CARIBOU HUNTING: LAND USE DIMENSIONS AND RECENT HARVEST PATTERNS IN KAKTOVIK, NORTHEAST ALASKA

by

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ABSTRACT

This report presents information on the caribou hunting areas, and caribou harvest levels for three study years (1981-83) by residents of the northeast Alaska community of Kaktovik. Based on compilation of detailed individual interviews with active caribou hunting households in the community, the general caribou hunting range was determined to cover about 7,600 square miles (19,600 sq km) and the intensively used area found to be about 2,900 square miles (7,500 sq km). Detailed caribou harvest information for the regulatory years 1981-82, 1982-83, and 1983-84 (July only) were collected through both formal and informal interviews with community hunters. The annual caribou harvest levels were highly variable during the three-year study period. In regulatory year 1981-82 the harvest was 43 caribou, whereas in regulatory year 1982-83 a total of 110 caribou were taken by community hunters. Twenty-nine caribou were harvested in July 1983, representing the first month's harvest of the 1983-84 caribou season. The average annual harvest level in recent years has been variously estimated to be about 100 caribou per year.

Site-specific and temporal harvest data were found to correlate closely with the general and intensive range information. For the two years in which detailed harvest information is available, 70 percent of all caribou harvested were taken on the coastal plain on or near the coast and 30 percent of the harvest came from the foothills and mountain region to the south of Kaktovik.

Based on the best available caribou herd distribution information, it appears that roughly half of the caribou harvest taken during the period 1981 to 1983 each came from the Porcupine and Central Arctic herds. In

1981-82, most caribou derived from the Central Arctic Herd; whereas in 1982-83 most caribou came from the Porcupine Herd.

Traditional caribou hunting areas, intensively used caribou harvest areas, and recent (1981-83) harvest sites occur in areas either undergoing rapid industrialization or being considered for oil and gas exploration and development in the near future. Furthermore, areas already industrialized did not contribute caribou to Kaktovik's annual harvest in the study period. This may be an early signal that there already is significant impact of oil and gas development on traditional caribou hunting patterns in Kaktovik.

Caribou are presently the most important local terrestrial food resource to Kaktovik residents. Conservation of this resource and its habitat, as well as recognition of the special role that caribou play in the lives of Kaktovik residents, are important elements in the formulation of land and resource management plans in Northeast Alaska.

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INTRODUCTION

This report is part of a long term study of land and resource use in the community of Kaktovik in northeast Alaska. It describes and analyzes particular findings on caribou hunting and harvesting in Kaktovik. The long term study was initiated due to a near paucity of reasonably detailed qualitative and quantitative information on hunting, fishing, and gathering activities for the community. Faced with rapidly changing nearby land and resource management conditions that could have significant effects on the community's subsistence activities, the acquisition of these data was deemed desirable by the staff of Alaska Department of Fish and Game, Division of Subsistence, Arctic Region. The present report serves to carry out the Division's mandate to "conduct studies to gather information, including data from subsistence users on all aspects of the role of subsistence hunting and fishing in the lives of the residents of the State" and to "make the information available to the public, appropriate agencies, and other organized bodies" (AS 16.05.094). In particular, this study was aimed at ensuring that regional land and resource management planning efforts for the Arctic National Wildlife Refuge and adjacent State lands had information available that would allow for the consideration of the interests of local residents in land and resource management plans in northeast Alaska.

The eastern and central arctic slope of Alaska are facing increasing industrialization. Major land reclassification to accommodate this expansion is occurring as a result. Caribou range, and consequently caribou hunting ranges, are among the resources being affected by these decisions. Concern for the conservation of caribou and the welfare of

those who depend upon caribou in this region of Alaska and Canada has been expressed for some time. In 1980, these concerns culminated in a proposed international caribou convention between the United State of America and Canada (U.S. Department of State 1980). The convention would provide for the conservation of migratory caribou and their habitat in northeast Alaska and northwest Canada. Though the American administration has placed a hold on this effort, full recognition exists at the governmental as well as public level in both countries that some arrangement must be found whereby this international resource, its habitat, and a small group of caribou hunters are managed with similar goals and objectives in mind.

On the Alaskan side of the north slope, efforts are underway to further expand the area available to oil and gas exploration and development to the east of Prudhoe Bay. A recent land trade between the U.S. Department of the Interior and the Arctic Slope Regional Corporation (ASRC) resulted in opening up ASRC lands near Barter Island within the Refuge to oil and gas exploration. A portion of the Arctic National Wildlife Refuge may also be opened, an option that is to be decided. This may include opening a portion of the Arctic National Wildlife Refuge (ANWR) to exploration, an option that is to be decided by Congress in 1986 after detailed baseline studies in ANWR have been undertaken (Section 1002, ANILCA 1980). Since the late 1950s, the Refuge has been a conservation area harboring the calving ground and summer range of the Porcupine Caribou Herd, among other resources. Studies are under way by the U.S. Fish and Wildlife Service (USFWS) and the Alaska Department of Fish and Game (ADF&G) to secure natural resource baseline information for the area and to evaluate the proposed land status change for the U.S. Department of the Interior by early 1986. To ensure that baseline

subsistence information is available to the associated decision making process, the Division of Subsistence of the Alaska Department of Fish and Game began collecting land and resource use information for the area in 1980.

PURPOSE

Caribou is the major big game resource in the northeast Arctic, so the study focused much of its attention on use dimensions relating to caribou. The purpose of this report is to describe the spatial requirements over time of Kaktovik caribou hunters, to define those areas in which the majority of all caribou harvest takes place over time, to report on detailed annual harvest data from community caribou harvesters, and to discuss these findings with respect to ongoing oil and gas development in northeast Alaska. Although caribou is known to be a major resource taken by Kaktovik residents for subsistence use, there have been conflicting and incomplete documentation of caribou use in the region. For instance, recent harvest estimates indicate that 100 to 300 caribou were taken annually by Kaktovik hunters in the 1970s (U.S. Department of State 1980), that an average of 75 caribou were harvested annually between 1962 and 1982 (ACI 1984), and that an estimated 80 were taken in 1980 (Jacobson and Wentworth 1982). There have been no studies, as far as could be ascertained from a thorough review of the literature, that have attempted to confidently state the annual caribou harvest level in the community, which herds the harvest was drawn from, sex composition of the harvest, where and when the harvesting activities took place, and the aerial extent of caribou hunting land use. This report is meant as a first step towards meeting this important information need.

STUDY AREA

The study area, shown in Figure 1, is in northeast Alaska, entirely north of the Arctic Circle. It is bounded by the Sagavanirktok River in the west, by the U.S./Canada border in the east, by the Brooks Range continental divide in the south, and by the Beaufort Sea to the north. Three physiographic provinces, the Arctic Coastal Plain, the Arctic Foothills, and the Brooks Mountain Range, are represented in the study area (Warhaftig 1965). The climate throughout the area is classified as Arctic (Searby 1968), with a mean annual precipitation of five to ten inches (12.7 to 25.4 cm) (Selkregg 1976), average summer and winter temperatures in the neighborhood of 41°F to -4°F (5°C to -20°C) respectively, and almost continuous easterly winds at about 13 knots (24 km/hr) at Barter Island, with occasional westerlies up to 80 knots (148 km/hr) (U.S. Fish and Wildlife Service 1982).

Land ownership in the study area is divided among state, federal, and native corporation holdings (Fig. 2). Major portions of the state lands, managed by the Department of Natural Resources (DNR), have either been leased or are in the process of being leased to industry for oil and gas exploration and development. The federal land is managed by the U.S. Fish and Wildlife Service as the Arctic National Wildlife Refuge. No industrial development has occurred or is occurring in this area at this time, although the opening of the refuge to exploration is under discussion, as indicated in the Introduction. The native corporation land holdings along the coast in the vicinity of Barter Island are managed by the Arctic Slope Regional Corporation (ASRC). A recent cooperative land action between the ASRC and the Department of the Interior, as mentioned

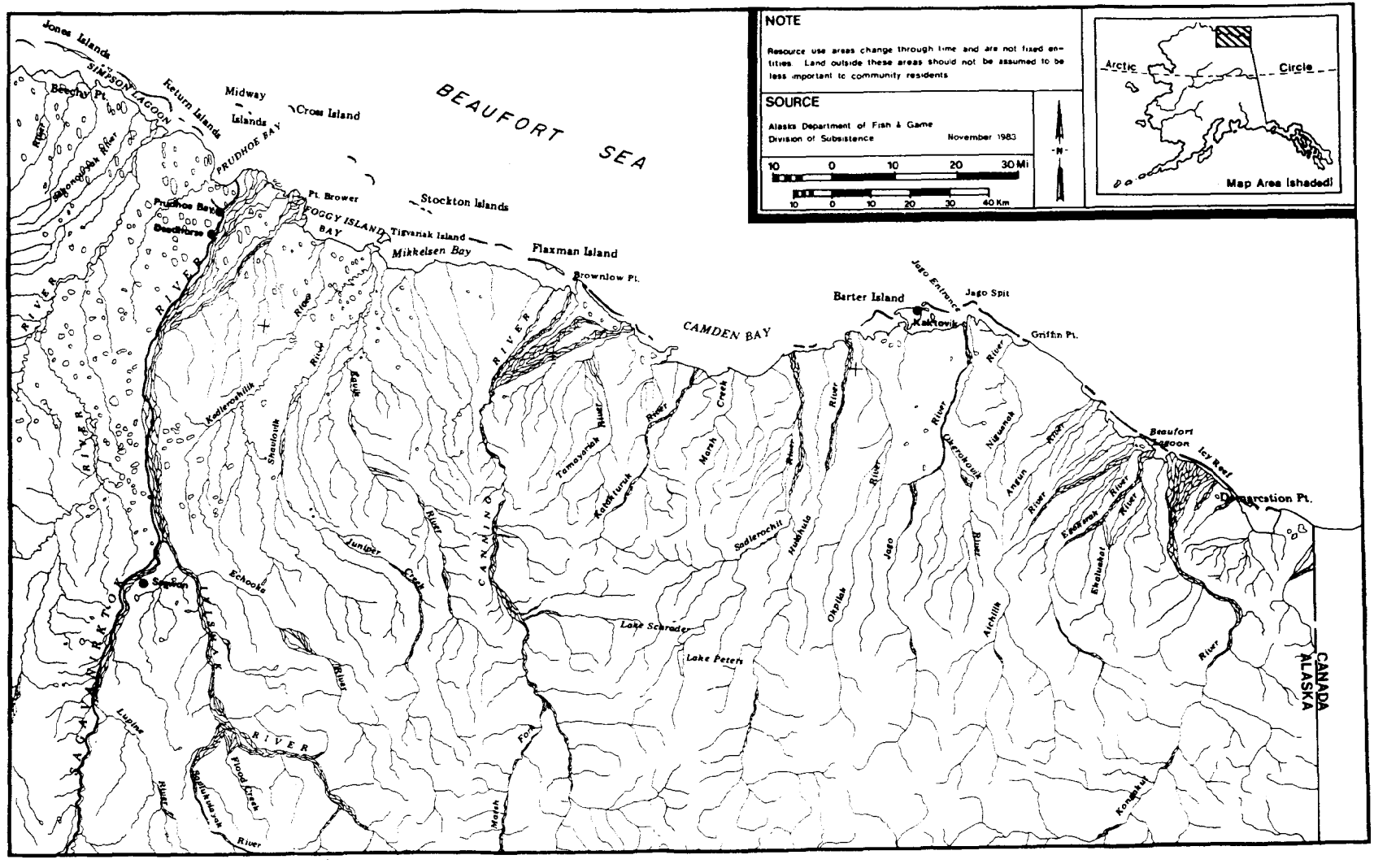

Fig. 1. The study area.

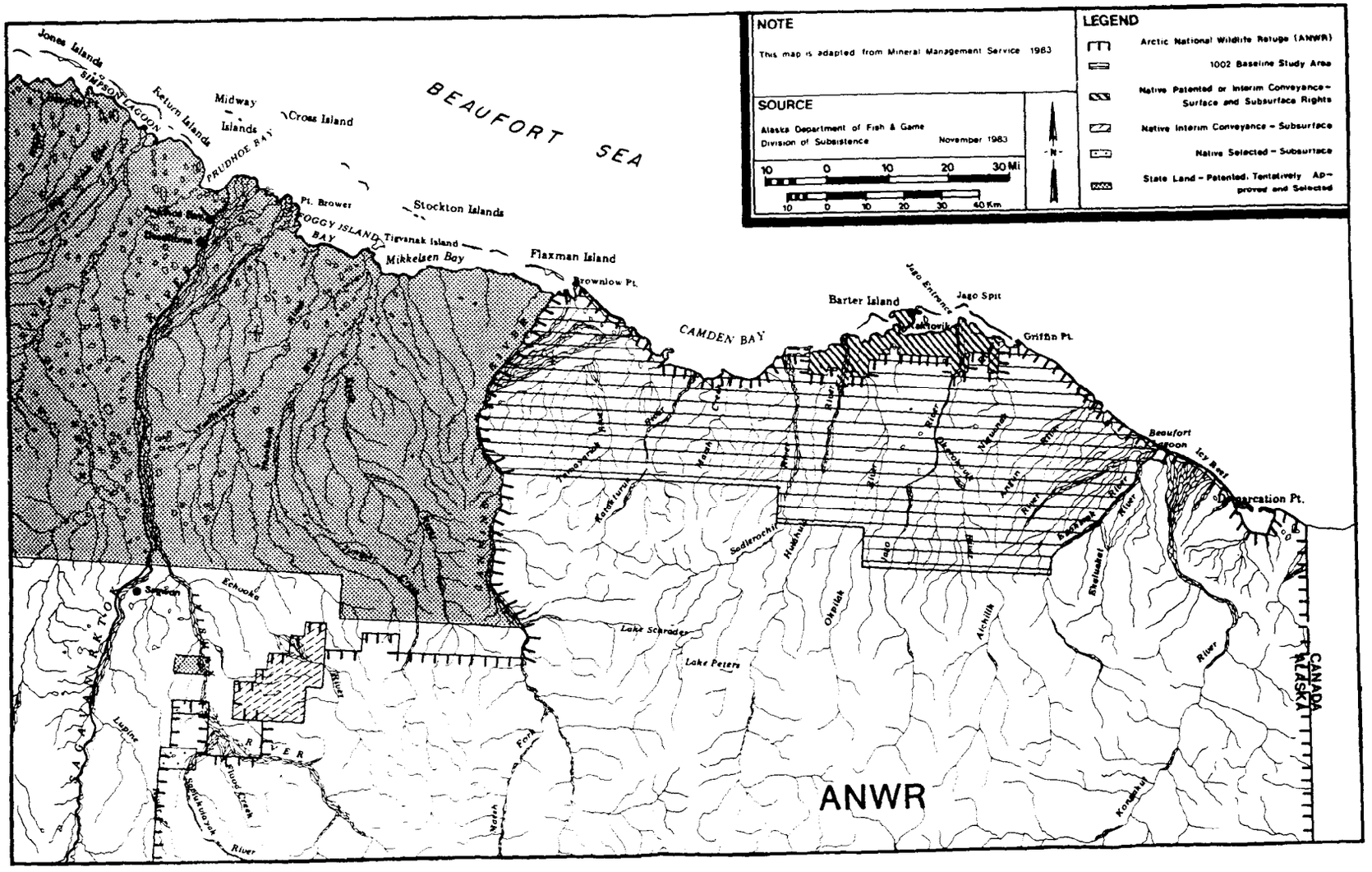

Fig. 2. Land status in the study area.

in the Introduction, has opened these lands up to exploratory drilling and plans are underway to begin such work in late 1984 or early 1985.

