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**Customary and Traditional Use Worksheet and
Options for Amounts Reasonably Necessary for
Subsistence Uses of the Teshekpuk Caribou Herd,
GMUs 26A and 24B**

Prepared by

Nicole M. Braem

**for the January 2014 Kotzebue and February 2014 Fairbanks Board of Game
meetings**

December 2013

Alaska Department of Fish and Game

Division of Subsistence



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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft ³ /s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols

alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

<i>all commonly-accepted abbreviations</i>	
<i>e.g., Mr., Mrs., AM, PM, etc.</i>	
<i>all commonly-accepted professional titles e.g., Dr., Ph.D., R.N., etc.</i>	
Alaska Administrative Code	AAC
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	\$, ¢
months (tables and figures):	first three letters (Jan.,...,Dec)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mid-eye-to-fork	MEF
mid-eye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations

alternate hypothesis	H _A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2 , etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	log ₂ , etc.
minute (angular)	'
not significant	NS
null hypothesis	H ₀
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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FOR AMOUNTS REASONABLY NECESSARY FOR SUBSISTENCE USES
OF THE TESHEKPUK CARIBOU HERD, GMUS 26A AND 24B**

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December 2013

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ABSTRACT

This report provides an updated description of the customary and traditional uses of caribou in game management units 26A and 24B by communities considered the primary users of caribou from the Teshekpuk caribou herd (TCH). It also provides options for amounts reasonably necessary for subsistence (ANS) for consideration by the Alaska Board of Game should it make a positive customary and traditional use finding for the TCH.

Key words: Subsistence hunting, amount necessary for subsistence, customary and traditional uses, North Slope, Teshekpuk caribou herd, Board of Game.

INTRODUCTION

Proposal 23 for the January 2014 Alaska Board of Game (BOG) meeting in Kotzebue requests a review of the customary and traditional use worksheet for the Teshekpuk caribou herd (TCH); that a determination be made if there are customary and traditional (C&T) uses; and if so, that the BOG establish amounts reasonably necessary for subsistence (ANS). The proposal will also be before the BOG in the Interior BOG meeting in February 2014 as Proposal 50.

This report has 2 sections. The first section presents information relevant to the customary and traditional use finding, and the second section presents information relevant to an ANS.

Caribou are present on the North Slope year-round. Four caribou herds intermingle at various times of the year (Figure 1): the Western Arctic caribou herd (WAH), Central Arctic caribou herd (CAH), the Porcupine caribou herd (PCH), and the TCH. The TCH was first recognized as a distinct herd in 1978. The herd has demonstrated high fidelity to calving areas surrounding Teshekpuk Lake, extensive use of coastal habitat for insect relief, and broad use of the coastal plain west of the Colville River drainage in late summer. Its use of winter ranges is highly variable; overlap of the TCH with WAH and CAH animals can be extensive during fall and summer (Parrett 2013).¹ Between 1984 and 2008, biologists estimate the herd grew from 11,822 to more than 68,000 animals. The most recent estimate, for 2011, is 55,704 caribou.

The annual take of caribou from each herd by residents of North Slope villages varies. Hunting pressure (and harvest) is tied to a variety of factors, including community size, its location in relation to the herds' ranges, and where caribou happen to migrate in a given year. Residents of the predominately Inupiat communities of Barrow, Atkasuk, and Nuiqsut are the primary users of the Teshekpuk caribou herd. Residents of 2 other North Slope villages, Wainwright in Game Management Unit (GMU) 26A, and Anaktuvuk Pass in GMU 24B, regularly harvest from this herd—each year, their caribou harvests are a variable mixture of WAH and TCH caribou.

Residents of other communities in GMU 26A, such as Point Lay and Point Hope, occasionally harvest caribou from the TCH. This is also the case in other villages in units 22, 23, southern 24, and 25A. In most cases, use is infrequent and rare because of the overwhelming presence of the WAH, CAH, and PCH on the periphery of the TCH range. Take of caribou by non-local hunters and nonresidents is minimal, as will be discussed under Criterion 1.

1. "The TCH is unique among arctic coastal plain calving caribou in that a substantial proportion of caribou remain on the coastal plain through the winter in most years. Even with that relative consistency, the only times of year when caribou are predictably distributed is during the insect season and late summer" (Parrett 2013, 256).

Based on these circumstances, this worksheet will confine itself to describing the harvest and use patterns of the primary users of this herd in GMUs 26 and 24B.

Paired with biologists' increased understanding of the seasonal distribution of the herd, it is possible in some years to estimate what portion of community harvest (from survey data), and non-local Alaskan and nonresident harvest (from the harvest ticket reporting system) is from the TCH, WAH, CAH, and the PCH.

SECTION 1: CUSTOMARY AND TRADITIONAL USE WORKSHEET, TESHEKPUK CARIBOU HERD

The BOG was first presented a C&T worksheet for the Teshekpuk caribou herd in 1990 (Appendix A). The administrative record does not capture if a C&T determination was made at the 1990 meeting. The same C&T worksheet was revised for the 1993 meeting (Appendix B); it is unclear whether the BOG made a finding at the 1993 meeting. This updated worksheet has been developed by the Alaska Department of Fish and Game (ADF&G) to assist the BOG in making a customary and traditional use determination. Should the BOG make a positive finding, options for establishing an ANS have been developed, and can be found in Section 2.

The following description of caribou harvest and use patterns as they relate to the 8 criteria for a C&T determination will confine itself to caribou overall. Harvest apportionment by herd, where possible, will be explored later in this document within the ANS options section.

CRITERION 1: LENGTH AND CONSISTENCY OF USE

A long-term consistent pattern of noncommercial taking, use, and reliance on the fish stock or game population that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the user's control, such as unavailability of the fish or game caused by migratory patterns.

The archaeological record documenting human occupation and land mammal hunting in the area extends back approximately 8,000–10,000 years at numerous sites identified with the Paleoarctic Tradition, and which are scattered across the Brooks Range and North Slope (Anderson 1984; Dumond 1984). The subsistence patterns of this tradition were focused on land-based hunting by small, mobile groups of people. Later archaeological traditions in the region had more diverse subsistence patterns, but caribou remained important, although periods occurred where they were in low abundance. Prior to the establishment of the modern, sedentary North Slope communities, aboriginal people moved seasonally to best take advantage of seasonally abundant species.

The North Slope Iñupiat were among the latest in Alaska to experience contact with non-Natives. The earliest ethnographic accounts (first-hand observations by non-Natives) describing North Slope Iñupiat use and reliance upon caribou date from the mid-19th century (Bockstoce 1988; Simpson 1855; Murdoch 1988). The historical subsistence patterns of North Slope Iñupiat societies fall into 2 broad categories: those oriented on sea mammal hunting with a secondary focus on terrestrial animals, birds, and fish, and those whose primary subsistence focus was caribou, supplemented with a variety of other game, birds, and fish. All societies, however, relied upon caribou for food, as well as a source of hides, sinew, bone, viscera, and antlers for the manufacture of a variety of clothing, bedding, shelters, and tools:

Of the two, the maritime Eskimo had the far richer life, able as they were to direct attention to inland hunting on the tundra when not engaged in sea mammal pursuit. Thus, they hunted caribou in the summer and fall. (Chance 1990, 24)

What the whale was to the tarmiut, the caribou was to the nunamiut. Its presence was vital to inland life, and like the whale on the coast, it became the keystone of economic, social, and religious activity, involved with an infinite number of restrictions, attitudes and treatment. (Chance 1990, 24)

Since the 1990s, the amount of information on the subsistence harvests and uses of caribou on the North Slope (Table 1) has increased. Studies have included quantitative assessment of harvests by ADF&G Division of Subsistence, the North Slope Borough Wildlife Department, and others (Bacon et al. 2009; Braem et al. 2011; Brower and Opie 1996; Brower and Opie 1997; Brower and Opie 1998; Braund, Brewster, et al. 1993; Braund, Loring, et al. 1993; Stephen R. & Associates Braund 2010; Steven R. Braund & Associates 2011; ADF&G Community Subsistence Information System [CSIS] ²; Fuller and George 1997; Holen, Hazell, and Koster 2012; Nelson, Mautner, and Bane 1978; Pedersen 1995; Pedersen 2000³; Pedersen and Opie 1991⁴; Pedersen and Opie 1992⁵; Pedersen and Opie 1994⁶; Pedersen and Nageak 2008⁷). A number of qualitative studies have documented patterns of use (Stephen R. & Associates Braund 2010; Brown 1979; Burch Jr. 2012; Galginaitis et al. 1984; Galginaitis 1990; Gubser 1965; Hall, Gerlach, and Blackman 1985; Hoffman, Libbey, and Spearman 1988; Ingstad 1954; Ivie and Schneider 1988; Paneak 2004; Pedersen 1979; Schneider, Pedersen, and Libbey 1980; Sonnenfeld 1956⁸; Spearman 1979).

Caribou continue to be an important subsistence resource to North Slope residents, as harvest surveys have demonstrated (Table 1). Estimated yearly harvests by Barrow, the regional center,

2. ADF&G Community Subsistence Information System: <http://www.adfg.alaska.gov/sb/CSIS/>. Hereinafter cited as CSIS.

3. Pedersen, S. 2000. Documentation of large mammal harvest levels in Nuiqsut, June 1999 through May 2000. Unpublished report. Alaska Department of Fish and Game Division of Subsistence, Fairbanks. Hereinafter cited as Pedersen 2000.

4. Pedersen, S., and T. Opie. 1991. Documentation of caribou harvest levels in Anaktuvuk Pass, 1990–91. Unpublished report. Alaska Department of Fish and Game Division of Subsistence and North Slope Borough Department of Wildlife Management. Fairbanks. Hereinafter cited as Pedersen and Opie 1991.

5. Pedersen, S., and T. Opie. 1992. Documentation of caribou harvest levels in Anaktuvuk Pass, 1991–92. Unpublished report. Alaska Department of Fish and Game Division of Subsistence and North Slope Borough Department of Wildlife Management. Fairbanks. Hereinafter cited as Pedersen and Opie 1992.

6. Pedersen, S., and T. Opie. 1994. Documentation of caribou harvest levels in Anaktuvuk Pass, 1993–94. Unpublished report. Alaska Department of Fish and Game Division of Subsistence and North Slope Borough Department of Wildlife Management. Fairbanks. Hereinafter cited as Pedersen and Opie 1994.

