, after careful review of available information the Board of Game determined that there were subsistence uses for musk ox in the Eastern Arctic (GMU 26B and C) and allocated 7 of 14 musk ox permits for the 1990-1991 season to subsistence use by residents of the village of Kaktovik.

### References Cited

- Bee, James W., and E. Raymond Hall  
1956 Mammals of Northern Alaska on the Arctic Slope. University of Kansas, Museum of Natural History. Misc. Publ. No.8. Lawrence.
- Burris, Oliver E., and Donald E. McKnight  
1973 Game Transplants in Alaska. Wildlife Technical Bulletin No. 4. Alaska Department of Fish and Game.
- Campbell, John Martin  
1962 Anaktuvuk Prehistory: A Study in Environmental Adadptation. PhD. Yale University. New Haven, Connecticut.
- Coady, John W.  
1980 History of Moose in Northern Alaska and Adjacent Regions. Canadian Field-Naturalist 94(1): 61-68.
- Golden, Howard  
1989 Annual Progress Report, Muskoxen Survey and Inventory Activities FY 1988. Division of Wildlife Conservation, Alaska Department of Fish and Game, Juneau.
- Gubser, Nicholas J.  
1965 The Nunamiut Eskimos: Hunters of Caribou. Yale University Press. New Haven.
- Harrington, Charles R.  
1961 History, Distribution, and Ecology of the Muskoxen. M.S. Thesis, McGill University, Department of Geography, Montreal.
- Hone, Elizabeth  
1934 The Present Status of the Muskox in Arctic North America and Greenland, With Notes on Distribution, Extirpation, Transplantation, Protection Habits and Life History. American Committee for Wildlife Protection. Special Publication No. 5.
- Hornaday, William T., and Charles Brewer  
1911 The Muskox in Alaska. Zoological Society Bulletin (New York) 45:754-755.
- Ingstad, Helge  
1951 Nunamiut: Blant Alaskas Innlands-eskimoer. Gyldendal Norsk Forlag. Oslo, Norway.
- Jennings, Larry B.  
1970 Muskox Transplant. Alaska Department of Fish and Game. Division of Game. Juneau. Volume X, Federal Aid in Wildlife Restoration Project.
- MacNeish, Richard  
1956 The Engigstciak Site on the Yukon Arctic Coast. Anthropological Papers of the University of Alaska 4(2):91-111, College, Alaska.
- MacNeish, Richard  
1958 Flora and Fauna of the Engigstciak Site (Unpublished Table). Files U.S Fish and Wildlife Service, Arctic National Wildlife Refuge, Fairbanks, Alaska.

- McKenna, Robert A.  
 1965 The Chandalar Kutchin. Arctic Institute of North America Technical Paper No.17. Montreal.
- Murdoch, John  
 1885 Ethnological Results of the Point Barrow Expedition, in Ninth Annual Report, Bureau of American Ethnology.
- Pedersen, Sverre  
 In prep. Subsistence Resource Harvests and Use in Kaktovik, Alaska, 1985-1987. Technical Paper No. 172. Division of Subsistence, Alaska Department of Fish and Game. Juneau.
- Pedersen, Sverre, Michael Coffing, and Jane Thompson  
 1985 Subsistence Land Use and Place Name Maps for Kaktovik, Alaska. Technical Paper No. 109. Division of Subsistence, Alaska Department of Fish and Game. Juneau.
- Pedersen, Sverre , and Neil Shishido  
 In prep. Contemporary Subsistence Land and Resource Use in Nuiqsut, Alaska. Technical Paper No.170. Division of Subsistence, Alaska Department of Fish and Game. Juneau.
- Rausch, Robert  
 1951 Notes on the Nunamiut Eskimo and Mammals of the Anaktuvuk Pass Region, Brooks Range, Alaska. Arctic 4(3):47-195.
- Russell, Frank  
 1898 Explorations in the Far North. Being the Report of an Expedition Under the Auspices of the University of Iowa During the Years 1892, 1893, and 1894. University of Iowa, Iowa City.
- Steensby, H. P.  
 1917 An Anthropogeographical Study of the Origin of the Eskimo Culture. Meddelelser Om Gronland 53 (2). Copenhagen.
- Tener, John S.  
 1965 Muskoxen in Canada. Canadian Wildlife Service (Ottawa). Monograph No. 2.
- Turner, Lucien M.  
 1886 Contributions to the Natural History of Alaska, Results of Investigations Made Chiefly in the Yukon District and Aleutian Islands; Conducted Under the Auspices of the Signal Service, United States Army, Extending from May, 1874, to August, 1881 Government Printing Office, Washington. (Arctic Series No.2)

## Appendix A: The Kaktovik Economy and Community Harvest Area

### The Kaktovik Economy

Kaktovik has a mixed subsistence-cash economy. Harvesting of local wild resources is a key element in the economy (and in the Inupiat culture), and annually contributes a substantial amount of food to the community -- 326 pounds per capita in 1986 and 429 pounds per capita in 1987 (Pedersen 1989). A wide variety of resources is harvested by Kaktovik residents (Table 3), including large terrestrial mammals, marine mammals, fish, and waterfowl. Other resources such as small mammals, ptarmigan, and berries are used as well and are essential in an environment where major fluctuations in cycles of resource abundance and distribution are commonplace. The community seasonal round (Table 3) closely resembles that of nearby North Slope communities and, with minor change in species emphasis, is similar to that of previous generations.