One permanent settlement, the village of Kaktovik, lies within the study area. It is located on Barter Island (Fig. 1), one of the largest barrier islands along the Beaufort Sea coast, about 90 miles west of the Canadian border and 120 miles east of Deadhorse (Prudhoe Bay). The village had its beginning in 1923 when a trading post was established on Barter Island, near an abandoned precontact settlement, and several families settled in its vicinity (Kaveolook 1977). Kaktovik has been a second class city since 1971 (Alaska Consultants Inc. 1983), with a population of approximately 200 people in 1983. A North Slope Borough census in mid-1982 placed the population at 189, of which 90 percent were Inupiat (Alaska Consultants Inc. 1984; Jacobson and Wentworth 1982; Pedersen 1982; North Slope Borough 1979; U.S. Department of the Interior 1974). The community is organized into an IRA council as well as a Native profit corporation called the Kaktovik Inupiat Corporation.

The village economy today has been characterized as mixed cash and subsistence (USFWS 1982). There is a considerable reliance on locally harvested resources (Kruse, Kleinfeld, Travis, and Leask 1980; Peterson 1978) including bowhead whale, caribou, fish, migratory waterfowl, and a variety of terrestrial birds and mammals (Appendix 1). Consequently, ties to the nearby land and ocean are understandably strong. Recent studies in Kaktovik have found caribou to be the main terrestrial big game species harvested by village hunters (Alaska Consultants Inc. 1984; Jacobson and Wentworth 1982; Pedersen 1982; North Slope Borough 1979; U.S. Department of the Interior 1974).

Two caribou herds, the Porcupine Herd and the Central Arctic Herd, range within Kaktovik's caribou hunting area (Pedersen and Caulfield 1981b). The range of each herd in the study area is depicted in Figure 3 (adapted from USFWS 1982). As shown in Figure 3, the range of the Central Arctic Herd and Porcupine Caribou Herd overlap in the study area, approximately in the vicinity of the Canning River and east to the Hulahula River. Population estimates place the Porcupine Caribou Herd at approximately 137,000 in 1982 (Whitten and Cameron 1983) and the Central Arctic Herd at approximately 9,000 in 1981 (Cameron, Whitten, and Smith 1983). Both herds are considered to be increasing in numbers slowly.

METHODOLOGY

In order to gain a full understanding of land use associated with caribou hunting and harvesting on a longitudinal basis, we interviewed Kaktovik households, with emphasis on long term residents, to acquire information on their extent and intensity of land use. The first phase of our investigation was aimed at delineating, as closely as possible, the total areal extent of caribou hunting activities in Kaktovik over time. This involved detailed land use mapping sessions with all resident caribou hunting households in the community using the same basic methodology as outlined by Freeman (1976) and Pedersen (1979). Each household drew on an acetate- or mylar-covered map (1:250,000 scale U.S. Geological Survey quadrangles) the total range that had been used by the household for caribou hunting since its establishment in the community. The resulting map is referred to as a household biography map. There was no attempt to place a value or relative importance on any piece of information provided in these interviews, but only to document the use or lack of use of land

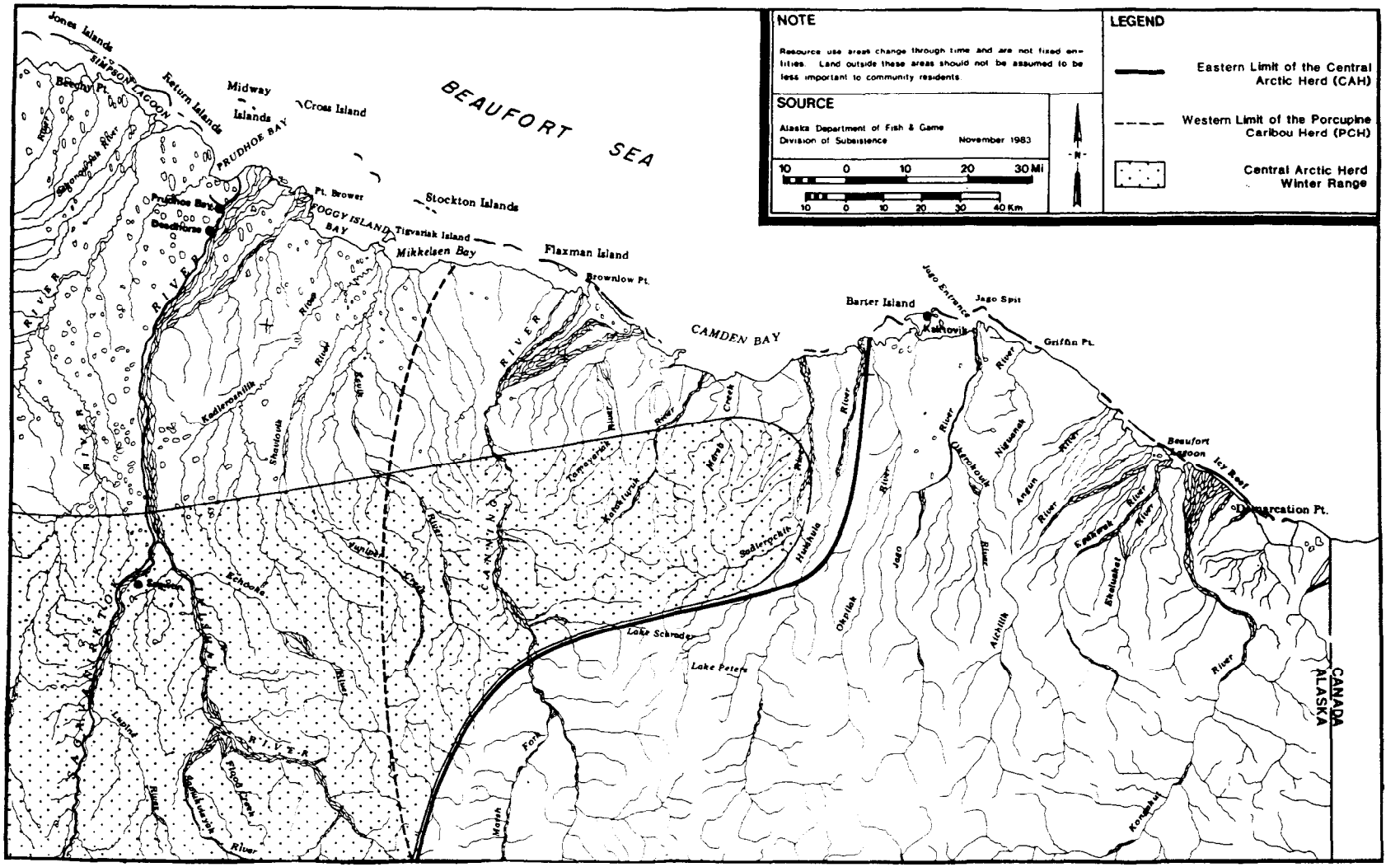

Fig. 3. Caribou herd ranges in northeast Alaska

areas. The biography information was collected from individual households on the condition that they would remain anonymous and that individual biography maps would not be released to other researchers without specific written permission.

Based on a community household census and interviews with key respondents, approximately 48 households in Kaktovik were identified as permanent. Thirty-seven of these households had members who hunted caribou. From 1980 to 1983, detailed household map biographies of caribou hunting areas were collected for 20 households. During a community review of the aggregate information, 12 additional households contributed to the aggregate information for a total sample size of 32 households. There is considerable interaction between households in the community and some are, in fact, subsets of cooperative hunting groups. Though our direct sample accounts for only 86 percent of the resident caribou hunting households, the community use area depicted probably represents close to 100 percent of the total area utilized by Kaktovik residents. Interview information indicates that those five households not interviewed (14 percent) do not represent a distinct caribou hunting group in the community but are in fact subsets of extended family groups whose use patterns are already accounted for in the aggregate maps.

The study's second phase was carried out in 1982 and 1983. It focused on delineating those areas which caribou hunters recalled they utilized the most -- that is, the areas where they drew the highest caribou harvest from over time. This information also was acquired through detailed land use mapping sessions. First the perceived intensively used areas of the 13 most active caribou hunting households in the community were mapped during detailed interviews utilizing the

question: where, over time, do you seem to consistently harvest the most caribou during summer (no ice and no snow) and winter (ice and snow conditions). The intensive map biography information was aggregated and reviewed with all remaining households in the community on an individual basis, and additional information added to the maps. The final draft community summary map product from these interviews was brought back to the community for final review in the summer of 1983. As a result, the intensity information portrayed in Figure 6 has been reviewed and approved by all 37 designated active caribou hunting households and by the 11 households designated as not active, as well as by members of the City Council and Kaktovik representatives on the Eastern Arctic Fish and Game Advisory Committee and the North Slope Borough Fish and Game Management Committee.

In addition to collecting land use information, the systematic collection of caribou harvest information was begun in 1981. A three-pronged data collection method was used to ensure that as much of each year's harvest data as possible was recorded. The three methods used included participant observation, informal in-season interviews, and a systematic village-wide survey each June or July. Basic information collected was where caribou were killed, how many of each sex were taken (if known), when caribou were taken, and by whom. This information was collected on an annual basis to correspond to the fish and game regulatory year, from July through June. The regulatory time frame is fortuitously correlated with the present seasonal caribou hunting round in Kaktovik. In late May and during much, if not all, of June, snowmachine travel usually ceases due to lack of snow. Boat travel is also restricted due to the presence of shore-fast melting ice until late June and occasionally

mid-July. The annual caribou season cutoff at the end of June and the beginning of a new season in July works well, as people seem to easily remember when they ended hunting by snowmachine and began hunting by boat.

Several field trips to Kaktovik in 1981-82 and a thorough community household survey in late May of 1982 provided a close estimate of the 1981-82 regulatory year caribou harvest in Kaktovik. Due to unfavorable hunting conditions beginning mid-May (rapid snow melt and overflowing rivers) most people were confined to the village, so nearly all caribou hunting households in the community were contacted.

There was close agreement between household caribou harvest information recorded by informal in-season interviews and harvests recorded with the household survey. To obtain additional information on the validity of the household survey data regarding caribou harvest, we allocated time in 1982-83 to be in the village and in the field to observe and record caribou harvest. Much of July 1982 was spent on Barter Island monitoring summer caribou harvest activities. Information on caribou hunting patterns and harvests was obtained during visits to harvest sites, through casual chats at the beachfront as hunters unloaded their boats, transported animals to processing locations, and butchered animals.

In addition, six trips were made to Kaktovik between late August 1982 and late May 1983. During these trips, recently harvested caribou in the village were noted and, as time allowed, the hunters were contacted. Three weeks (April 19 through May 10) during spring 1983 were devoted to participant-observation trips afield with hunters from Kaktovik. Field time was spent with hunters from five separate households, and in addition, data from other hunters were gathered while visiting their field camps.

In July 1983, a household caribou harvest survey was conducted in Kaktovik while preparing to monitor the 1983-84 summer harvest. Household caribou harvest data for the 1982-83 regulatory year gathered during the July 1983 survey were compared to and found to agree closely with our participant-observation data from the previous July and April-May field trips with local hunters. Households and hunters were able to recall quite accurately the number and sex of caribou taken as well as the approximate time and location of the harvest.

Kaktovik hunting parties are often composed of members from several households. Thus a convergent group knowledge exists on the success of a particular hunting effort. Due to this, it was determined that households interviewed were able to report on the number of animals taken by hunters from other households with which they had hunted. Such leads were followed up on by contacting the particular hunter or his or her household, when possible. In general, second-hand information was found to be quite reliable. The reason for this may be that when a hunter returns with caribou it is not long before most of the villagers know about his or her success and hunters tend to be very precise when it comes to subsistence-related information. To acquire good, consistent harvest reports also required that good rapport has been established with hunters and hunters agree with the research aims and they voluntarily participate. It also helps, perhaps, to not be collecting this information in an enforcement or direct management capacity.

Harvest data from several sources regarding a single hunter's success were consistently the same. Although a situation where a hunter had written down the number, sex, location, and date of caribou harvested was not observed, his or her reported take accurately represented not only

animals documented earlier, but also often confirmed additional harvest information shared by secondary sources. Harvest tickets are only occasionally filled in. The conclusion is therefore that informant recall of caribou harvest data is sufficiently reliable for the needs of this study.