7. Pedersen, S., and J. Nageak. 2008. Documentation of caribou harvest levels in Anaktuvuk Pass, June 2006–May 2007. Unpublished report. Alaska Department of Fish and Game Division of Subsistence and City of Anaktuvuk Pass. Fairbanks. Hereinafter cited as Pedersen and Nageak 2008.

8. Sonnenfeld, J. 1956. Changes in subsistence among Barrow Eskimo. Unpublished PhD dissertation, John Hopkins University. Baltimore, MD and Office of Naval Research, Project ONR-140. Arctic Institute of North America. Barrow. Hereinafter cited as Sonnenfeld 1956.

have ranged from between 1,158 to 3,359 caribou between 1987 and 2003; per capita harvests have ranged from 31.8–88.6 lb per capita. In 12 estimates of the Nuiqsut harvest between 1985 and 2007, the community took between 258–672 caribou annually, with pounds per capita harvests from 73.1–361.0 lb. Wainwright harvests have ranged from 505–1,231 caribou annually from 1988–2009, with per capita values from 117.0–284.0 lb. Because of their inland location, Atqasuk and Anaktuvuk Pass do not have the access to marine mammals as do other North Slope communities. Thus, they depend more heavily on caribou. In the 8 surveys conducted in Atqasuk since 1994, annual harvest has varied from 157 caribou in 2007 to 398 caribou in 1996. Pounds per capita harvests have ranged from 82.7–207.2 lb. Since 1990, annual harvests by Anaktuvuk Pass of 210–732 caribou have been documented, with per capita harvests between 80.0 and 304.0 lb.

Data from comprehensive harvest surveys confirm the continued importance of caribou within total annual subsistence harvests, which will be discussed further in Criterion 8.

Less information exists for caribou harvests by residents of communities other than Anaktuvuk Pass in GMU 24B (Table 1). Harvests have proven more variable. A single study in 1973 documented caribou harvests in Alatna and Allakaket of 300 animals combined, representing an estimated 224 lb per person. The same study estimated harvests of 50 caribou in Bettles and Evansville combined, representing 114 lb per person.

With the exception of the 2 most recent studies in Allakaket, most studies since then have documented lesser harvests of caribou. The crash of the WAH in 1976 and later changes in its migration pattern are the likely causes. In a study by Marcotte and Haynes (1985) several respondents emphasized that traditionally caribou had played an important part in their diet:

In recent years few caribou have been found in the area, which is reflected in the low caribou harvest. However, they remain an important resource to people in the Koyukuk River area, and would be harvested in greater numbers with higher caribou population levels.

The low participation in caribou harvest (about 5 to 20 percent) is a reflection of the current scarcity of caribou in the area. Many residents commented that caribou migrations have failed to pass through the area during the last decade. (Marcotte and Haynes 1985, 44–48)

Annual caribou harvest in GMU 26A by non-local Alaskans and nonresidents, as tracked through the state's harvest ticket database, is minimal (Figure 2; Figure 3). Over a 15-year period, 1998–2012, a total of 1,258 caribou were reported killed, which is an average of 84 caribou per year. Of that number, more than half were killed by Alaska residents. Some harvest was reported by residents of North Slope communities, particularly Barrow and Anaktuvuk Pass, but it was only 2% of resident harvest. When harvest ticket data are compared to results from community harvest surveys as described earlier, it is clear that the harvest ticket database does not capture local harvests.

CRITERION 2: SEASONALITY

The pattern of taking or use recurring in specific seasons of each year.

Historically, the North Slope Iñupiat hunted caribou virtually year-round, although more intense periods of caribou harvest occurred at particular times of year. In coastal settlements, spring whaling would take precedence (Bockstoce 1988; Murdoch 1988; Spencer 1959).

At present, caribou are taken year-round on the North Slope, but, as in the past, hunting effort (and harvest) will often be heavier in particular months and seasons (Table 2). At Atqasuk, August and September is when there has been the most activity (Bacon et al. 2009). At Barrow and Nuiqsut, more caribou are taken in July and August when they are available to boat hunters (Braem et al. 2011; Braund, Brewster, et al. 1993; Fuller and George 1997). Anaktuvuk Pass harvests the majority of its caribou in the fall and spring (Brower and Opie 1996, 13). In years in which the fall harvest is poor, higher harvests will occur during late winter/spring months. Wainwright harvest is concentrated in August and September.

The communities of Alatna, Allakaket, Bettles, Evansville, and Wiseman primarily harvest caribou in the winter, although harvests do take place in the fall if caribou are present.

Harvests tracked through the harvest ticket reporting system, which primarily captures harvest by non-local Alaskans and nonresidents; show that from 1998–2012, 90% of harvest in GMU 26A occurred in August and September (68% in August) (Table 3).

CRITERION 3: MEANS AND METHODS OF HARVEST

A pattern of taking or use consisting of methods and means of harvest that are characterized by efficiency and economy of effort and cost.

Historically, a variety of methods were used to take caribou. These include spearing swimming animals from a *qayaq*, caribou drives (aided by constructed barriers or naturally-occurring features such as lakes), snares, bows and arrow, and deadfalls. These methods disappeared after the introduction of firearms in the 19th century. Caribou drives in particular allowed the Iñupiat to harvest large numbers of caribou in a short time (Burch Jr. 2012; Spencer 1959; Murdoch 1988). As Burch (2012, 39) observed:

The traditional yearly cycle of Alaska Natives who depended on caribou for their living had to articulate in a systematic way with the annual cycle of caribou movements. Although it is often alleged in anthropological writings that traditional Native people for whom caribou were an important resource “followed the herds,” that could not have been true in any literal sense (Burch [Jr.] 1991). Ordinary people, traveling with elders, infants, and all of their paraphernalia, could not walk 3,000 miles (5,000 km) per year. What people could do, and what many of them did do, was go to where they expected caribou to be at certain times of year. During some seasons, however, caribou were in the territory of a foreign nation. Alaska Native caribou hunters thus had to take political factors into account in their search for caribou, in addition to the more obvious (to us) ecological and economic ones.

Efficiency was achieved by placement of camps near migration routes and travel at the appropriate time to areas where caribou were likely to be present. Camps situated along river corridors enabled access to hunting areas prior to freezeup when bull caribou were in prime shape; caribou harvest was coincident with heavy fall fishing effort.

Today, numerous fixed camps are spread across the landscape, with many located on the major waterways that serve as “highways.” Barrow and Atqasuk base multiple harvest activities from these camps, including important fisheries, berry picking, and caribou hunting in the fall. The current resettlement location of Anaktuvuk Pass was selected because of its location along major caribou migratory corridors. Caribou harvest also takes place opportunistically during other

subsistence activities; for example, during wolf and wolverine hunting and trapping. Caribou hunting is carried out by individual hunters as well as by groups of people cooperating under specific rules of sharing. Caribou are taken with modern firearms; in studies, local residents have indicated a preference for smaller calibers because it is believed a smaller caliber wastes less meat. They often use a variety of calibers under different conditions. Hunters in GMU 26A are allowed to take caribou by a boat under power; swimming caribou may also be taken with a firearm using .22 caliber rimfire cartridges. Boats and all-terrain vehicles are the primary means of transportation used during open water season, while snowmachines are favored after freezeup.

CRITERION 4: GEOGRAPHIC AREAS

The area in which the noncommercial, long-term, and consistent pattern of taking, use, and reliance upon the fish stock and game population has been established.

Prior to 1840, the Iñupiat people of the North Slope were loosely organized in 6 groups or nations of small kin-based settlements with recognized territories (Burch Jr. 1980). By 1900, these societies had ceased to exist. However, communities today still use areas that were the traditional territories of the various small societies that preceded modern villages.

Mapping efforts, the earliest in the 1970s, show that a large area of the North Slope is used by local residents to hunt caribou (Figure 4).

More recent mapping efforts in Barrow, Nuiqsut, Wainwright, Anaktuvuk Pass, Alatna, Allakaket, Bettles, and Wisemen have shown consistent use of the same areas through time (figures 5–14) although interannual variation is common in response to caribou migratory patterns, weather, conditions for travel, and other factors. Certain areas may be used more regularly because they have proven particularly productive; often these are sites close to communities. In a recent study, over a 10-year period, Barrow used a total of 26,328 miles² for caribou hunting; Nuiqsut used 20,084 miles² (Steven R. Braund & Associates 2010).

Caribou harvests in GMU 26A tracked through the harvest ticket database are heaviest in 2 uniform coding units (UCUs) that are associated with guided hunts and transporters (L. S. Parrett, Wildlife Biologist III, ADF&G, Fairbanks, personal communication with Nicole M. Braem, Subsistence Resource Specialist, ADF&G, Fairbanks, Nov. 13, 2013) (Figure 15). In the time period 2002–2007, 57% of harvest came specifically from those 2 UCUs (L. S. Parrett, Wildlife Biologist III, ADF&G, Fairbanks, personal communication with Nicole M. Braem, Subsistence Resource Specialist, ADF&G, Fairbanks, Nov. 13, 2013). Lesser harvests are spread out among various other UCUs in GMU 26A.

CRITERION 5: MEANS OF HANDLING, PREPARING, PRESERVING, AND STORING

A means of handling, preparing, preserving, and storing fish or game that has been traditionally used by past generations, but not excluding recent technological advances where appropriate.

Historically, caribou were important not just for sustenance, but also as a source of material for many items of clothing, including parkas, underwear, socks, boots, mittens, and gloves. Thick, heavy winter hides were used for blankets and heavy socks, while short-haired summer hides, especially those of fawns, were sought for dress garments and underclothes (Murdoch 1988). The necessity of hides for clothing was a driver in the trade between coastal and inland groups of Iñupiat. In addition to meat, various organs, viscera, bones, sinew, antlers, and fat were salvaged.

Coastal groups tended to store caribou meat frozen in ice cellars (*siġhuaq*). Inland groups more commonly stripped and dried the meat (*paniqtaq*).

Today's approach to salvage and methods of processing caribou are a mixture of the old and the new. Caribou may be frozen (and stored in an ice cellar or a modern freezer), dried, or eaten fresh. Hunters commonly take more from the field than minimal state salvage requirements, including the head, various organs, fat, bones, hides, antlers, and sinew. Dried caribou fat, or *qaunnaq*, is an important ingredient for *akutaq* (Eskimo ice cream). Raw caribou is eaten frozen (*quaq*). Skin from the legs is used to make the uppers for boots (*kammit*). Hides are used as bedding material (*qarraaq*) and for various craft items.