Average community household income was estimated at \$28,000 in 1986 (Pedersen, in prep.), with a cost of living more than twice as high as Anchorage. The effective household income was thus less than \$14,000 per year, or about \$4,000 per capita (with average household size of 3.5). The main employer in the community is local government, which together with local trade and services account for over 60 percent of available jobs. Very few residents are engaged in oil and gas industry related employment.

A recent (1989) Division of Subsistence harvest survey in the community found that 98 percent of community households had used and 92 percent had harvested local resources in the preceding 12 months (Pedersen, in prep.). Sharing of resources between households in the community is widespread. Survey information from 1986-87 showed that all households received a resource share from another household that year, while 83 percent gave locally harvested resources to other households in the same period.

TABLE 3. Kaktovik Resources Harvested and Seasonal Round

RESOURCE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Marine fish							Occasional	Primary	Primary	Occasional		
Freshwater fish	Occasional	Occasional	Primary	Primary	Occasional					Occasional	Primary	Occasional
Moose									Occasional	Occasional	Occasional	Occasional
Muskox			Primary									
Grizzly bear			Occasional									
Dall sheep	Occasional	Occasional	Primary	Occasional						Occasional	Primary	Occasional
Caribou	Occasional	Occasional	Primary	Primary	Occasional		Primary	Primary	Occasional	Primary	Primary	Occasional
Furbearers	Occasional	Occasional	Primary	Occasional						Occasional	Primary	Occasional
Bowhead whales									Primary	Occasional		
Seals	Occasional	Occasional	Occasional	Occasional	Primary	Occasional	Occasional	Occasional	Primary	Occasional	Occasional	Occasional
Polar bear	Occasional	Occasional	Occasional	Occasional	Occasional			Occasional	Occasional	Occasional	Occasional	Occasional
Waterfowl (sp.)				Occasional	Primary	Occasional	Occasional	Occasional	Primary			
Small mammals			Occasional	Primary	Primary	Occasional			Occasional	Primary	Occasional	
Ptarmigan (sp.)	Occasional	Occasional	Primary	Occasional					Occasional	Occasional	Occasional	Occasional
Berries (sp.)							Primary	Primary	Primary			

 Primary periods of harvest  
 Occasional periods of harvest  
 No harvest occurring

### Community Harvest Area

The resource harvest area associated with Kaktovik is estimated to cover ca. 11,400 square miles (Pedersen *et al.* 1985) (Fig. 2). Since intensive study began on Kaktovik land use, it appears that the activity is presently concentrated in an area extending from the Canadian border in the east, to Tigvariak Island in the west and inland to the continental divide of the Brooks Range. Much of this range was historically utilized from dispersed settlements before consolidation of families at Kaktovik.

Subsistence harvesting activities during the snow and ice-free season ("summer"--late June through early October) are presently concentrated along the nearshore, coastal, and near coastal (up to 5 miles inland) portion of the use area. Small aluminum outboard-powered boats, commonly 18' "Lund"-type, are used along the coast, and inland destinations are reached on foot or with three/four-wheel all-terrain vehicles. The absence of navigable rivers in their area currently restricts summer access to the inland portions of the coastal plain and to the mountains. However, it is not uncommon for Kaktovingmiut to travel extensively at this time of year, and in the course of a summer many will have covered the coastal region from the MacKenzie River in the east to Prudhoe Bay in the west.

Marine mammal harvests as well as caribou hunting, fishing and berrypicking are the main activities at this time of the year. The major subsistence harvests during "summer" have in recent years occurred between Pokok Bay and Flaxman Island.

It is during "winter," from early October until mid-June when snow covers the ground and the ocean and rivers are ice-covered, that the Kaktovingmiut occupy their entire terrestrial resource area and when the coastal plain, foothills and mountains are intensively used. Hunting, trapping and ice-fishing take residents far and wide at this time of the year, and seasonal camps are established at selected inland locations to serve as social and logistical centers. Since our studies began in Kaktovik (1980) the coastal and nearshore area from Barter Island to the Canning River, the Sadlerochit to Aichilik River drainages (including the intervening mountains), and the coastal and nearshore portion from Barter Island to, and the drainage of, the Kongakut River are regularly, and in some cases intensively used each winter. Caribou, sheep, moose, and musk ox are harvested at this time as are furbearers, fish, and seals.