FINDINGS

Figure 4 summarizes all individual caribou-hunting map biographies as well as the additional information contributed by household information reviews. It depicts the total minimum estimate of the extent of land use associated with Kaktovik residents' caribou hunting in Alaska over time, since the establishment of Kaktovik as a community circa 1923 to 1982. The area extends approximately 180 miles (290 km) on its longest axis from east to west, is roughly 80 miles (129 km) at its widest, and covers approximately 7,600 square miles (19,684 sq km). The majority of the use area lies within the Arctic Coastal Plain but also clearly extends into the Arctic Foothills and Brooks Mountain Range physiographic provinces.

Most of the caribou hunting area is within the Arctic National Wildlife Refuge and covers the entire ANILCA Section 1002 study area (see Fig. 2). It is significant to note that close to one-third of the depicted use area lies to the west of the Canning River in an area that is experiencing rapid land use changes. Here, just as in the Kuparuk area west of Prudhoe Bay, one can observe a slow but nonetheless gradual movement of intensive industrial activity into an area where previously the only land use was associated with subsistence hunting, trapping, and fishing. Recent oil and gas lease sales to the west of Canning River have taken place inside the area used by Kaktovik caribou hunters and more

sales are already planned (U.S. Department of Interior 1983). Though no production related infrastructure has been developed in the caribou hunting area, several oil wells have been drilled and there is considerable seismic testing ongoing throughout the area.

As mentioned, the Kaktovik caribou hunting area extends westward out of the range of the Porcupine Caribou Herd (PCH) into what has come to be known as the Central Arctic Herd (CAH) range (Figs. 3 and 4). Whether this is a recent occurrence or not, it still indicates that harvest of caribou by Kaktovik hunters must at times comprise animals from the CAH. It has been previously assumed that only Porcupine caribou were harvested by Kaktovik hunters (U.S. Department of State 1980).

As suggested in Figure 4, some caribou hunting has occurred to the east of the United States/Canada border. Detailed information was not systematically gathered about this area, as the main concern was to first conduct research in the ANILCA Section 1002 study area and in the area where the State of Alaska has management responsibilities.

Generally speaking, the area depicted in Figure 4 is hunted by one of two methods. Boats are used for caribou hunting during summer, when the coastal waters are ice free and no snow is on the ground, roughly from June to late September. Nearly every household in Kaktovik has a boat and it is not uncommon for villagers to use them extensively during the summer months for hunting, fishing, and traveling (Jacobson and Wentworth 1982). Hunters rarely penetrate far inland, as the rivers in the eastern arctic are too shallow for effective boat travel and the coastal plain is very soggy. Currently most summer hunting occurs along the coast and rarely more than a mile or two inland.

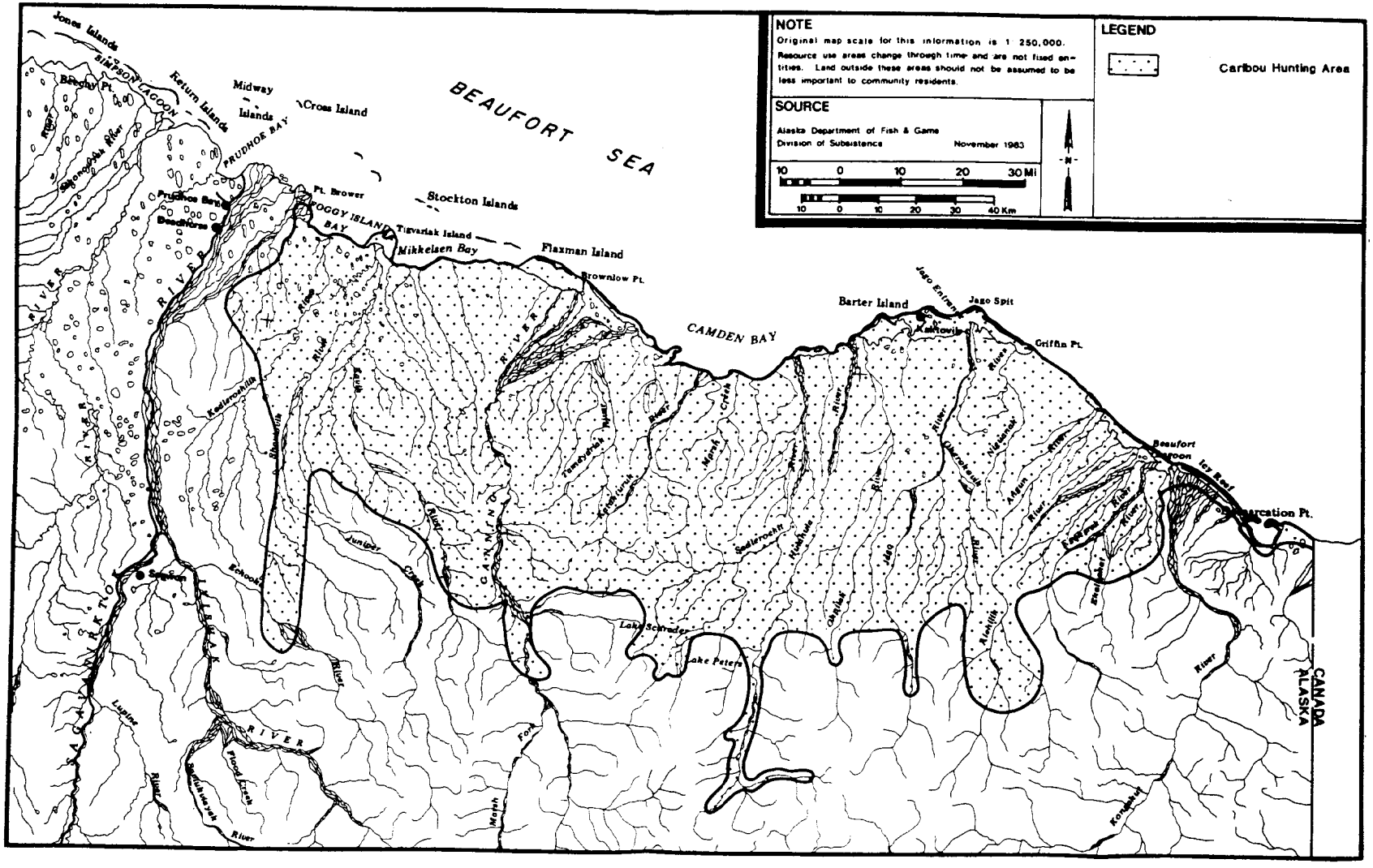

Fig. 4. Extent of land used for caribou hunting by Kaktovik residents ca. 1923 to 1983.

In the past, pack dogs and air boats were used by Kaktovik caribou hunters to follow rivers inland during summer (P. Akootchook pers. comm., 1982). According to field data, neither of these methods have been used in the last decade. Historically Kaktovik people made extensive use of pack dogs (P. Akootchook pers. comm., 1982; D. Akootchook pers. comm., 1982; W. Soplu pers. comm., 1982).

Snowmachines are used for caribou hunting during winter when there is sufficient snow on the ground for snowmachine travel and the coastal waters are iced over, usually from mid-October to late May. The most extensive land use associated with caribou hunting occurs at this time. Travel along the coast or on the coastal plain is virtually unrestricted by terrain, and snow conditions are usually suitable for snowmachining in any direction away from Kaktovik. In the foothills region there are some areas unsuitable for snowmachine travel due to snow accumulations or general terrain features. Snowmachine travel in the Brooks Mountain Range is by and large restricted to the river valleys and low passes.

As shown in Figure 5, about 2,900 square miles (7,500 sq km) (38 percent of the extensive area) is considered as intensively used caribou hunting area by Kaktovik residents. To depict seasonality of use, areas were divided into summer or winter use areas, based on transportation used to reach the area. The intensively used area for winter (snowmachine use) accounts for about 2,300 square miles (6,000 sq km) or 80 percent of the area. The intensively used area for summer (boat use) accounts for about 600 square miles (1,500 sq km) or 20 percent of the area. Both categories include the area at the mouth of the Canning River classified as both summer and winter area. These findings are consistent with earlier stated

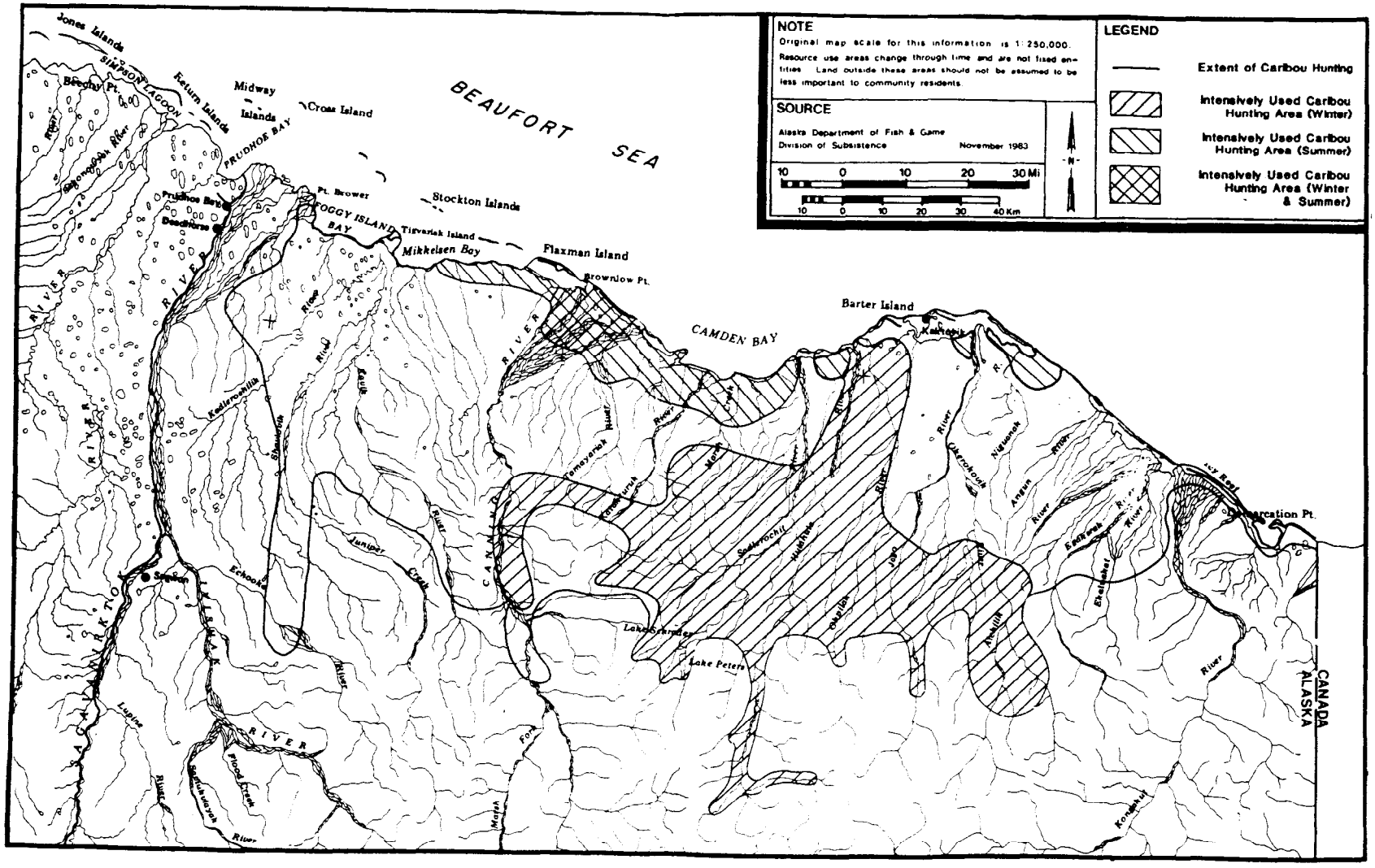

Fig. 5. Land areas intensively used for caribou hunting by season, Kaktovik residents, ca. 1923 to 1983.

indications that winter land use is not as spatially limited as summer land use.

It is evident from Figure 6 that all intensive summer caribou hunting land use occurs within the coastal plain, mostly to the area west of Kaktovik. The area extends about 30 miles (48 km) westward outside the Arctic National Wildlife Refuge to the vicinity of Bullen Point, well within an area that is presently experiencing considerable exploratory drilling activity.

Most of the winter high use area lies in the foothills and the Brooks Mountain Range with components in the coastal plain in the vicinity of Barter Island and the Canning River delta. Only a small portion of the intensively used winter caribou hunting area is designated as lying outside the Arctic National Wildlife Refuge, though hunters are known to range well to the west of the Canning River during winter. Land use in the foothills region is not restricted by many terrain features, whereas travel in mountains is by and large restricted to valleys and low passes, when there is sufficient snow cover for snowmachines.

As mentioned in the Methodology section, the caribou harvest data in Tables 1 and 2 and in Figure 6 probably represent a total accounting of all caribou harvested in Kaktovik for the regulatory year July 1981 through June 1982. Based on the community survey and the two other methods mentioned, 14 households harvested 43 caribou in seven different locations during the regulatory year. Most caribou harvested were bulls; only four cows were taken (Table 1).

Harvest timing for the regulatory year 1981-82 is shown in Table 2. Of the known temporal harvest information, we find that caribou were harvested in 6 of 12 months. Summer hunting occurred in July and August

TABLE 1. CARIBOU HARVESTED BY KAKTOVIK RESIDENTS, JULY 1981 THROUGH JUNE 1982.

Sex	Number	Percentage of Harvest
Bulls	33	77
Cows	4	9
Unknown	6	14
Total	43	100

Sample size = 14 households.

and accounted for 17 bulls (52 percent of all bulls taken and 40 percent of all known harvest for the year). No cows were taken during the "summer" hunt. The four cows harvested were taken during the late "winter" months, two in March, and two in May. Of the bull "winter" harvest, only 1 (2 percent of overall harvest) was taken in fall (October), whereas 15 (35 percent of the total harvest) were taken during March, April, and May. The seasonality of 6 caribou (14 percent) is unknown.

Twenty-two caribou (20 bulls and 2 cows) were taken on the coast and 16 caribou (13 bulls, 2 cows, and 1 unknown sex) were taken in the foothill and mountain areas. Harvest locations for six caribou were unknown (see Fig. 6).