CRITERION 6: INTERGENERATIONAL TRANSMISSION OF KNOWLEDGE, SKILLS, VALUES, AND LORE

A pattern of taking or use that includes the handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation.

Caribou hunting is the most common type of land-based hunting on the North Slope. Young hunters may begin following experienced family members at an early age. Caribou hunting is often concurrent with other subsistence activities, such as fishing, berry-picking, etc. Often these activities occur during extended stays at family camps. Subsistence camps are an important setting in which traditional values, behaviors, hunting and processing techniques, knowledge of the landscape and travel skills, and sharing are taught and reinforced:

As in all the North Slope villages, there are members of many Barrow families who grew up out on the land. They have an intimate knowledge of the areas where their parents taught them how to catch the food they needed to survive. Those individuals continue to use the same areas, now teaching their children and their grandchildren when, where, and how to successfully harvest the available resources. (Braund, Brewster, et al. 1993, 5)

The teaching of traditional and modern skills has been prioritized in numerous community plans. As on the Seward Peninsula and in Northwest Alaska, local residents on the North Slope stress the importance of allowing the lead caribou in a group to pass undisturbed to avoid deflecting or scattering the caribou that follow.

CRITERION 7: DISTRIBUTION AND EXCHANGE

A pattern of taking, use, and reliance where the harvest effort or products of that harvest are distributed or shared, including customary trade, barter, and gift-giving.

Trade networks between various groups of Iñupiat and other Alaska Natives were extensive prior to first contact with non-Natives. North Slope groups participated in major trade fairs at Sisauliq (on Kotzebue Sound), Nigliq (near the current-day site of Nuiqsut), Barter Island, and the McKenzie River. Coastal Natives traded coastal resources (particularly blubber and oil) for inland resources, such as caribou meat and hides, and fox and wolverine skins. When non-Natives arrived in the region, they traded extensively with local people for caribou meat and items of clothing (Bockstoce 1988; Murdoch 1988). During the whaling period, a commercial market for caribou developed with local Iñupiat supplying whaling crews.

Cooperation by individuals and families in the production of subsistence foods is well-documented in ethnographic literature. Harvest surveys in North Slope communities have

documented high percentages of households giving and receiving caribou meat; the number of households using caribou in a community is almost without exception higher than those who actually harvest caribou (e.g., Bacon et al. 2009; Braem et al. 2011; Brower and Opie 1996; Brower and Opie 1997; Brower and Opie 1998; Braund, Brewster, et al. 1993; Braund, Loring, et al. 1993; Steven R. Braund & Associates 2010; Steven R. Braund & Associates 2011; CSIS; Fuller and George 1997; Pedersen 2000). Caribou are one of several resources distributed to community members and visitors during North Slope community celebrations such as *Nalukataq*, *Kivgik*, and for Christmas and Thanksgiving feasts. In 1994, Atqasuk hunters assisted Anaktuvuk Pass by hunting caribou for that community when caribou were scarce near Anaktuvuk Pass (Brower and Opie 1997, 25). Caribou are one of many subsistence resources that are items of barter between individual households and communities on the North Slope. As in the past, residents of coastal communities bring marine resources, for example *maktak*, to Anaktuvuk Pass regularly in exchange for dried caribou meat (Fuller and George 1997).

CRITERION 8: DIVERSITY OF RESOURCES IN AN AREA; ECONOMIC, CULTURAL, SOCIAL, AND NUTRITIONAL ELEMENTS

A pattern that includes taking, use, and reliance for subsistence purposes upon a wide variety of fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life.

Subsistence harvests by North Slope communities are diverse, with residents harvesting and using a wide variety of fish, game, birds and eggs, berries, and plants. Annual pounds per capita harvests remain among the highest documented in the state.

Over a 2-year period (1988–1990), residents of the coastal community of Wainwright harvested at least 46 species of fish, birds, marine and terrestrial mammals, and plants and berries (Braund, Loring, et al. 1993). In 1992, various communities harvested between 34 and 62 individual species (Fuller and George 1997). In 5 studies between 1995 and 2003, Barrow households harvested more than 60 different species (Bacon et al. 2009).

Caribou are often a significant portion of total annual harvest by weight, eclipsed only by bowhead whales (figures 16–18). In 1992, marine mammals were the majority of Barrow’s harvest by weight (73%) followed by land mammals (18%). Virtually all of the land mammal harvest was caribou. In 2009, Wainwright caribou harvests made up 42% of the total harvest, (167,356 lb of 401,255 lb of wild foods harvested), with a mean per capita harvest for all resources of 680 lb.

At inland communities, caribou are an even greater portion of the harvest. At Atqasuk in 1994–1995, 57% of the total harvest was caribou; at Nuiqsut, it was 48%. Recently, at Anaktuvuk Pass in 2011, caribou were 79% of the total harvest: 77,707 lb of 85,040 lb.

TABLES AND FIGURES

Table 1.–Estimated total and pounds per capita caribou harvests, select GMU 26A and 24B communities.

Community	Year/ period	Estimated caribou harvest	Number caribou per capita	Pounds per capita	Source/notes
Anaktuvuk	1990–1991	592	2.2	223.2	Pedersen and Opie 1991, unpubd.
Pass	1991–1992	536	2.0	245.3	Pedersen and Opie 1992, unpubd.
	1992	600	2.2	260.0	Fuller and George 1997 [rev 1999]
	1993–1994	574	1.8	219.4	Pedersen and Opie 1994, unpubd.
	1994–1995	322	1.1	135.7	Brower and Opie 1996
	1996–1997	210	0.7	80.4	Bacon et al. 2009 [rev. 2011]
	1998–1999	500	1.6	189.3	Bacon et al. 2009 [rev. 2011]
	1999–2000	329	1.0	122.7	Bacon et al. 2009 [rev. 2011]
	2000–2001	732	2.6	303.8	Bacon et al. 2009 [rev. 2011]
	2001–2002	271	0.9	106.2	Bacon et al. 2009 [rev. 2011]
	2002–2003	436	1.4	169.0	Bacon et al. 2009 [rev. 2011]
	2006–2007	696	2.3	298.8	Pedersen and Nageak 2008, unpubd.
	2011	616	2.0	250.8	Holen, Hazell, and Koster 2012
	Atqasuk	1994–1995	262	1.2	136.8
1996–1997		398	1.8	207.2	Bacon et al. 2009 [rev. 2011]
1997–1998		266	1.1	130.8	Bacon et al. 2009 [rev. 2011]
2002–2003		221	1.0	113.0	Braem et al. 2011
2003–2004		352	1.4	167.4	Braem et al. 2011
2004–2005		207	0.8	95.0	Braem et al. 2011
2005–2006		174	0.7	87.4	Braem et al. 2011
2006–2007		157	0.7	82.7	Braem et al. 2011
Barrow	1987–1988	1595	0.6	61.9	Braund, Brewster, et al. 1993
	1988–1989	1533	0.6	59.5	Braund, Brewster, et al. 1993
	1989–1990	1656	0.6	64.2	Braund, Brewster, et al. 1993
	1992	1993	0.5	60.0	Fuller and George 1997 [rev 1999]
	1995–1996	2155	0.5	60.4	Bacon et al. 2009 [rev. 2011]
	1996–1997	1158	0.3	31.8	Bacon et al. 2009 [rev. 2011]
	2000	3359	0.7	88.6	Bacon et al. 2009 [rev. 2011]
	2001	1820	0.4	46.5	Bacon et al. 2009 [rev. 2011]
	2002–2003 ^a	5641	1.1	123.1	Braem et al. 2011; *overestimate*
	2003	2092	0.5	55.2	Bacon et al. 2009 [rev. 2011]
	2003–2004 ^a	3548	0.7	87.7	Braem et al. 2011; *overestimate*
	2004–2005 ^a	4338	0.8	94.4	Braem et al. 2011; *overestimate*
	2005–2006 ^a	4535	0.9	103.3	Braem et al. 2011; *overestimate*
2006–2007 ^a	5380	1.0	111.3	Braem et al. 2011; *overestimate*	

a. Barrow estimates published in Braem et al. (2011) are overestimates due to sampling issues that resulted in a bias toward Inupiat households. That and the small sample size resulted in gross overestimate of annual harvests. However, the patterns of use (timing, locations, etc.) are representative.

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Table 1.–Page 2 of 3.

Community	Year/ period	Estimated caribou harvest	Number caribou per capita	Pounds per capita	Source/notes
Nuiqsut	1985–1986	513		149.7	ADF&G unpublished data
	1992	278	0.7	78.0	Fuller and George 1997 [rev 1999]
	1993	672	1.9	361.0	Pedersen 1995
	1994–1995	258	0.6	73.1	Brower and Opie 1998
	1995–1996	362	0.9	103.1	Bacon et al. 2009 [rev. 2011]
	1999–2000	413	0.8	111.6	Pedersen 2000, unpubd.
	2000–2001	496	1.1	133.9	Bacon et al. 2009
	2002–2003	397	1.0	118.4	Braem et al. 2011
	2003–2004	564	1.3	156.8	Braem et al. 2011
	2004–2005	546	1.3	147.2	Braem et al. 2011
	2005–2006	363	0.9	102.1	Braem et al. 2011
	2006–2007	475	1.2	142.5	Braem et al. 2011
	Wainwright	1988–1989	505	1.0	117.0
1989–1990		711	1.4	177.8	Braund, Loring, et al. 1993
1992		748	1.4	150.0	Fuller and George 1997 [rev 1999]
2002–2003		866	1.6	189.0	Bacon et al. 2009 [rev. 2011]
2009		1231	2.1	283.7	Kofinas, Burnsilver, and Magdanz In prep ⁹
Alatna/Allakaket	1973	300		224.1	Nelson, Mautner, and Bane 1978
	1982	6		4.7	Marcotte and Haynes 1985
	1983	0		0.0	Marcotte and Haynes 1985
	1984	4		2.6	Marcotte and Haynes 1985
Alatna	1997–1998	21		109.2	Andersen, Utermohle, and Brown 1998
	1998–1999	11		53.0	Andersen, Utermohle, and Brown 2000
	1999–2000	0		0.0	Andersen, Utermohle, and Jennings 2001
	2001–2002	0		0.0	Andersen et al. 2004
	2002–2003	34		122.8	C. L. Brown, Walker, and Vanek 2004
	2011	28		117.6	Holen, Hazell, and Koster 2012
Allakaket	1997–1998	11		7.8	Andersen, Utermohle, and Brown 1998
	1998–1999	43		29.5	Andersen, Utermohle, and Brown 2000

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9. Kofinas, Gary, B. Burnsilver, and James S. Magdanz. In prep. “The Study of Sharing Networks to Assess the Vulnerabilities of Local Communities to Oil and Gas Development Impacts in Arctic Alaska”. U.S. Department of the Interior, Bureau of Ocean Energy Management, Minerals Management Services.