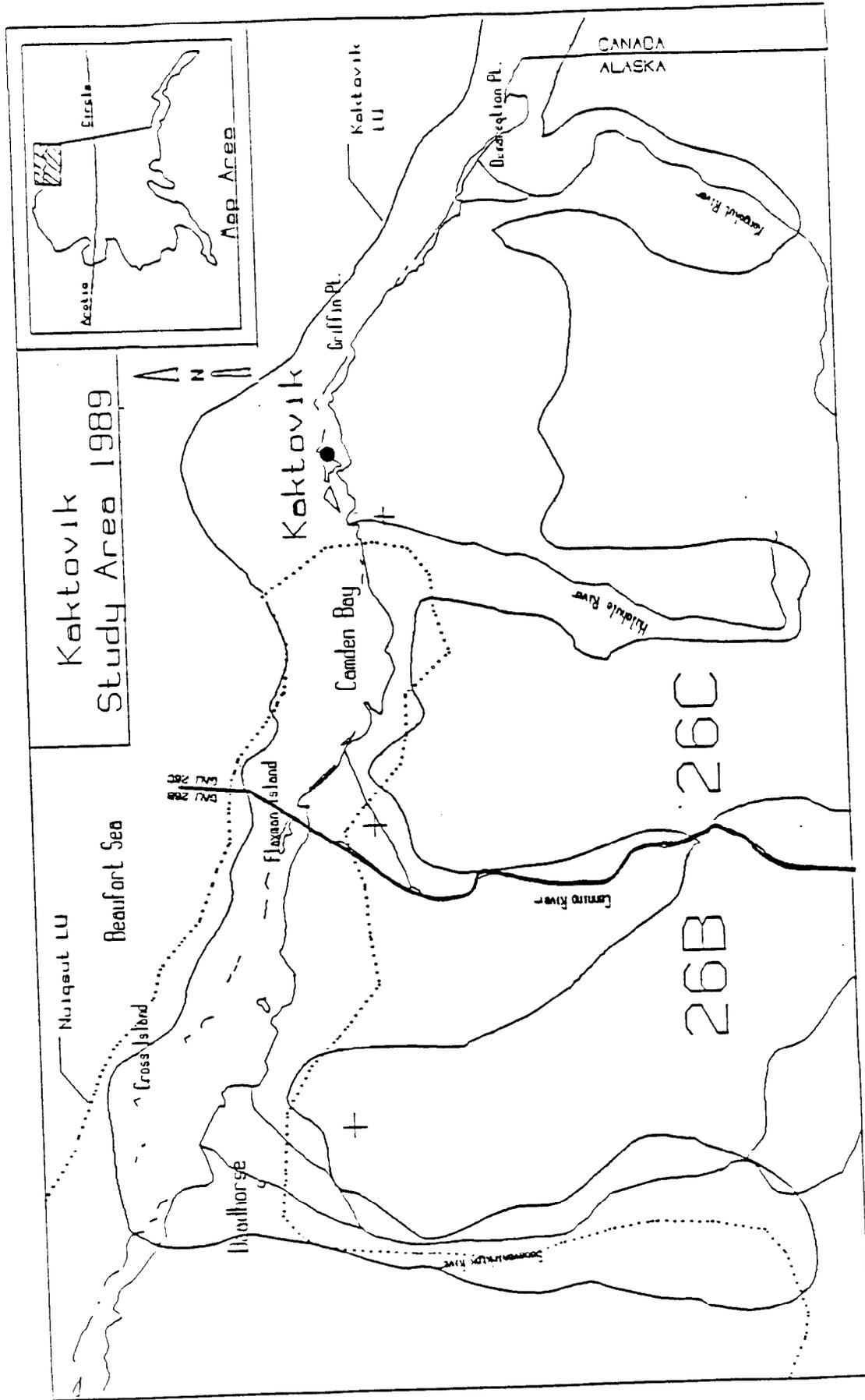


FIGURE 2. Subsistence Land Use in Northeastern Alaska

## Appendix B. Land Status in the Eastern Alaskan Arctic.

### Land Status

Lands in GMU 26C are owned by the U.S. Fish and Wildlife Service (FWS) and the Arctic Slope Regional Corporation/the Kaktovik Inupiat Corporation (ASRC/KIC). The FWS lands are managed as the Arctic National Wildlife Refuge (ANWR), and ASRC/KIC are managing their lands for multiple use at this time. Lands in GMU 26B are held mainly by the State of Alaska, and are managed for multiple use, with a heavy emphasis on oil and gas leasing, development and production. The FWS manages the southeastern portion of the unit as part of ANWR, with some private (ASRC) inholdings. Within the area there are also over 100 Native allotments (land parcels up to 160 acres) applied for and approved that primarily belong to residents of Kaktovik.

Existing land uses in the area include subsistence hunting, fishing, trapping and gathering by the communities of Kaktovik and Nuiqsut (Figure 2), native cultural resource sites (nearly 200 recorded in the area, such as old graves, former family homesites, sites associated with various historic events, many of which qualify as significant archaeological sites), and Native allotments used as hunting, trapping, or fishing camps by local residents. Sport hunting and fishing as well as guiding and outfitting increasingly account for land use in the area as well. Industrial land use continues to increase in the central and eastern Alaskan Arctic. River guiding/floating, hiking and a variety of government and private industry mineral survey and assessment projects also take place annually on lands within GMUs 26B and 26C.