The 1982-83 (July to June) known caribou harvest data are shown in Figure 7 and Tables 3 and 4. The July community survey and other data collection approaches provided information for 26 of 38 caribou hunting households for the regulatory year, a 68 percent sample. As shown in

TABLE 2. CARIBOU HARVESTED BY MONTH AND SEX, JULY 1981 THROUGH JUNE 1982 BY KAKTOVIK RESIDENTS

	J	A	S	O	N	D	J	F	M	A	M	J	Unknown
Bulls	3	14		1					7	6	2		6
Cows									2		2		
Total	3	14		1					9	6	4		6
	(7%)	(33%)		(2%)					(21%)	(14%)	(9%)		(14%)
	"Summer"			"Early Winter"					"Late Winter"			"Summer"	Unknown
Percent by Season	40%				2%				44%			0	14%

Sample size = 14 households

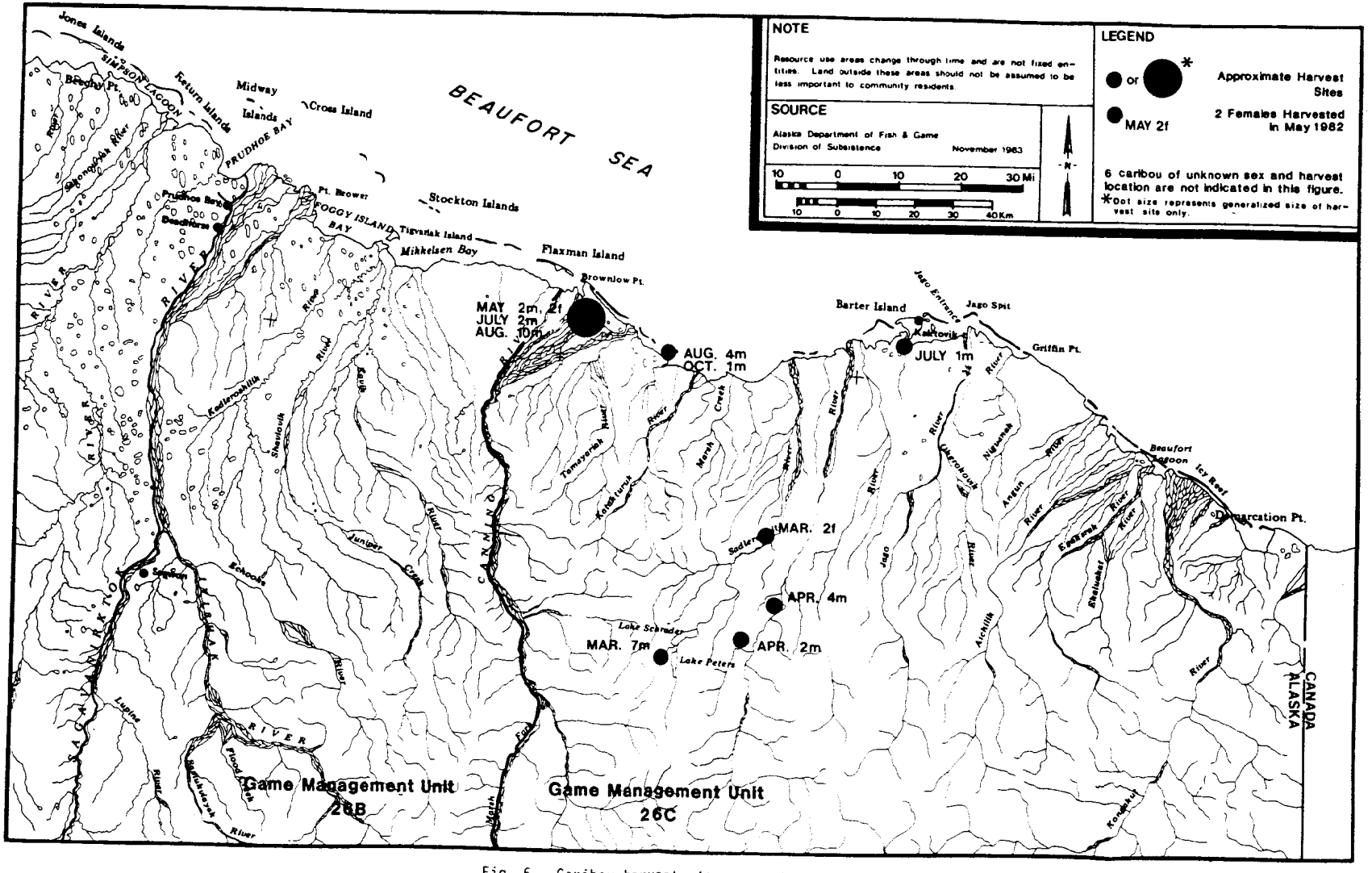

Fig. 6. Caribou harvest sites, months taken, and sex of caribou harvested by Kaktovik residents for regulatory year 1981-82.

TABLE 3. CARIBOU HARVESTED BY KAKTOVIK RESIDENTS, JULY 1982 THROUGH JUNE 1983.

Sex	Number	Percentage of Harvest
Bulls	82	75
Cows	28	25
Unknown	0	0
All	110	100

Sample size - 26 households.

Table 3 and Figure 8, a minimum of 110 caribou were taken by 22 of 26 households in 12 separate locations. Based on informal data sources, possibly up to 20 additional caribou were taken. These 20 are not entered into the locational, temporal, or sex group data base depicted in Table 3 and Figure 7. The same informal information sources indicate that an additional 6 (15 percent) caribou hunting households did not take caribou during the year. As these households were not surveyed in July, they also were not included in Table 3. If informal information is considered, the 1982-83 caribou harvest estimate is 130 caribou for Kaktovik residents.

Caribou were harvested in six separate locations along the coastal plain, with the most distant easterly location being at Griffin Point, 20 to 25 miles (32 to 40 km) away from Kaktovik, and the most westerly location at the mouth of the Canning River approximately 60 miles (96 km) away (Fig. 8). All coastal hunting occurred within a mile or two of the shoreline. In all, 86 caribou (78 percent of the known harvest) were

TABLE 4. CARIBOU HARVESTED BY MONTH AND SEX, JULY 1982 THROUGH JUNE 1983, BY KAKTOVIK RESIDENTS

	J	A	S	O	N	D	J	F	M	A	M	J	Unknown
Bulls	74	4	1							3			
Cows	8			4						14	2		
Total	82	4	1	4						17	2		
	(74%)	(4%)	(1%)	(4%)						(15%)	(2%)		
	"Summer"			"Early Winter"				"Late Winter"				"Summer"	
Percent by Season		79%			4%						17%		

Sample Size = 26 households

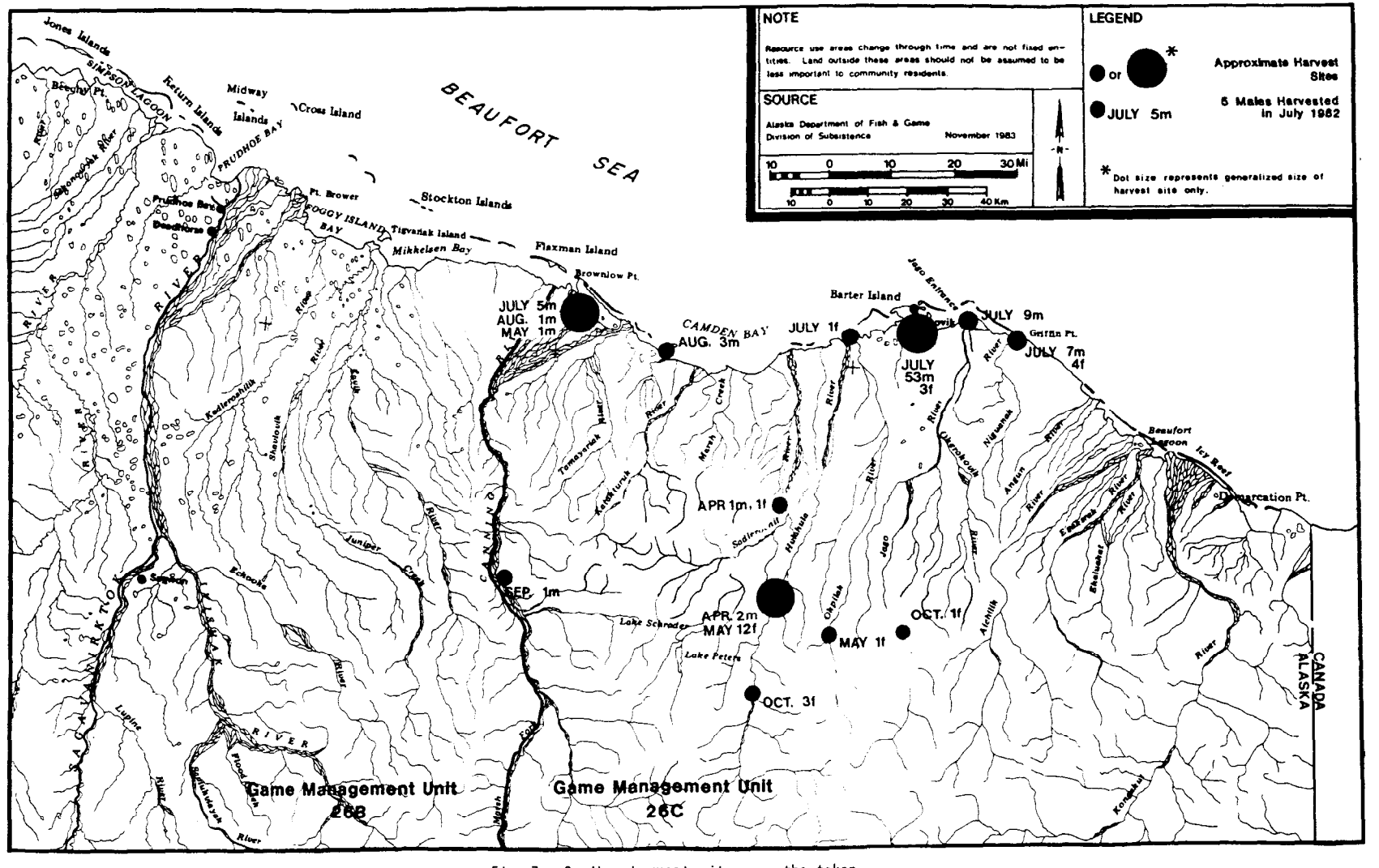

Fig. 7. Caribou harvest sites, months taken, and sex of caribou harvested by Kaktovik residents, July 1982 through June 1983.

taken along the coast. The majority (56 caribou) were harvested on or near Barter Island within a few miles of the community.

Inland hunting occurred in six separate locations of which two are in the Foothills province and four in the Brooks Range province (Figure 7). There were 24 caribou harvested at these locations. With the exception of one bull caribou harvested with aircraft transportation on the upper Canning River in September, all other inland caribou were taken with the aid of snowmachine transportation to the south of Barter Island. The most distant documented harvest locale, in the upper Hulahula River, lies about 80 miles (128 km) due south of Kaktovik, and the remainder lie from 50 to 65 miles (80 to 105 km) south of Barter Island.

Caribou were harvested over a seven-month period during the regulatory year 1982-83 (Table 4). The majority of caribou were taken in July and April (74 and 15 percent respectively) with much lower levels of take in the remaining five months. By season, the majority of the harvest, 87 caribou (79 percent), were taken during the "summer" and 23 caribou (21 percent) taken during "winter." No caribou were reported as harvested on the coast during the 1982-83 winter.

The sex composition of the 1982-83 caribou harvest (Table 3) shows that 75 percent (82 animals) of the known harvest comprised bulls and 25 percent (28 animals) cows. In terms of seasonal sex composition of the harvest (Table 4), bulls made up 91 percent and cows 9 percent of the "summer" harvest (87 total animals), whereas during the "winter" bulls made up 17 percent and cows 83 percent of the harvest (23 total animals).

Caribou harvest information for the entire regulatory year 1983-84 is not available; however, harvest and locational information for July 1983, the early part of the "summer" hunting season appear in Table 5 and

TABLE 5. CARIBOU HARVESTED BY KAKTOVIK RESIDENTS, (JULY 1983 ONLY).

Sex	Number	Percentage of Harvest
Bulls	16	55
Cows	13	45
Unknown	0	0
Total	29	100

Sample Size = 8 households

Figure 9. Eight Kaktovik households harvested 29 caribou (16 bulls and 13 cows) in 3 distinct locations during the first 3 weeks of July 1983. From all indications, these were the only households taking caribou in July.

All recorded caribou harvest during July took place on the coastal plain on or near the coast with sites located directly south of Barter Island and eastward to Griffin Point approximately 20 miles (32 km) away from Kaktovik.

Caribou harvest locations for the harvest data collection period are presented in Figure 9. Each year has a separate symbol to facilitate between-year comparisons. There were 15 harvest locations identified. Six distinct harvest sites were located in the coastal plain. One site was used all three years, four sites were used two of the years, and one site was used in only one year. Coastal caribou hunting sites to the east of Barter Island tended to be close to Kaktovik, within 20 to 25 miles (32 to 40 km), whereas those to the west were up to 60 miles (96 km) away.

There were nine distinct inland harvest sites during this time period. Four of these sites lie within the foothills physiographic region

and five within the Brooks Range region. One site was used twice while the remaining eight were only used once during the study period.

The majority of the recorded inland caribou harvest sites lie largely due south of Barter Island at a distance between 40 and 70 miles (64 to 112 km) from Kaktovik. The inland harvest site on the upper Canning River is anomalous in this respect, for it lies at a considerable distance (80 miles, 128 km) to the southwest. This harvest site is also unusual in that air transport rather than a snowmachine was used to reach it during the 1982-83 season.