Table 1.–Page 3 of 3.

Community	Year/ period	Estimated caribou harvest	Number caribou per capita	Pounds per capita	Source/notes
	1999–2000	13		10.2	Andersen, Utermohle, and Jennings 2001
	2001–2002	9		6.8	Andersen et al. 2004
	2002–2003	106		52.6	C. L. Brown, Walker, and Vanek 2004
	2011	95		84.3	Holen, Hazell, and Koster 2012
Bettles/Evansville	1973	50		114.0	Nelson, Mautner, and Bane 1978
	1982	14		27.5	Marcotte and Haynes 1985
	1983	5		8.1	Marcotte and Haynes 1985
	1984	3		5.3	Marcotte and Haynes 1985
	2002–2003	0		0.0	C. L. Brown, Walker, and Vanek 2004
Bettles	1997–1998	0		0.0	Andersen, Utermohle, and Brown 1998
	1998–1999	25		107.1	Andersen, Utermohle, and Brown 2000
	1999–2000	21		52.0	Andersen, Utermohle, and Jennings 2001
	2011	6		65.0	Holen, Hazell, and Koster 2012
Evansville	1997–1998	3		7.7	Andersen, Utermohle, and Brown 1998
	1998–1999	4		16.3	Andersen, Utermohle, and Brown 2000
	1999–2000	2		10.0	Andersen, Utermohle, and Jennings 2001
Wiseman	2011	4		40.0	Holen, Hazell, and Koster 2012

Table 2.–Caribou harvest timing, percentage of total caribou harvest by month, GMU 26A and 24B communities.

Atqasuk		Percent of year's harvest by month													
		1994						1995							
		July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown	
		16.6	23.0	23.0	13.4	11.8	3.7	0.5	4.8	1.1	0.0	1.6	0.5	0.0	
		<i>Source</i> Brower and Opie 1997													
		1996						1997							
		July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown	
		9.1	30.4	25.1	9.1	2.1	2.4	8.6	3.5	4.7	2.4	0	2.7		
		<i>Source</i> Bacon et al. 2009													
		1997						1998							
		July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown	
		13.5	35	20.3	9	3.8	4.5	3.4	4.5	1.9	1.1	0.8	1.1	1.1	
		<i>Source</i> Bacon et al. 2009													
		2002						2003							
		June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown	
		3.4	4.0	48.3	18.1	3.4	3.4	5.4	0.0	0.0	0.0	0.0	0.7	13.4	
		<i>Source</i> CSIS													
		2003						2004							
		June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown	
		15.4	10.8	24.3	23.2	9.3	0.0	0.8	0.0	0.0	0.0	0.4	3.9	12.0	
		<i>Source</i> CSIS													
		2004						2005							
		June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown	
		4.5	15.3	33.9	23.7	2.3	0.6	4.0	4.5	1.7	2.3	0.0	4.0	3.4	
		<i>Source</i> CSIS													
		2005						2006							
		June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown	
		0.8	5.8	45.5	36.4	1.7	0.0	2.5	3.3	0.8	0.8	0.0	0.8	1.7	
		<i>Source</i> CSIS													
		2006						2007							
		June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown	
		41.5	13.8	18.5	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.9	
		<i>Source</i> CSIS													

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Table 2.-Page 2 of 5.

Percent of year's harvest by month													
Barrow													
1992													
Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
5	4	6	4	4	8	15	23	16	8	5	3		
<i>Source Fuller and George 1997</i>													
1995						1996							
July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown	
31.3	25.8	8.2	3.4	4.5	0.7	2.2	8	10.5	2	0.7	1.3	1.5	
<i>Source Bacon et al. 2009</i>													
1996						1997							
July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown	
25.6	18.9	15.1	12.2	4.4	2.7	0.8	2.1	3.1	3.9	1.7	2.5	6.9	
<i>Source Bacon et al. 2009</i>													
2000													
Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Unknown	
2.2	5.5	3.1	2	1.8	0.7	17.8	31.7	7.5	15.7	6	5.1	1	
<i>Source Bacon et al. 2009</i>													
2001													
Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Unknown	
3	2.3	3	0.4	0.9	1.2	15.6	24.1	17.7	26.5	5.1	0.4		
<i>Source Bacon et al. 2009</i>													
2002						2003							
June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown	
2.7	26.8	26.2	11.9	14.2	5.6	2.2	3.2	2.7	1.3	0.9	0.8	1.6	
<i>Source Braem et al. 2011</i>													
2003						2004							
June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown	
3.3	25.2	30.4	11.3	11.7	2.1	2.5	4.7	3.0	0.5	0.7	1.3	3.2	
<i>Source Braem et al. 2011</i>													
2003													
Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Unknown	
4.2	3.2	5.2	2.6	3.9	15.8	9.7	23.5	14.6	6.5	7.6	3.1	0.2	
<i>Source Bacon et al. 2009</i>													

NOTE: while total estimated harvest was overestimated in some data years, the timing of harvest is accurate.

Table 2.-Page 3 of 5.

		Percent of year's harvest by month											
Barrow	2005						2006						
	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown
	7.5	22.0	36.0	13.2	9.9	3.3	0.2	1.2	0.4	2.6	0.9	2.4	0.4
<i>Source Braem et al. 2011</i>													
Nuiqsut	2006						2007						
	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown
	20.8	18.9	18.1	22.0	3.8	0.9	4.1	1.2	2.4	0.4	2.0	2.0	3.3
<i>Source Braem et al. 2011</i>													
1992													
Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
5.0	7.0	5.0	5.0	5.0	6.0	12.0	33.0	5.0	5.0	5.0	5.0		
<i>Source Fuller and George 1997</i>													
1994						1995							
July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown	
25.3	12.9	2.4	32.1	5.2	1.6	3.6	2.0	5.2	2.8	0.8	6.0	0.0	
<i>Source Brower and Opie 1996</i>													
1995						1996							
July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown	
23.7	23.4	13.3	5.3	3.3	1.3	3.9	3.1	9.1	0.9	0	12.6	0	
<i>Source Bacon et al. 2009</i>													
2000						2001							
July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown	
18.1	17.7	9.8	13.4	7.3	7.3	1	5.7	8.2	0	0.6	1	10	
<i>Source Bacon et al. 2009</i>													
2002						2003							
June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown	
15.9	14.1	32.6	8.8	11.5	0.9	2.6	1.3	2.2	6.2	4.0	0.0	0.0	
<i>Source Braem et al. 2011</i>													
2003						2004							
June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown	
7.4	10.6	11.6	11.8	4.2	4.4	0.5	0.0	0.2	2.7	1.2	2.0	43.3	
<i>Source Braem et al. 2011</i>													

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		Percent of year's harvest by month												
Nuiqsut	2004							2005						
	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown	
	16.5	30.2	22.9	6.2	17.2	0.2	0.2	1.1	0.0	1.1	2.9	0.7	0.9	
	<i>Source</i> Braem et al. 2011													
	2005							2006						
	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown	
	61.0	15.9	10.8	4.1	0.0	6.4	0.0	0.0	0.0	0.0	0.7	0.0	1.0	
	<i>Source</i> Braem et al. 2011													
	2006							2007						
June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown		
16.2	30.6	22.5	9.8	11.0	0.6	0.6	0.0	0.6	1.7	2.9	1.2	2.3		
<i>Source</i> Braem et al. 2011														
Wainwright	1988 and 1989													
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March		
	1	1	0	12	23	25	16	4	2	3	7	7		
	<i>Source</i> Braund, Loring, et al. 1993													
	1992													
	Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
	5	5	5	5	5	9	9	26	10	10	5	5		
	<i>Source</i> Fuller and George 1997													
	2002						2003							
July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown		
6.5	28.1	36.1	18.3	3.9	1.7	1.1	1.7	1.2	0.4	0.8	0.3	0		
<i>Source</i> Bacon et al. 2009														
Anaktuvuk Pass	1994						1995							
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown	
	42.2	20.9	15.3	2.4	10.0	5.2	1.2	1.2	7.2	11.2	6.4	1.6	0.0	
	<i>Source</i> Brower and Opie 1996													
	1996						1997							
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown	
12.4	24.2	30.1	15.6	2.7	1.6	4.1	1.4	2	5.4	0.7	0	0		
<i>Source</i> Bacon et al. 2009														

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		Percent of year's harvest by month													
Anaktuvuk Pass	1998							1999							
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown		
	11	38.4	25	1.2	0	0	0	3.4	9	7.6	3.6	0.8		0	
	<i>Source</i> Bacon et al. 2009														
	1999							2000							
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown		
	7.5	34.9	27.4	5.3	0	0	1.9	1.5	8.5	7.7	3.9	0		1.4	
	<i>Source</i> Bacon et al. 2009														
	2000							2001							
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown		
	1.6	5.7	6.8	4.8	1.8	1.2	0	0.9	25.4	33.6	9.1	9.1		0	
	<i>Source</i> Bacon et al. 2009														
	2001							2002							
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown		
	0	13.9	11.3	6.1	0	0	10.6	6.4	23.3	15.9	12.7	0		0	
	<i>Source</i> Bacon et al. 2009														
	2002							2003							
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	June	Unknown		
	2.8	24.3	26.4	2.5	9.6	0.9	0	15.8	5.8	5.2	4	1.8		0.9	
	<i>Source</i> Bacon et al. 2009														
	2006							2007							
	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr	May	Unknown		
	4.7	10.3	19.8	20.7	4.3	4.9	2.9	2.2	11.9	5.0	7.3	6.0			
	<i>Source</i> Pedersen and Nageak 2008														
	2011							2012							
	Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Unknown		
	5.8	3.4	3.1	5.8	3.3	0.0	0.9	35.6	20.3	0.2	6.3	15.3		0.0	
	<i>Source</i> Holen et al. 2012														

Table 3.—Reported caribou harvest by all hunters, 1998–2012, harvest ticket reporting system, GMU 26A.

Month	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
January						3	12			3		2			2	22
February						1	1					1			2	5
March						7	1					2		1	1	12
April		1				2		1	7	3		1				15
May	1					2		1	2	1						7
June								1							1	2
July	5				2		4	1		3	3	3	3	1	2	27
August	17	37	53	49	53	73	74	70	49	78	57	58	43	75	64	850
September	17	12	14	6	16	24	25	13	31	25	34	10	22	17	19	285
October	5			2	4	4			1					1		17
November	4				3	1				1					1	10
December																0
Unknown			1		1	1			1				1		1	6

Source WinfoNet.

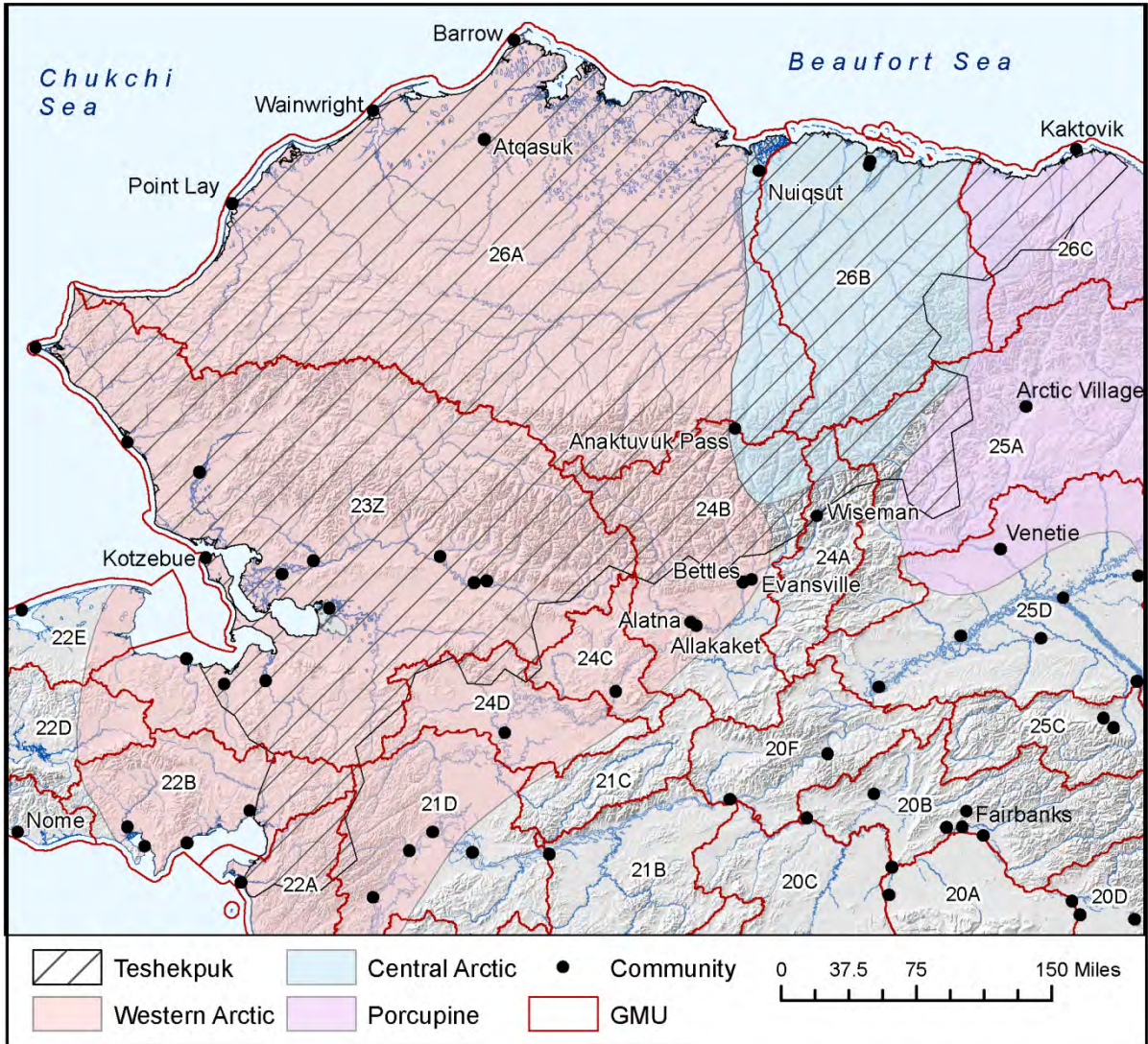


Figure 1.—Ranges of the Western Arctic, Teshekpuk, Central Arctic, and Porcupine caribou herds.

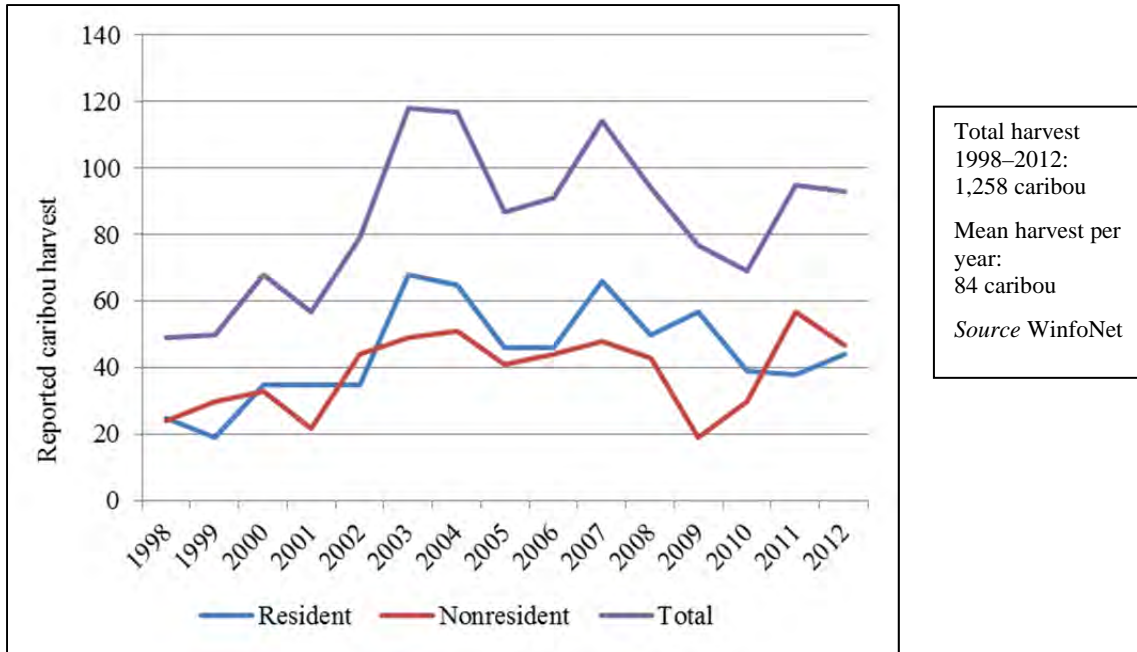


Figure 2.–Caribou harvests in GMU 26A, by resident (local and non-local hunters) and nonresident hunters, from the harvest ticket reporting system, 1998–2012.

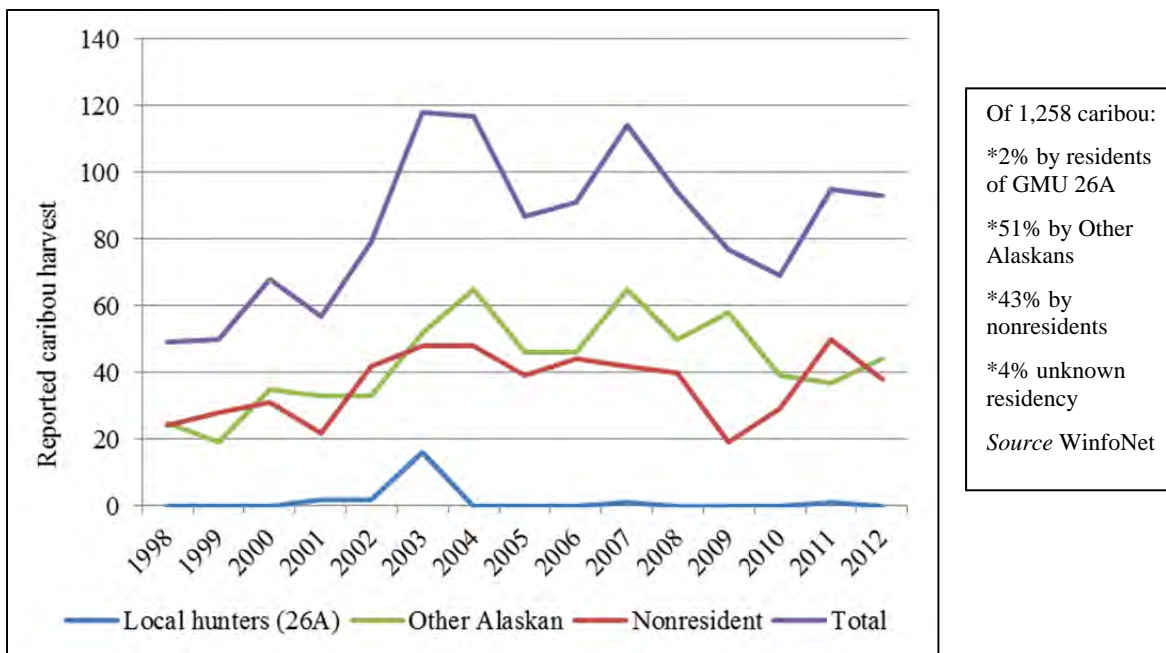


Figure 3.–Caribou harvests in GMU 26A, by residents of GMU 26A, other Alaska residents, and nonresident hunters, from the harvest ticket reporting system, 1998–2012.