Based on these data and their limitations, it appears that coastal harvest sites may receive more repeated use over time than do inland sites. Of six coastal harvest sites used in 1981-82 and 1982-83, three were used in both years and three in only one year, whereas for the nine inland harvest sites only one was used twice in the same time period and the other seven received only one year's use. In July of 1983 three coastal caribou harvest sites were utilized. Of these three, two had been used the previous year and one site had been visited in both preceding years.

During the 1981-82 regulatory year, the caribou hunting season in subunit 26C was open from July 1 through March 31. The season in subunit 26B was closed to the taking of cows but was open to the harvest of bulls from August 10 through October 15 and from February 15 through April 15 (Table 6). From harvest data, all of the 1981-82 regulatory year caribou harvest took place in subunit 26C (Fig. 5). Ten caribou (23 percent of the total harvest) appear to have been taken outside of the regulatory season during the 1981-82 regulatory year. Six caribou (14 percent) were taken during April and four (nine percent) during May. No harvest appears

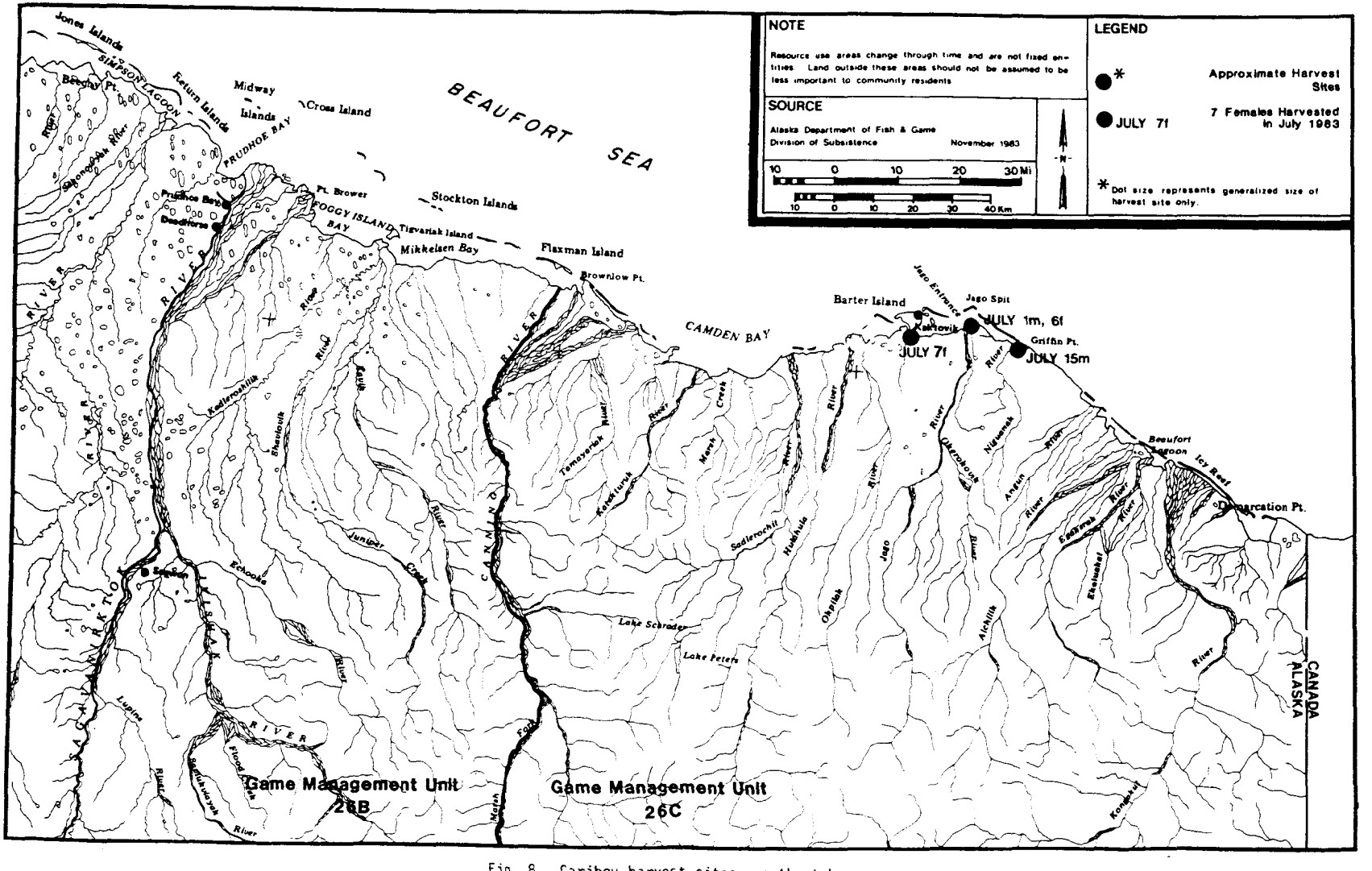

Fig. 8. Caribou harvest sites, months taken, and sex of caribou harvested by Kaktovik residents for regulatory year 1983-84.

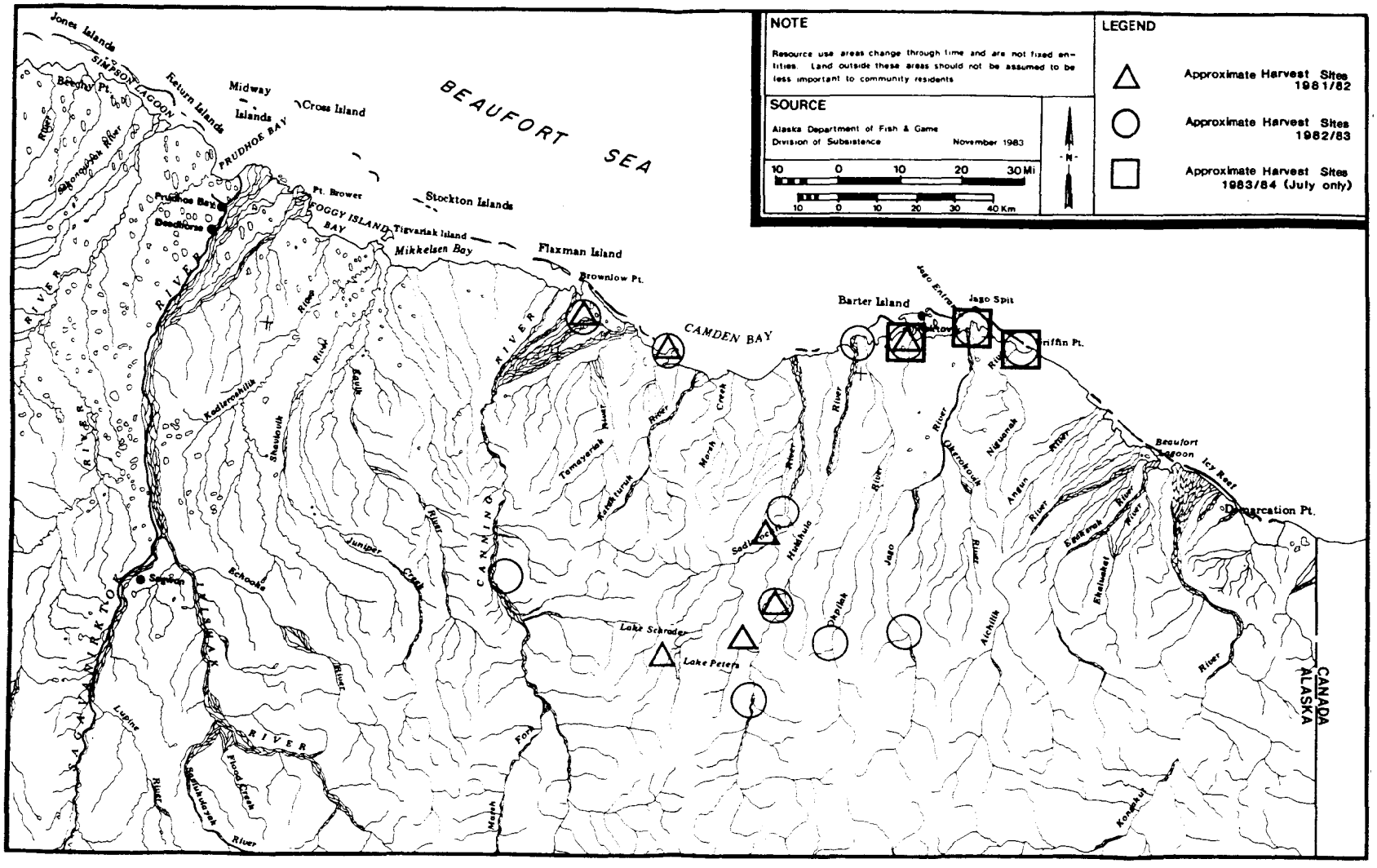

Fig. 9. Summary of caribou harvest sites for regulatory years 1981-82, 1982-83, and 1983-84 (July only).

to have taken place during June. One coastal location accounted for four of the ten caribou harvested (two male, two female) and two inland locations were reportedly used to harvest two (male) and four (male) caribou respectively. In terms of the sex composition of this harvest, we find that eight (80 percent) were males and two (20 percent) were females. The females were harvested at the coastal harvest site.

The 1982-83 regulatory seasons in subunits 26B and 26C were identical to the 1981-82 seasons (Table 6). No harvest took place outside of subunit 26C during the 1982-83 regulatory year (Fig. 7). During regulatory year 1982-83, 19 caribou (17 percent of the total 1982-83 harvest) appear to have been taken after the season closed. Seventeen caribou (15 percent) were taken in April and 2 (2 percent) in May (again, no animals are known to have been harvested during June). Sixteen caribou (2 male, 14 female) were taken at one location inland, 2 caribou (1 male, 1 female) were harvested at a second inland site, while one additional animal (female) was taken at yet another inland location. Four males (21 percent) and 15 females (79 percent) represent this out of season take.

Regulatory season changes effective July 1983 extended the caribou hunting season through the end of April for both subunits 26B and 26C. However, subunit 26B still remained closed to the harvesting of female caribou from July 1 through September 30 (Table 6). Harvest data for the month of July 1983 (regulatory year 1983-84) indicate that all harvest occurred near the coast and within subunit 26C (Fig. 8).

Annual harvest information compiled during this project (Fig. 10) indicates that there can be substantial variation in village harvest levels over time. In the three years' data, there is a difference of 260 percent between caribou harvest in regulatory year 1982-83, when 110

TABLE 6. CARIBOU HUNTING SEASONS AND BAG LIMITS FOR GAME MANAGEMENT SUBUNITS 26B AND 26C, DURING 1981-82, 1982-83, AND 1983-84 REGULATORY YEARS

	1981-82	1982-83	1983-84
Game Mgmt. Unit 26B	August 10 through October 15 and February 15 through April 15.	August 10 through October 15 and February 15 through April 15.	July 1 through April 31.
	Three Bulls	Three Bulls	Five caribou; however, female caribou may be taken only from October 1 through April 31.
Game Mgmt. Unit 26C	July 1 through March 31.	July 1 through March 31.	July 1 through March 31.
	Five caribou; provided that not more than two caribou may be transported from these units per regulatory year.	Five caribou; however, not more than two caribou may be transported from these regulatory units per regulatory year.	Five caribou; however, not more than three caribou may be transported from these units per regulatory year.

Source: Alaska Board of Game (1981, 1982, 1983).

caribou were harvested, and regulatory year 1981-82, when 43 caribou were harvested. Recent harvest estimates from other sources (Fig. 11) also suggest that the annual harvest of caribou in Kaktovik fluctuates considerably from year to year (although some of this fluctuation may be due to different estimating methods).

There is evidence that the availability of, and easy access to, Porcupine Herd caribou during post-calving, generally in late June and July, may be an important factor in determining annual harvest levels. In Figure 12 the annual harvest information for 1981-82, 1982-83, 1983-84 has

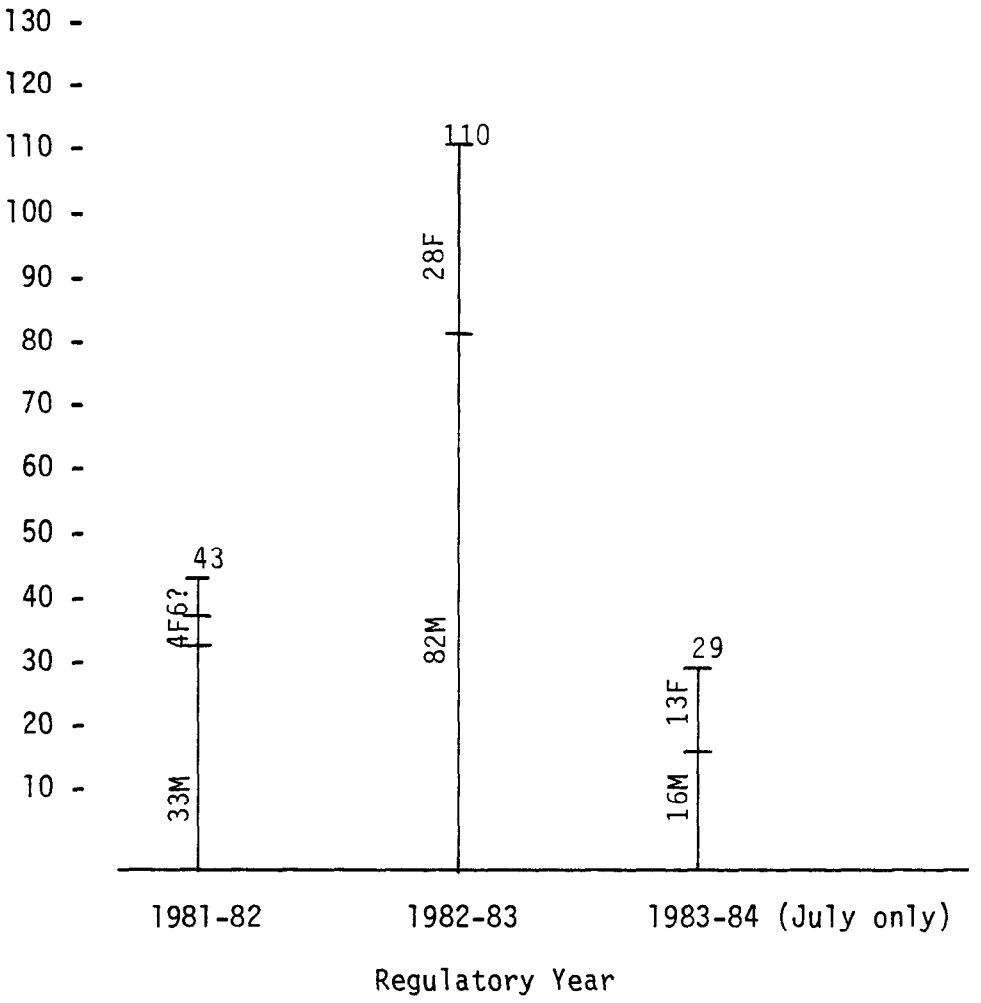

Fig. 10. Caribou harvest for regulatory years 1981-82, 1982-83, and 1983-84 (July only) by Kaktovik residents