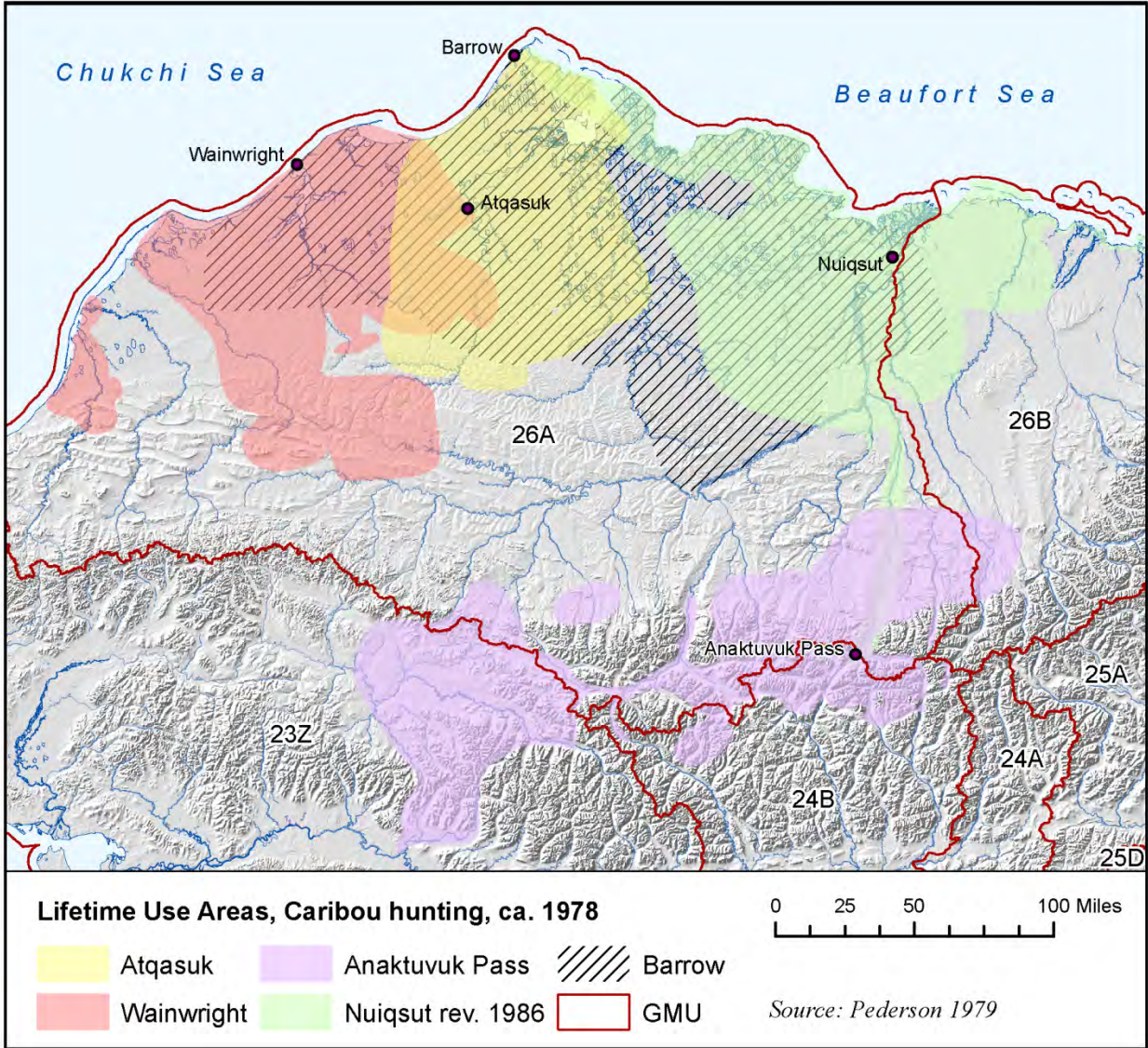


Figure 4.–Lifetime community caribou hunting use areas ca. 1978, Wainwright, Barrow, Atqasuk, Nuiqsut, and Anaktuvuk Pass.

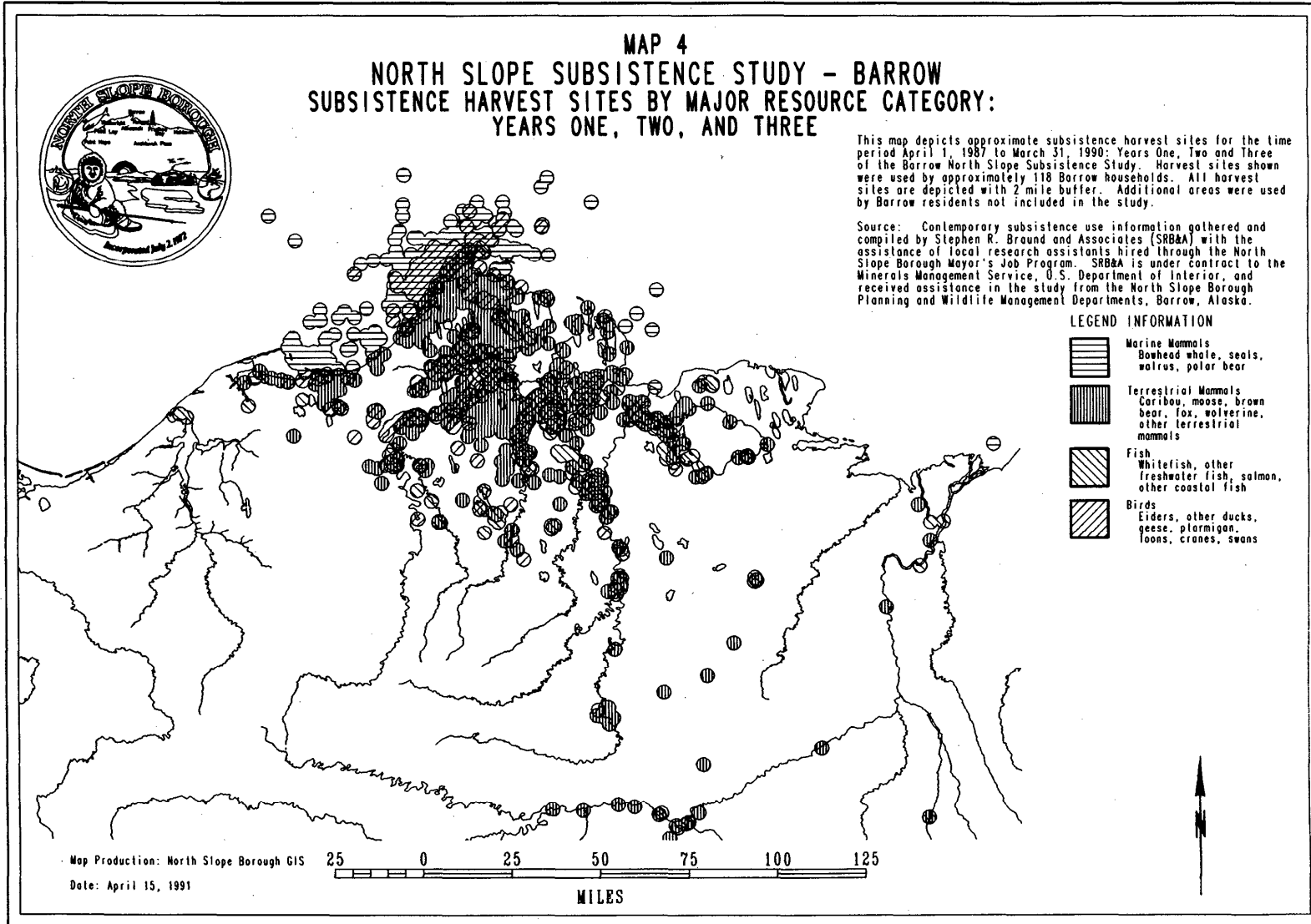


Figure 5.-Barrow harvest sites, by resource category, 1987-1989.

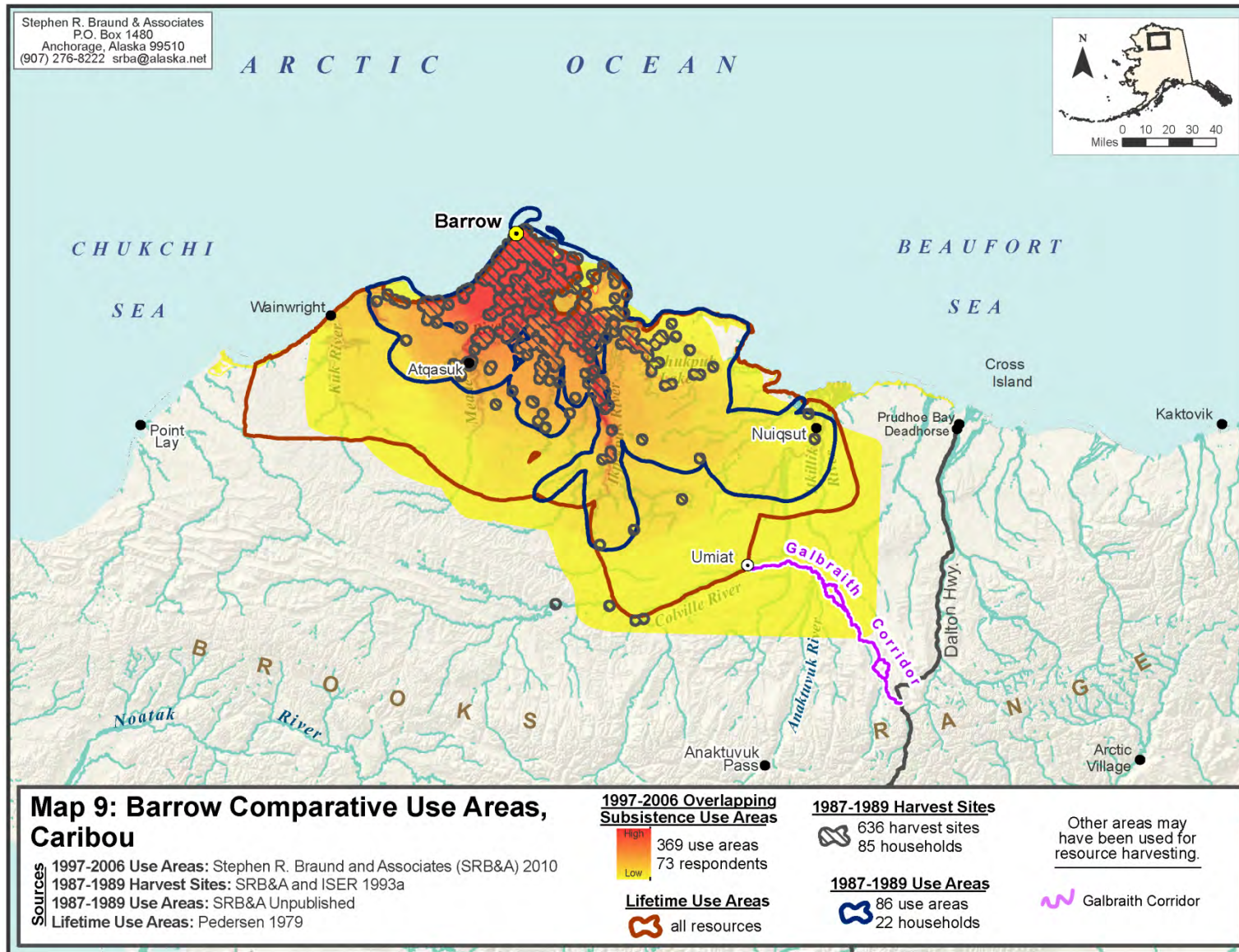


Figure 6.—Barrow comparative use areas, various studies.

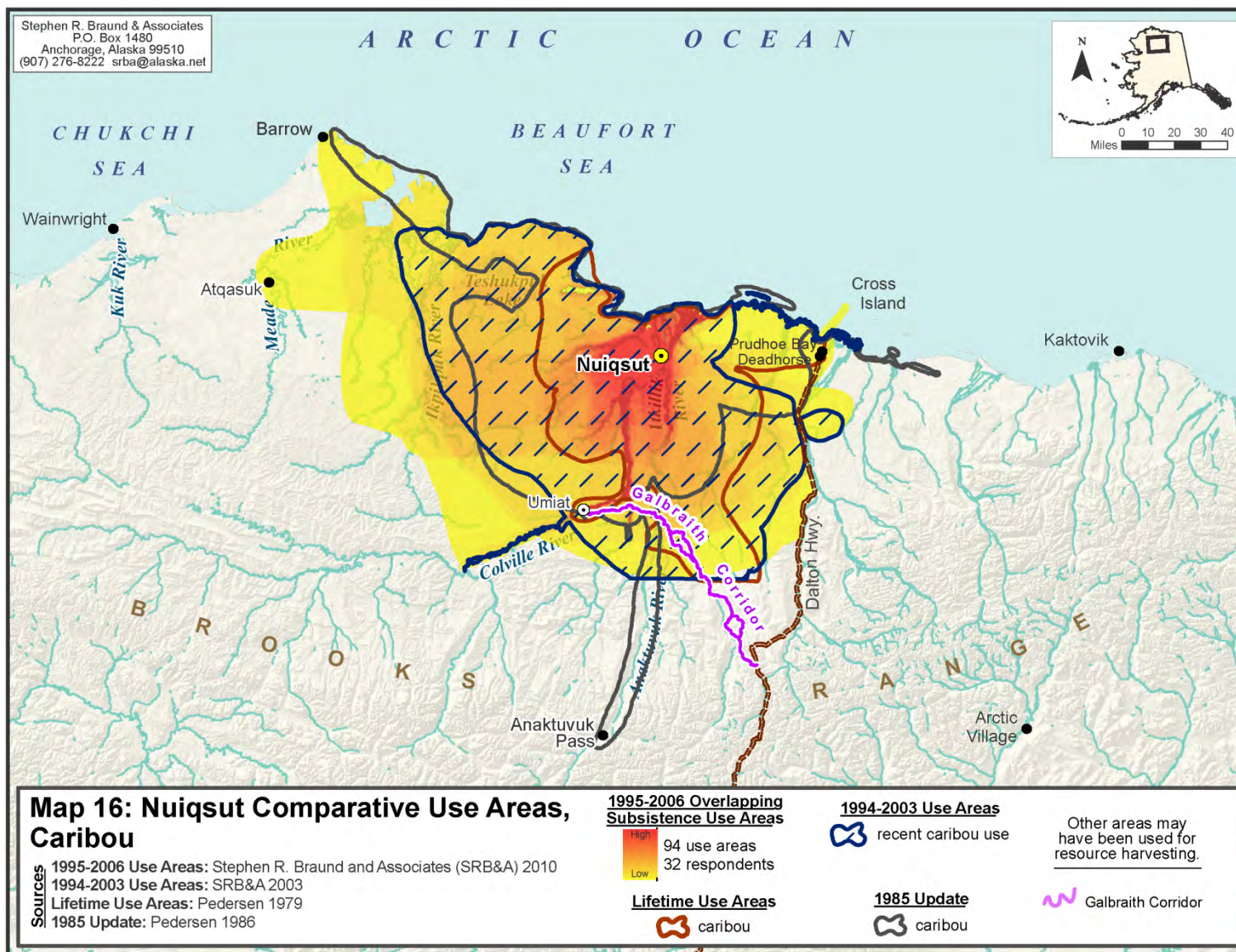


Figure 7.—Nuiqsut comparative use areas, various studies.

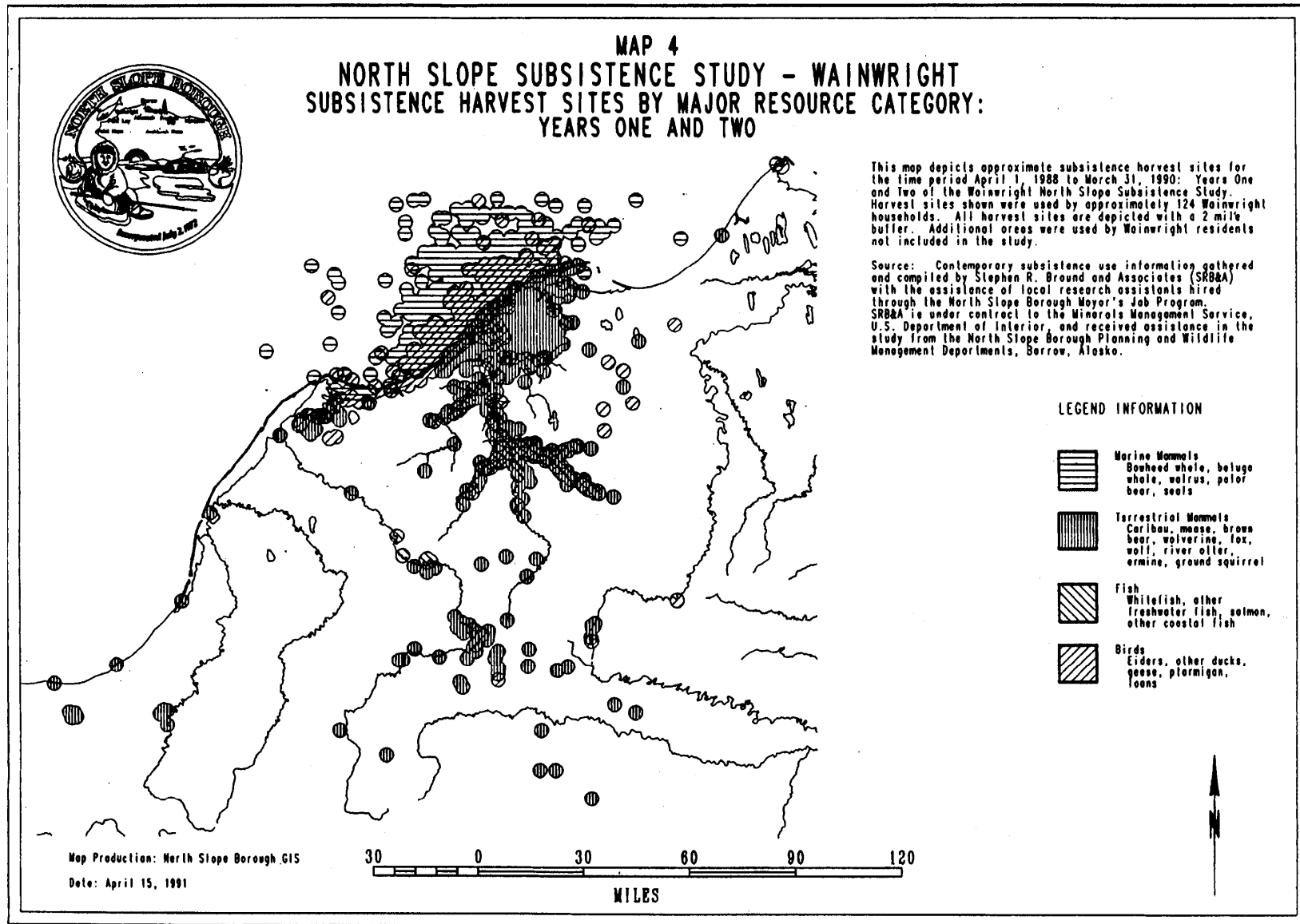


Figure 8.—Wainwright harvest sites, by resource category, 1987–1989.