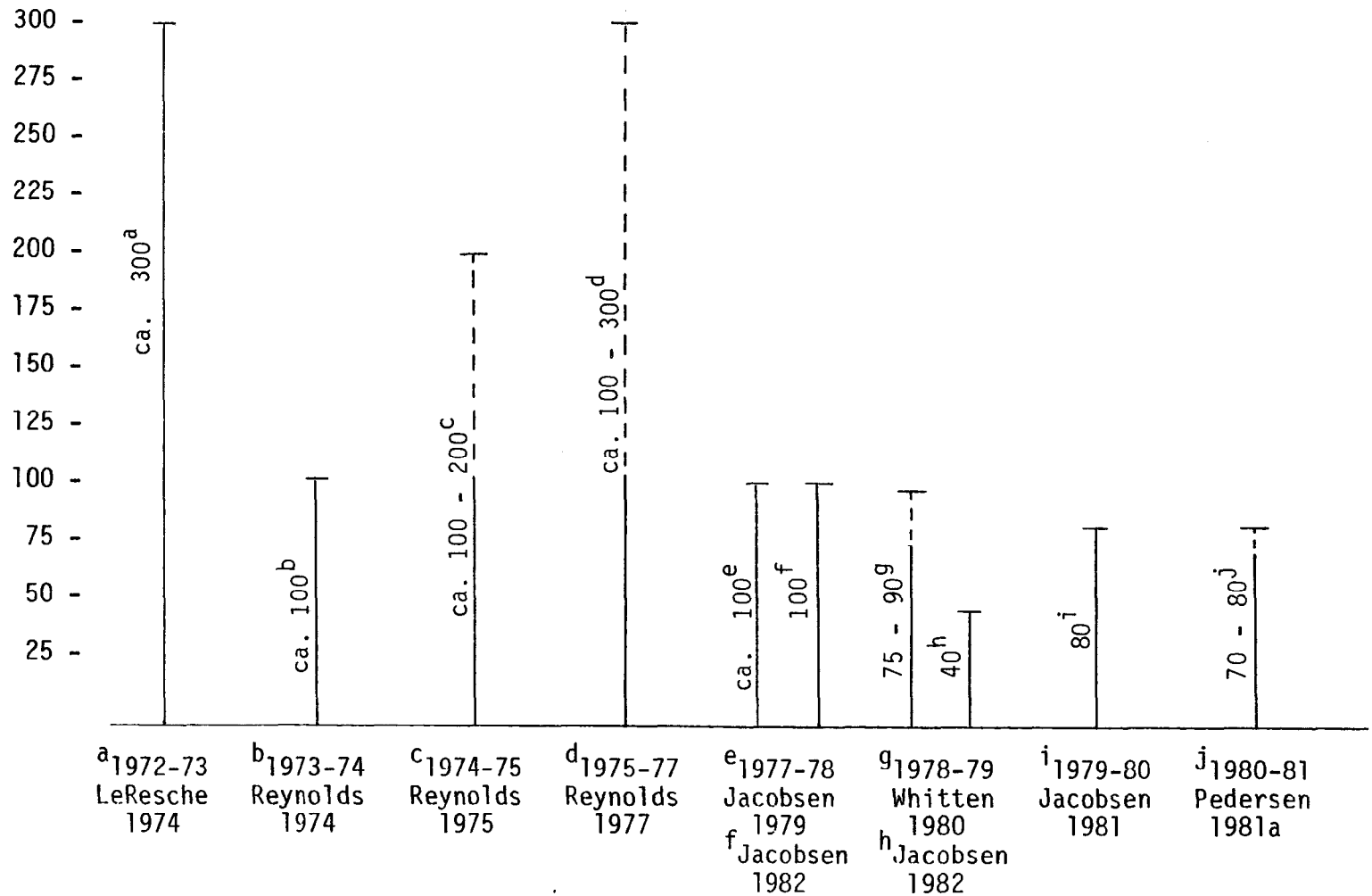

Fig. 11. Recent estimates of caribou harvests by Kaktovik residents.

been arranged by month and level of harvest. The month of July clearly stands out as a month showing substantial harvest differences. During 1981-82 the July caribou harvest was 3, in 1982-83 the harvest level was 82, and in 1983-84 the July caribou harvest level was 29. Thus the July caribou harvest in 1982 was more than 27 times higher than in 1981 and almost 3 times higher than in 1983. In fact the July 1982 harvest (82 caribou) alone was almost double the total annual harvest for 1981-82 (43 caribou). In July of 1981, post-calving caribou did not appear close to Kaktovik. In contrast, in July of 1982, they were numerous along the coast east of the Sadlerochit River and even came onto Barter Island in large numbers. In July of 1983, post-calving caribou appeared in moderate numbers along the coast east of the Hulahula River. Thus it seems likely that the post-calving distribution of caribou in these years did exert some influence on summer harvest levels.

In terms of coastal versus inland harvest trends, of 176 caribou harvested for the period 1981 to 1983 with known locations, fully 78 percent (137 caribou) were taken on the coast and 22 percent (39 caribou) were taken inland (Figs. 6, 7, 8, and 9). This marked distinction between inland and coastal caribou harvest levels also exists when the incomplete data set from 1983-84 is eliminated. Of 147 caribou harvested in 1981-82 and 1982-83, 73 percent (108 caribou) were taken on the coast whereas 27 percent (39 caribou) were taken inland. Clearly coastal harvests of caribou were greater, by a factor of 3:1, than inland harvests during the study period.

The harvest sex composition for the study period shows some interesting comparisons. Of 176 caribou taken with assignable sex in 1982-83, 74 percent (131 caribou) were bulls and 26 percent (45 caribou)

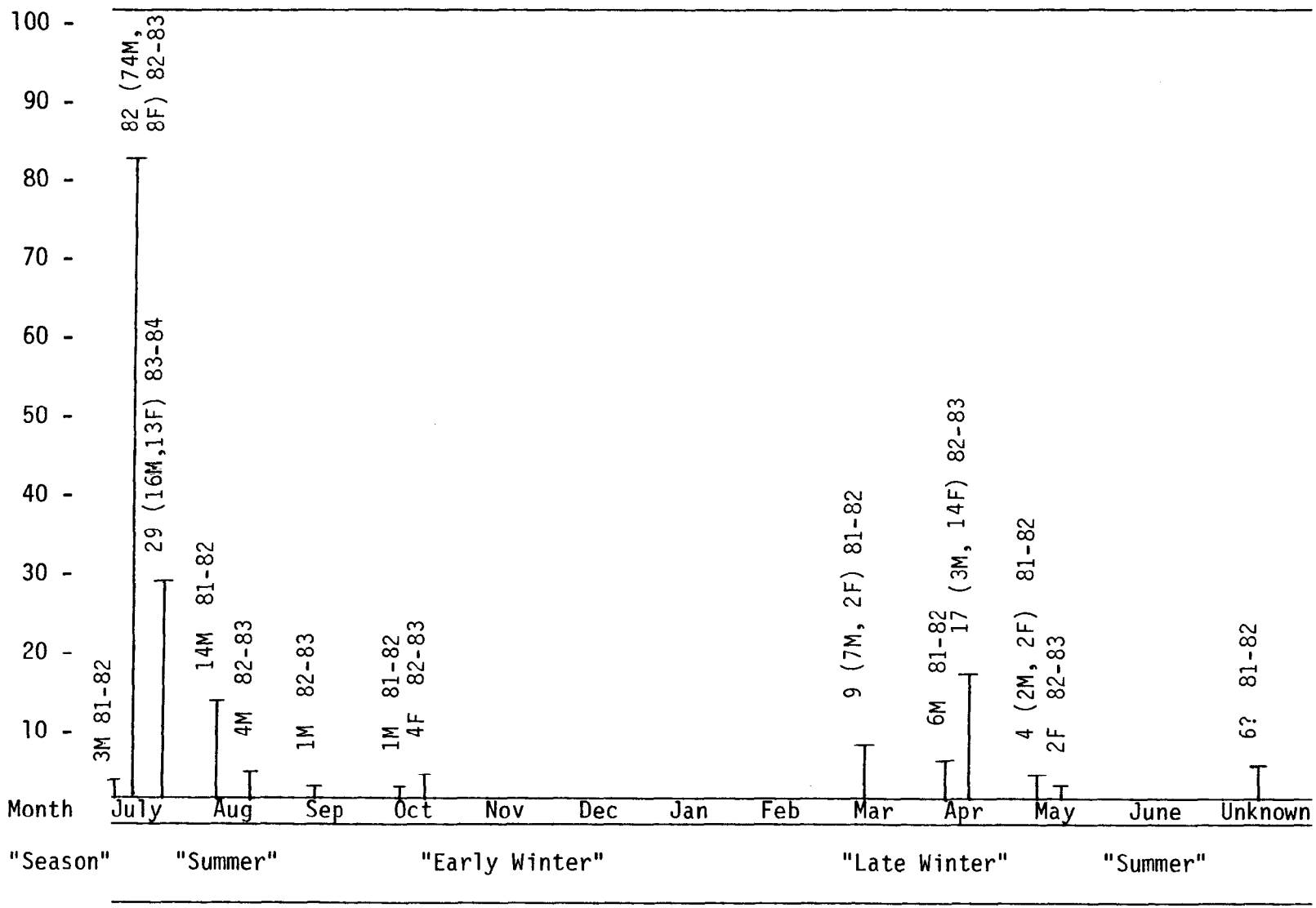

Fig. 12. Caribou Harvests by Month, Regulatory Year 1981-82, 1982-83, and 1983-84 (July only) by Kaktovik Residents

were cows. By year, in 1981-82 bulls comprised 89 percent (33) and cows 11 percent (4) of the total annual harvest of known sex caribou (37), and in 1982-83 bulls made up 75 percent (82) and cows 25 percent (28) of the year's known sex harvest (110). Because the 1983-84 data set covers but a small portion of the year, it cannot readily be used in the annual harvest comparison. There is thus a clear trend toward the harvesting of more bulls than cows.

Using the "winter/summer" concept established earlier, the harvest data can be arranged to indicate seasonal harvest patterns with respect to sex composition (Fig. 12). The "summer" harvest in 1981-82 comprised only bulls (17 caribou), whereas in 1982-83 bulls comprised 91 percent (78 caribou) and in 1983-84 (July only) 55 percent of the harvest (16 caribou) were bulls. In general it appears that bulls are well represented in the summer harvest and that they may be selected over females during this time of the year.

"Winter" sex composition of harvested caribou is also shown in Fig. 12. Only two years of harvest data are available, and each is different. In 1981-82 bulls comprised 80 percent (16/20) of the harvest, whereas in 1982-83 they only comprised 17 percent (3/23). It appears that there can be a considerable variation in the bull/cow harvest between years and that there may not be a sex selection factor that directs the harvest effort during "winter." This variation in sex selection appears in both "early" and "late" winter periods (Fig. 12). After freeze-up in late September or early October, there is a brief period of productive caribou hunting. For the two years in which we have quantitative measures, 1981-82 and 1982-83, only a small number of caribou were harvested during this early hunt. In 1981-82 one bull was taken in October on the coast west of Barter Island

(Fig. 6) and in 1982-83 four caribou (all cows, Fig. 7) were taken in October in the mountains south of Barter Island. Granted the numbers are small, but they suggest there may be no clear selection for either sex of caribou during early "winter" hunting.

In late "winter" when days are longer, and the temperatures more moderate, there appears to be another active caribou hunting period. In 1981-82 hunters took 19 caribou in March, April, and May. Of these, 15 (79 percent) were bulls and 4 (21 percent) cows. During April and May in 1982-83 Kaktovik caribou hunters took 19 caribou -- 16 cows (84 percent) and 3 bulls (16 percent) -- which is nearly the reverse in terms of sex composition from the same period in 1981-82. Thus, there is no apparent selection for either sex during the late "winter" hunt either.

DISCUSSION

Assignment of the present caribou harvest in Kaktovik to a particular herd poses some challenges at this time. Though we now have reasonably detailed harvest locale and timing information, we are unable to accurately plot the annual distribution of caribou from either of the two herds which range within the delineated extensive caribou hunting area for Kaktovik. Some general distribution information not yet published (Whitten pers. comm., 1984) indicates that, in recent years, caribou from the Porcupine Herd have not ranged farther west along the coast than the Sadlerochit River in summer and have, by and large, been absent from the coastal plain, foothills, and the north side of the Brooks Range during winter (Fig. 3). Some small scattered groups from the Porcupine Caribou Herd may have been present within the winter hunting range of Kaktovik caribou hunters, but present data on this are not conclusive.

Central Arctic caribou range eastward along the coast as far as the Canning River delta and possibly to the Katakturuk River during summer (Cameron and Whitten 1979; USFWS 1982). In winter the herd commonly ranges as far east as the Canning River and is believed to have recently moved even further eastward onto the north slope of the ANWR at times (USFWS 1982). In the last few years, small numbers of caribou have been observed in the foothills area of the Hulahula and Sadlerochit rivers and Peters and Schrader lakes area during winter. These caribou can be assigned to the Central Arctic Herd, but the possibility exists that elements of the Porcupine Herd may also be present among these caribou. While awaiting the final outcome of delineation of the ranges of these two herds in the area of interest to this study, the most reasonable hypothesis at present is that caribou taken east of the Sadlerochit River during "summer" of 1981-82, 1982-83, and 1983-84 are assignable to the Porcupine Herd. Those caribou harvested west of the Sadlerochit River during the same time frame are assignable to the Central Arctic Herd.

Caribou harvested during "winter" in the region around the Canning River in 1981-82 and 1982-83 are with little doubt attributed to the Central Arctic Herd. Those taken in the foothills and mountains south of Barter Island (Jago, Hulahula, and Sadlerochit rivers) also may be provisionally assigned to the Central Arctic Herd although recent information indicates that there are Porcupine Caribou Herd animals in the area during winter at times (Whitten pers. comm., 1984).

Based on the above assumptions, 2 percent of the 1981-82 caribou harvest in Kaktovik derived from the Porcupine Herd (one bull) and 84 percent from the Central Arctic Herd (36 caribou, including 32 bulls and 4 cows), with 14 percent of unknown harvest location (6 caribou Table 7).

TABLE 7. PROVISIONAL HERD ASSIGNMENT OF CARIBOU HARVESTED IN REGULATORY YEARS 1981-82 AND 1982-83.

Caribou Herd	1981-82	1982-83	Two-year Total
Central Arctic Herd	36 (84%)	33 (30%)	69 (45%)
Porcupine Herd	1 (2%)	77 (70%)	78 (51%)
Unknown Locations	6 (14%)	0 (0%)	6 (4%)
Total Harvest	43 (100%)	110 (100%)	153 (100%)

In the regulatory year 1982-83, a total of 110 caribou were harvested by Kaktovik hunters. Of these, 70 percent were from the Porcupine Herd (77 caribou; 69 bulls and 8 cows) and 30 percent from the Central Arctic Herd (33 caribou; 13 bulls and 20 cows). During July of 1983 Kaktovik hunters harvested 29 caribou (16 bulls and 13 cows), all assignable to the Porcupine Herd.

It is apparent that there were significant differences between 1981-82 and 1982-83 in terms of which herds were contributing to the annual caribou harvest at Kaktovik. The Central Arctic Herd contributed the greatest percentage of animals in 1981-82, while the Porcupine Herd contributed the bulk of animals in 1982-83. Most of these differences derive from the summer harvest: in 1981-82 the Porcupine Herd was not available to Kaktovik hunters during summer, while they were available in 1982-83 (and presumably, from the July figures, they were accessible in 1983-84).

Winter harvesting of caribou apparently was concentrated on the Central Arctic Herd both years. Of 44 caribou harvested during the winter of 1981-82 and 1982-83 (20 bulls and 24 cows), all are probably assignable to the CAH (though there is a small chance that a few animals from the PCH may have been among these). Combining all harvests for two years (1981-82 and 1982-83), the 153 caribou were drawn nearly equally from the two herds (Table 7).

It is quite possible that over time the figures for herd-specific harvests will end up unlike those developed here. For the time period of this study, Kaktovik caribou hunters took slightly more caribou from the Porcupine Herd than from the Central Arctic Herd. However, the two years harvests suggest that the ratio may vary considerably from year to year depending on a variety of factors as outlined above.

One interesting finding is the extent to which actual harvest sites for the past three study years fall within the "subsistence use area" which represents a general caribou hunting area used over the past half-century by residents of the community of Kaktovik. In Figure 13, harvest locations are plotted over the map depicting the areal extent of caribou hunting in Kaktovik. Not one of the 15 recorded harvest sites lies outside the area reported to represent the land used for caribou hunting by Kaktovik residents from about 1923 to 1983. The congruence between these two different types of information lends considerable credence to the idea that the informants reported well on their perceptions of where caribou hunting takes place in the eastern arctic.

To further test the agreement between hunters' perceived hunting area information and actual harvest location information, the known 1981-82, 1982-83, and 1983-84 harvest locations were plotted on the overlay of

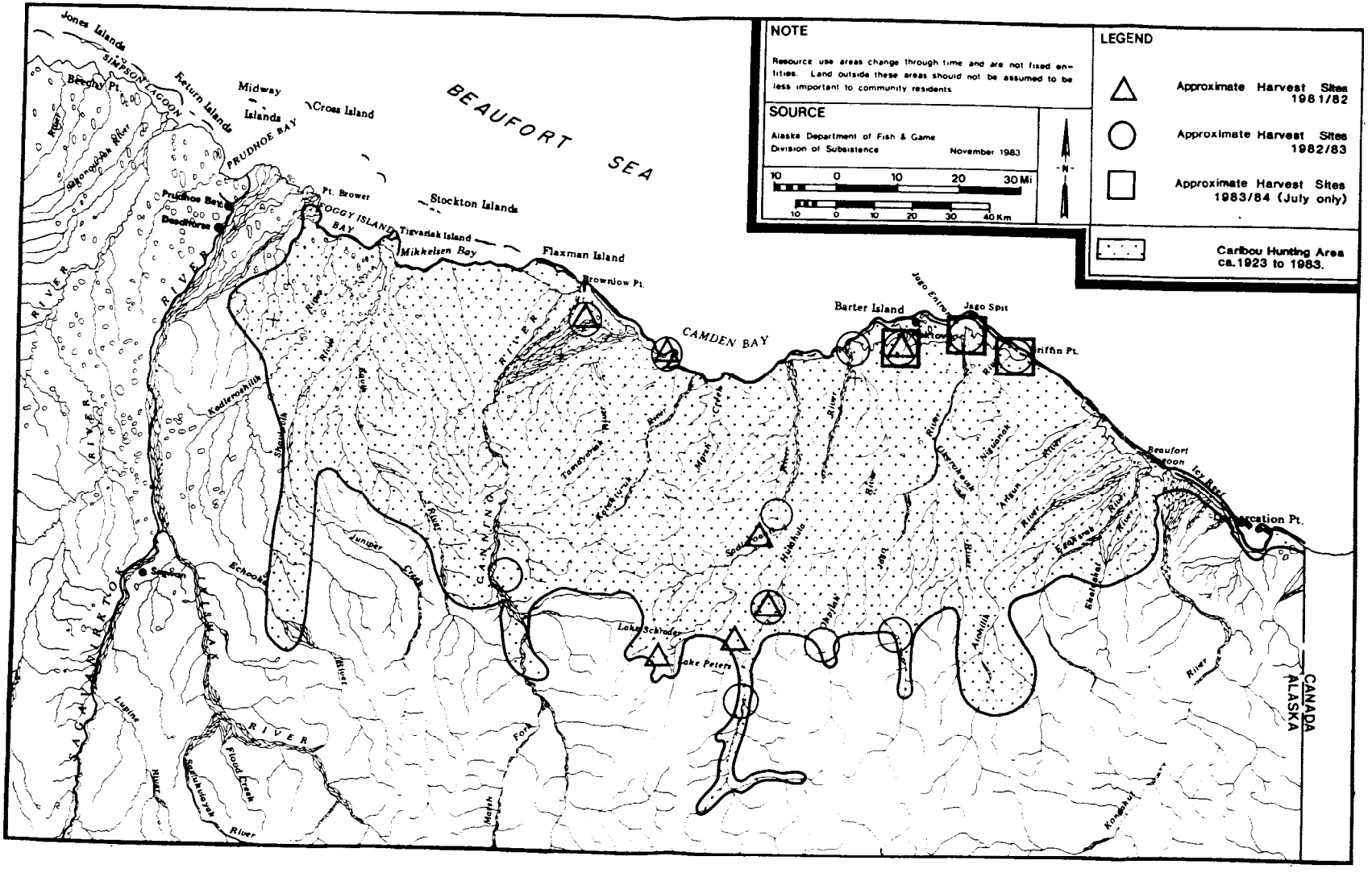

Fig. 13. Caribou harvest sites, July 1981 through July 1983, plotted on Kaktovik's hunting area.

areas perceived as intensively used for caribou hunting (Fig. 14). Again, an extremely good fit is found between the two information types, lending additional confidence in the perceptual information. Of 15 harvest locales recorded between 1981 and 1983, none fall completely outside the delineated perceived high intensity use area.

Although some caribou have been taken during April and May after the regulatory season closed, the majority of the caribou harvested by Kaktovik hunters have been taken during the open regulatory season. Seventy-seven percent, 83 percent, and 100 percent of the caribou harvest occurred during the open season for the 1981-82, 1982-83, and July 1983-84 regulatory years respectively. It appears that no caribou were harvested during November, December, January, February, or June for the 1981-82 and 1982-83 regulatory years. With the extension of the 1983-84 hunting season through the end of April, one might expect a reduction in the out-of-season take. However, 1981-82 and 1982-83 harvest data indicate that some out-of-season harvest may still occur in May.

While conducting the household harvest survey during late May 1982, it became clear that many hunters believed that the area west of the Canning River (subunit 26B) was closed to caribou hunting to people living in Kaktovik. Apparently, this dates back to the 1979-80 regulatory year when a registration permit was required to hunt caribou in subunit 26B but not in subunit 26C (Alaska Board of Game 1979). People were very interested to learn that since the 1980-81 regulatory year, a registration permit has not been required in subunit 26B and that the area had been, and is indeed, open to them, though with a different season and bag limit than in Unit 26C.

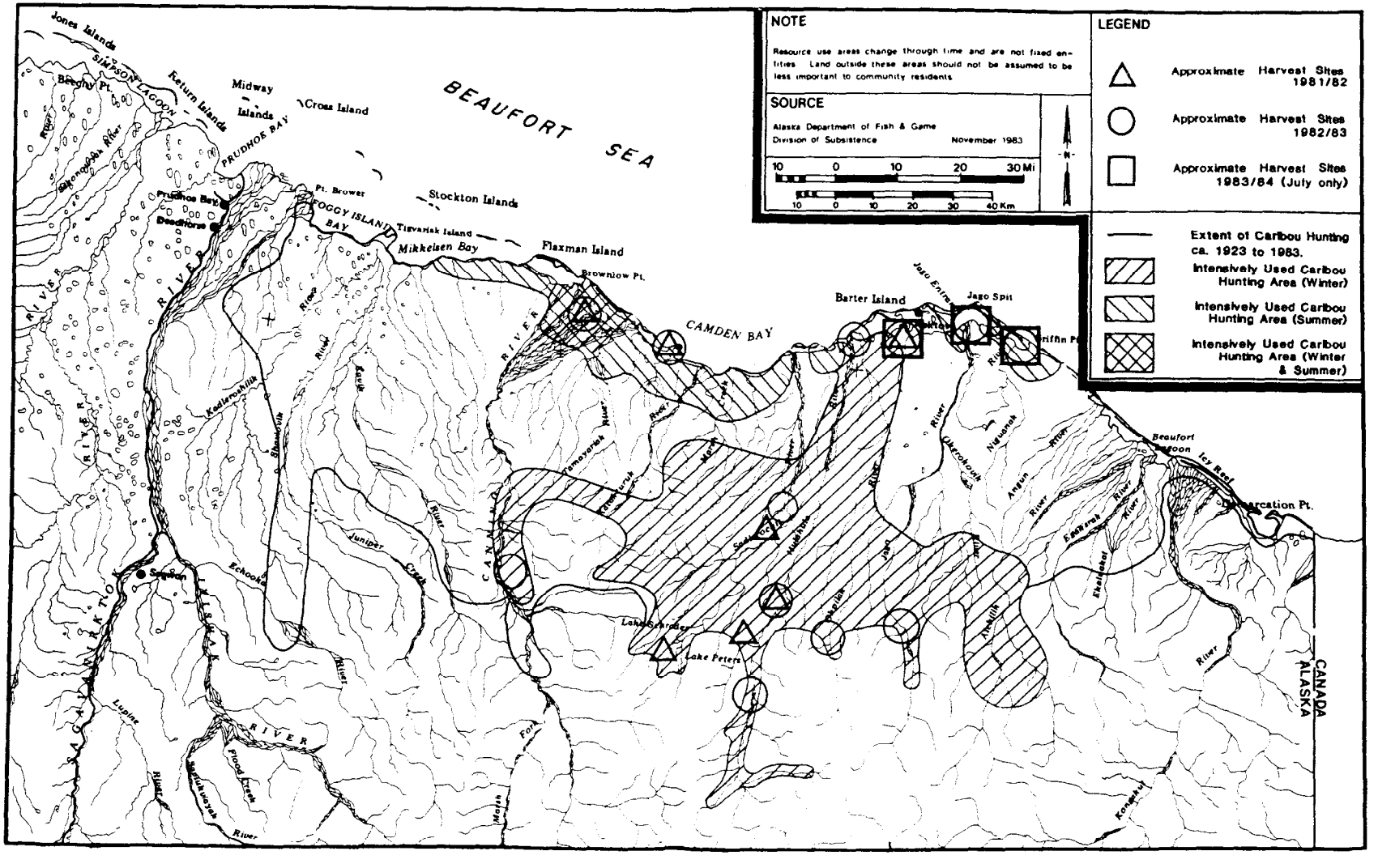

Fig. 14. Summary of caribou harvest sites and land areas intensively used for caribou hunting.

Past caribou hunting regulations for subunit 26B have allowed only bulls to be harvested. In 1983, caribou hunting regulations for subunit 26B were changed to permit the harvest of cows from October 1 through April 30 (Table 6). Harvest sites nearest subunit 26B have produced largely bulls (91 percent), although two cows were taken on the Canning River delta during the 1981-82 regulatory year.

Harvests in and near the Canning River delta during harvesting period occurred only from early May through late August. One reason for this timing pattern may be that due to the distance from Kaktovik, hunters may be accessing this area during times of the year when there is sufficient daylight to make extended travel easier. Other environmental factors such as snow conditions, direction and velocity of winds, or drifting ice may also restrict access. Harvest may not be determined simply by hunter access, but may also be partially regulated by the availability and distribution of caribou in the area.

In Figure 15, the most detailed caribou land and resource use information has been overlayed on the area proposed for withdrawal for oil and gas leasing in the Arctic National Wildlife Refuge (USFWS 1982). All of the identified coastal harvest areas and nearly all of the coastal area designated as high yield for caribou hunting lie within the proposed withdrawal. On the Sadlerochit River the ANILCA Section 1002 boundary touches the northernmost harvest area identified on that river. In terms of recent documented harvest figures, 138 caribou were harvested on or near the coast inside the proposal area. This represents 76 percent of Kaktovik's recent caribou harvest and therefore clearly stands out as an area of interest to both government and industry. Whether this trend holds over the long run will be important to establish in light of the

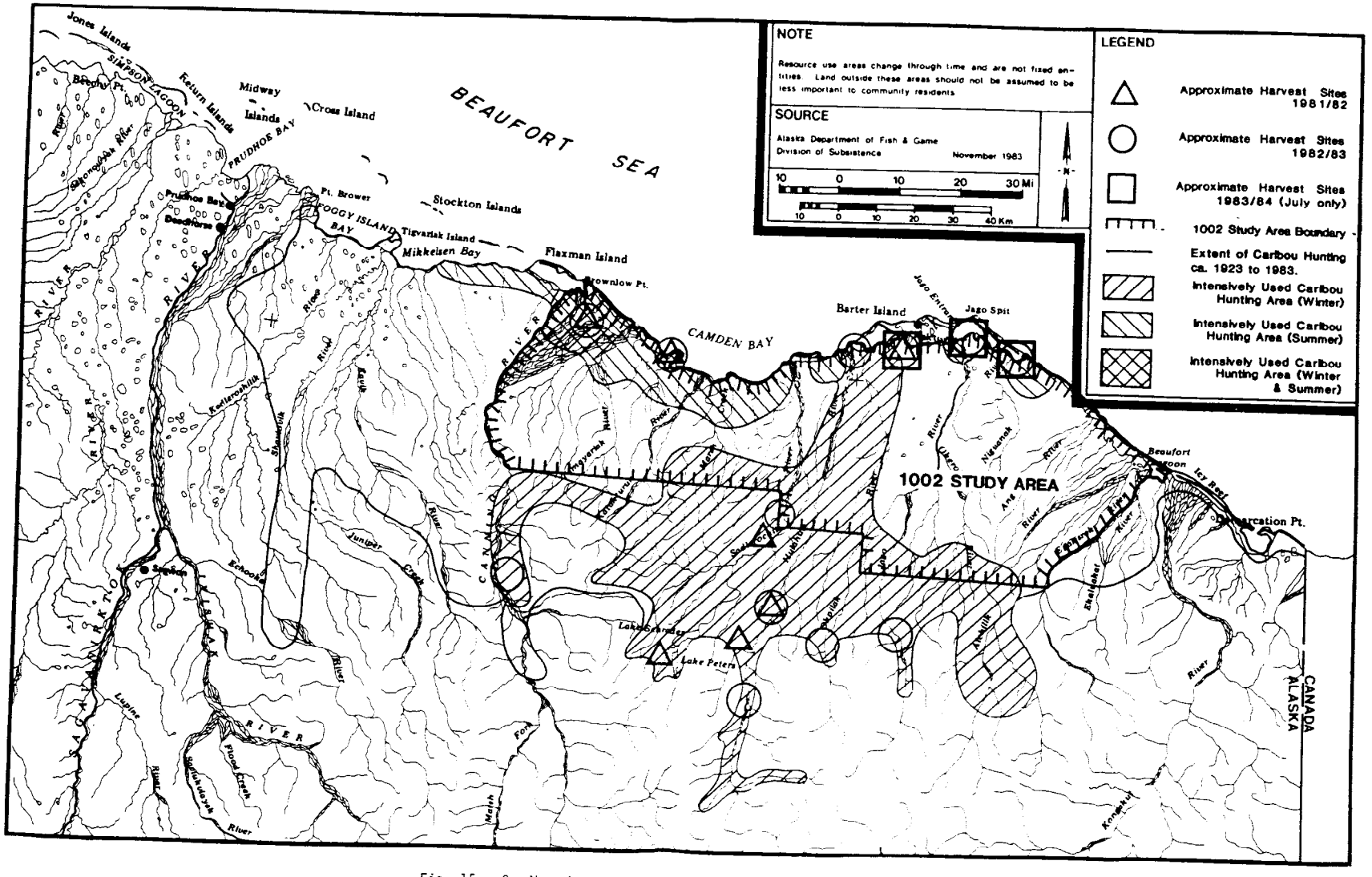

Fig. 15. Caribou harvest sites, July 1981 through July 1983, and caribou hunting area plotted on Section 1002 proposed lease area.

proposed oil and gas leasing in the area. Mitigating measures should be formulated if any leasing is proposed in the area to ensure its continuing productivity and access to Kaktovik caribou hunters.

Development of state leases on the western border of the Canning River will influence caribou availability and hunter success there, since that coastal area has been designated a high yield area as far west as Bullen Point (Figs. 5 and 12). Several recently used harvest locales are also located in this vicinity, indicating that the area is still intensively used. There is already considerable concern among biologists working on the Central Arctic Herd as well as by resident hunters over industrial development within the range of the herd and its long term effect (Cameron, Whitten, and Smith 1983).

It is worth noting that no caribou were taken by Kaktovik hunters in the rapidly industrializing area west of the Canning River during the study period. Despite the designation of a sizable area west of the Canning River as part of Kaktovik hunters' general caribou hunting range (Fig. 4) and the identification of a coastal strip extending into the industrializing coastal zone as a high yield area for caribou hunting (Fig. 6), Kaktovik hunters have not reported harvesting caribou there during the study period. This was despite the fact that several late spring excursions were made by Kaktovik hunters and fishermen by snowmachine far into the development area during the study period. The resources pursued during these trips appear to be several types of anadromous fish (arctic char and grayling in particular) and furbearers (notably wolves).

That caribou were not harvested by hunters in this area may be due to a number of factors including uncertainty of the caribou hunting

regulations for the area. Confusion exists in the community over the different seasons and bag limits for caribou hunting in Units 26 B and 26 C. Additionally, hunters may believe that much of the area is closed to the taking of big game (as is a large area around Prudhoe Bay) now that there is a considerable presence of oil and gas industry related activities east of Prudhoe, both offshore and onshore, all the way to the Canning River. Possibly there were no caribou in the area for some reason when Kaktovik hunters were there, or perhaps the caribou were very easily spooked by snowmachines and stayed outside rifle range. Whatever the reason may be, Kaktovik hunters did not report taking any caribou west of the Canning River during the study. More information should be developed on this situation to bring it into better focus. Meanwhile it seems reasonable that certain mitigating measures are in order on state, federal, and privately leased lands, in and near Kaktovik's caribou hunting range to minimize potential further alienation of hunters from either the land or the subsistence resources in the area.

CONCLUSIONS

The purpose of this report was to provide detailed information on land use dimensions and harvesting patterns associated with caribou hunting in the village of Kaktovik in northeast Alaska. Through a land use mapping study, it was determined that Kaktovik caribou hunters used an extensive (7,600 sq miles or 19,684 sq km) geographic area over time, to hunt caribou for their community. The highly intensive caribou hunting area, delineated within the overall range, was some 2,900 square miles (6,000 sq km). However, access to the entire area has been necessary to provide the community with caribou since 1923.

A sizable portion of the general caribou hunting range, as well as a portion of the intensively used area, have been identified as lying within a rapidly industrializing portion of the east-central North Slope. However, very little caribou hunting activity has been conducted in the area recently by Kaktovik residents. No caribou have been reported taken from the area since 1981, when the Division of Subsistence began to collect harvest information from Kaktovik. It was suggested that unclear harvesting regulations as well as industrialization may have lead to avoidance of this region by Kaktovik caribou hunters.

Validation of survey harvest data by field documentation indicates that hunters recalled and accurately reported their annual caribou harvesting success. Household harvest data collected during the July survey in 1983 were closely supported by the field harvest documentation.

Based on the significant differences between the three study years, annual caribou harvest levels in Kaktovik appear to be highly variable from year to year. Variations may be due in large part to the fluctuating distribution of caribou in Kaktovik's hunting area, especially fluctuations of the summer caribou population. There may also be a linkage to the harvest of other resources such as bowhead whale, fish, and sheep that has not yet been investigated.

High yield caribou areas were identified along coastal and inland sections. Seventy percent of all caribou harvest took place on the coastal plain near the coast and 30 percent of the caribou harvest came from the foothills and mountain areas. Inadequate information on recent annual distribution of caribou from the Central Arctic Herd and the Porcupine Herd within the Kaktovik caribou hunting range makes it difficult to confidently assign portions of the annual harvest to either

herd. However, based on the best available caribou distribution information from the eastern North Slope, roughly half of the three-year's caribou harvest in Kaktovik came from each herd. On an annual basis, however, the Porcupine Herd may supply most of the caribou one year, while the Central Arctic Herd supplies most of the caribou other years.

The majority of caribou harvested by Kaktovik hunters during the study were taken during the regulatory season in subunit 26C. With extension of the season through April 30 in regulatory year 1983-84, fewer animals can be expected to be taken outside the regulatory season.

There was extremely good fit between the information on land used for caribou hunting and the site-specific harvest locations. The two information types supported each other in clearly identifying recent areas of high intensity caribou hunting use. These may be special areas of concern to Kaktovik residents with respect to the harvesting of one of their most important terrestrial food sources.

Finally, though the annual caribou harvest level in Kaktovik was relatively low during the study (43 in 1981-82 and 110 in 1982-83), the significance of caribou as the major local terrestrial food resource stands out. It is important therefore that adequate conservation measures be put into place at the earliest possible time to ensure long-term viability of the caribou and their range in northeast Alaska and to ensure continued access and use by Kaktovik residents to this important resource. This means that it is incumbent for federal, state, and private land managers in the designated area to fully consider this existing land use when developing land use plans which result in competing land uses within the defined area.

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APPENDIX 1

RESOURCES HARVESTED BY KAKTOVIK RESIDENTS*[1,2]

Category	Species: Inupiaq	Species: Scientific
BIG GAME		
Caribou	Tuttu	Rangifer tarandus
Dall sheep	Imñaiq	Ovis dalli
Grizzly bear	Akłaq	Ursus arctos
Moose	Tuttuvak	Alces alces
FURBEARERS		
Arctic Fox	Tigiganniaq	Alopex lagopus
Red fox	Kayuqtuq	Vulpes vulpes
Wolf	Amaġuq	Canis lupus
Wolverine	Qavvik	Gulo gulo
SMALL MAMMALS		
Alaska marmot	Siksrikpak	Marmota broweri
Arctic ground squirrel	Siksrik	Spermophilus parryii
Mink	Itiġiaqpak	Mustela vison
Weasel	Itiġiaq	Mustela erminea
MARINE MAMMALS		
Bearded seal	Ugruk	Erignathus barbatus
Belukha whale	Qilalugaq	Delphinapterus leucas
Bowhead whale	Aġviq	Baleana mysticetus
Polar bear	Nanuq	Ursus maritimus
Walrus	Aiviq	Odobenus rosmarus
Ringed seal	Natchiq	Phoca hispida
Spotted seal	Qasigiaq	Phoca vitulina
BIRDS		
Birds' eggs	Mannich	
Black brant	Niġliñġaq	Branta bernicla
Canada goose	Niġliq	Branta canadensis
Common eider	Amauliġruaq	Somateria mollissima
King eider	Qiŋalik	Somateria spectabilis
Oldsquaw	Aaqhaaliq	Clangula hyemalis
Pintail	Kurugaq	Anas acuta
Rock ptarmigan	Niksaaktuŋiq	Lagopus mutus
Snow goose	Kaŋuq	Chen caerulescens
Snowy owl	Ukpik	Nyctea scandiaca
Willow ptarmigan	Aqargiq	Lagopus lagopus

APPENDIX 1 cont.

Category	Species: Inupiaq	Species: Scientific
FISH		
Arctic char	Iqalukpik	Salvelinus alpinus
Arctic cod ("tomcod")	Uugaq	Boreogadus saida
Arctic flounder	Nataaġnaq	Lisopsetta glacialis
Blackfish ("old man fish")	Iłuuqiñiq, Anayuqaksrauraq	Dallia pectoralis
Chum salmon	Iqalugruaq	Oncorhyncus keta
Fourhorned sculpin	Kanayuq	Myoxocephalus
Grayling	Sulukpaugaq	Thymallus arcticus
Lake trout	Igalukpik	Salvelinus naymacush
Ling Cod	Tittaaliq	Lota lota
Pike	Siilik	(Not positively identified)
Pink salmon	Amaqtuq	Oncorhyncus gorbuscha
Quadricornis		
Smelt	Iłhuaġniq	Osmerus mordax
Whitefish		
Arctic cisco	Qaaktaq	Coregonus autumnalis
Least cisco	Iqalusaaq	Coregonus sardinella
Broad whitefish	Aanaakłiq	Coregonus nasus
Round whitefish	Aanaakłiq	Prosopium clyindraceum
VEGETATION		
Berries		
Blueberry	Asiaq	Vaccinium uliginosum
Cloudberry	Aqpik	Rubus chamaemorus
Cranberry	Kimmigñaq	Vaccinium vitis-idaea
Greens/Roots		
Wild potato	Masu	Hedysarum alpinum
Wild rhubarb	Quŋulliq	Oxyria digyna
Willow leaves	Akutuq	Salix sp.
FUEL AND STRUCTURAL MATERIAL		
Coal	Aluaq	
Driftwood	Qiruk	
Sod	Ivruq	
Willows	Uqpik	

*[1] This is a listing of selected locally harvested resources used by Kaktovik residents in the 1970s and 1980s. It is included in this report to show the wide range of resources utilized. Clearly Kaktovik residents' realm of resource management interest can be expected to span widely outside the caribou. A detailed assessment of land use dimensions associated with the above listed resources is being drafted and will follow in the near future. (Technical Paper No. 109).

*[2] Adapted from Jacobson and Wentworth, 1982; Pedersen, 1979; U.S. Fish and Wildlife Service, 1982.