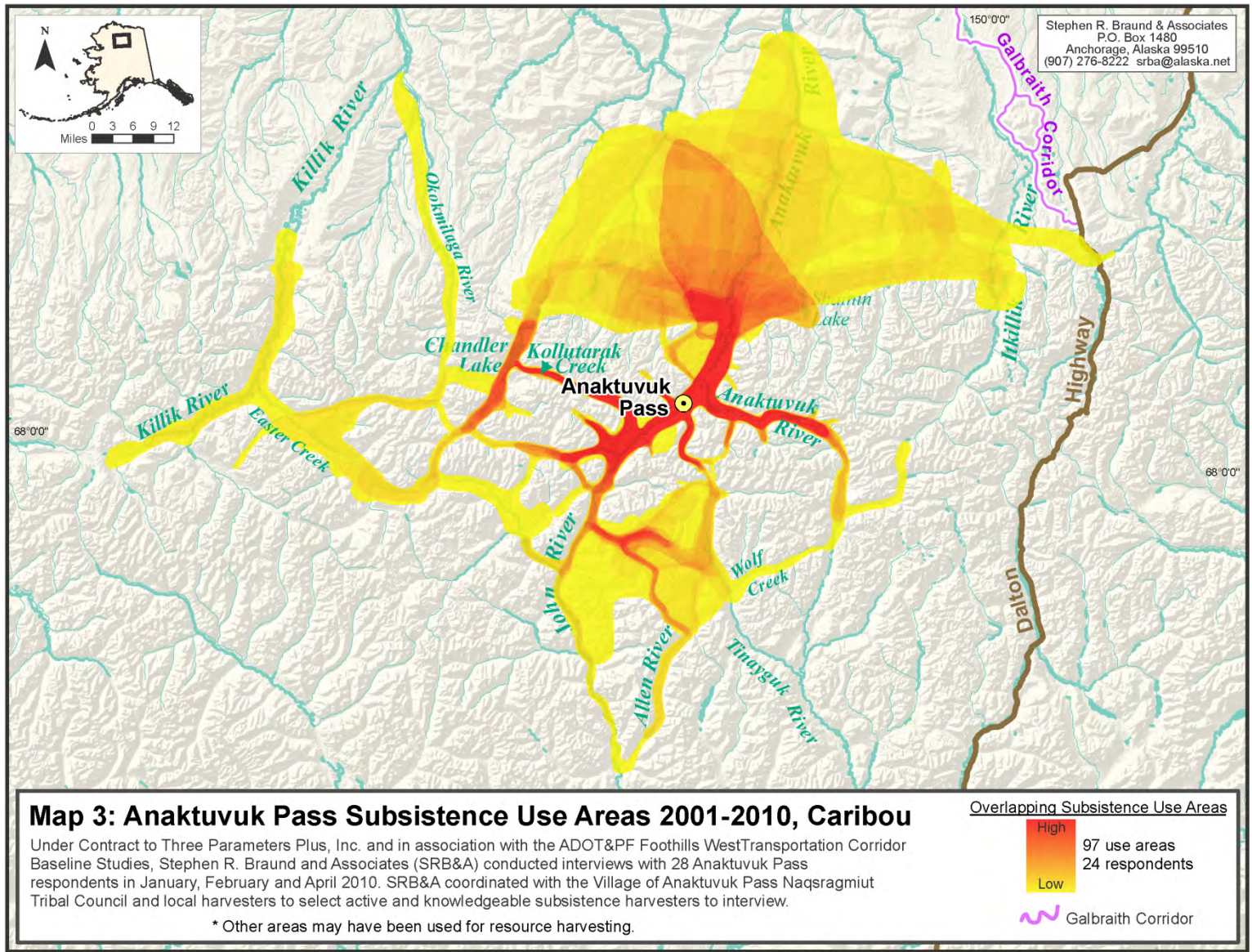
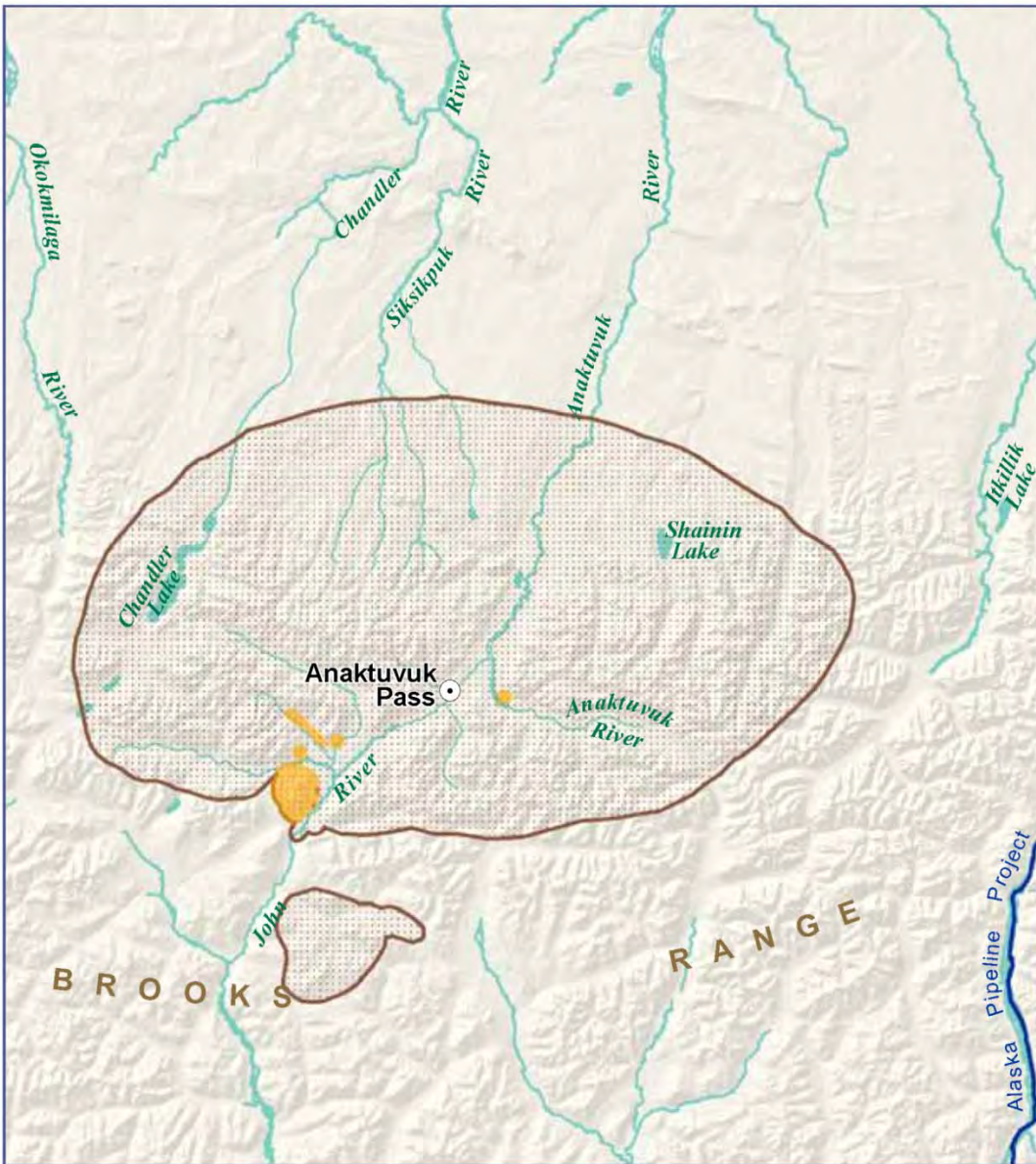


Figure 9.—Anaktuvuk Pass caribou subsistence use areas, 2001–2013.



Map Scale 1:850,000

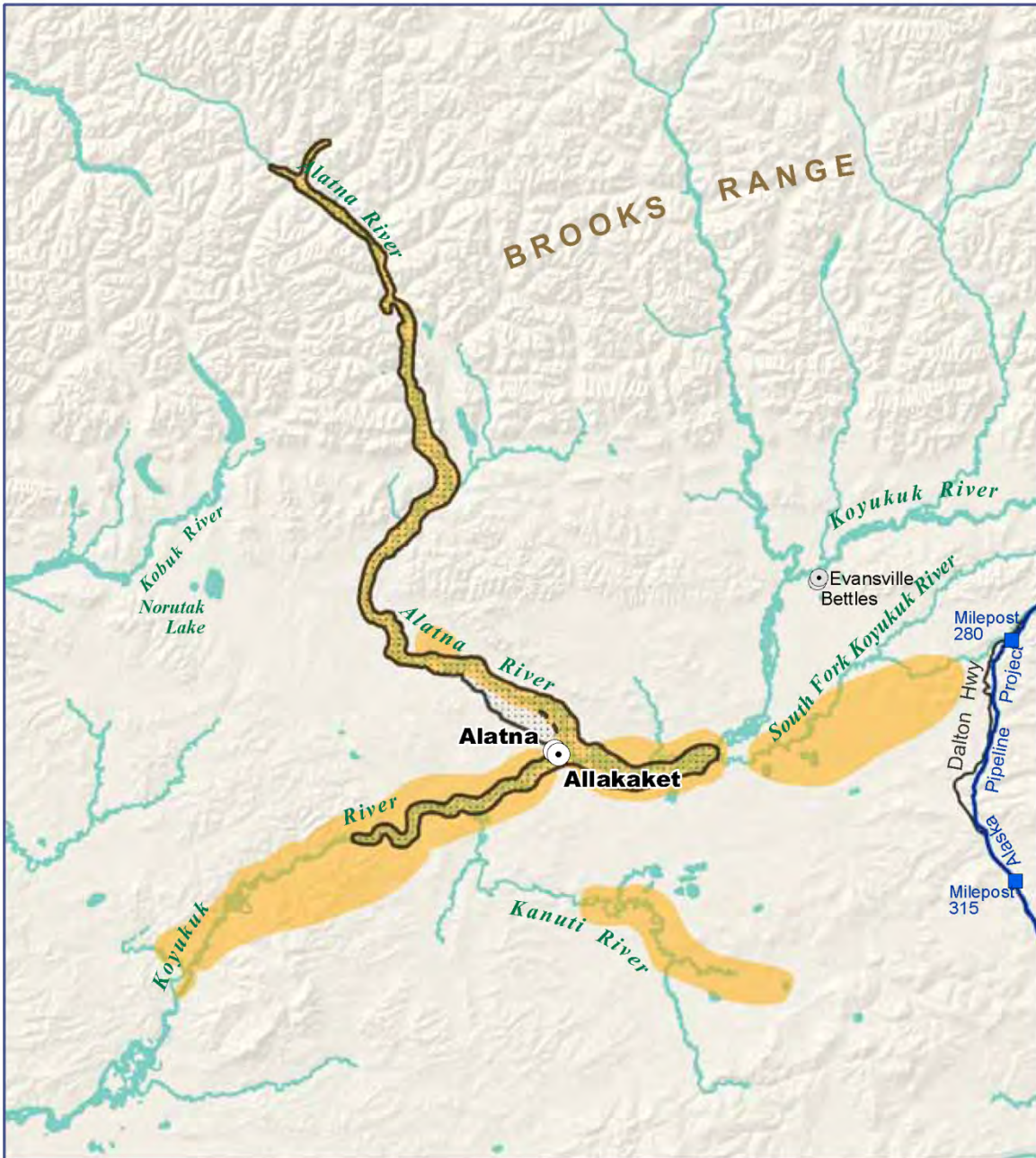
**Anaktuvuk Pass -
Caribou and Moose, 2011**

- Moose Search Areas
- Caribou Search Areas
- Highway
- Alaska Pipeline Project

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Alaska Department of Fish and Game collected the data in cooperation with Stephen R. Braund and Associates (SRB&A), and SRB&A digitized the data and prepared the maps. The subsistence maps were prepared for purposes of the Alaska Pipeline Project studies.
Source: Holen, D., S.M. Hazell, and D.S. Koster, editors. 2012. Subsistence harvests and uses of wild resources by communities in the eastern interior of Alaska, 2011. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 372, Anchorage, Alaska.

Figure 10.—Anaktuvuk Pass caribou and moose search areas, 2011.



Map Scale 1:1,250,000

Alatna - Caribou and Moose, 2011

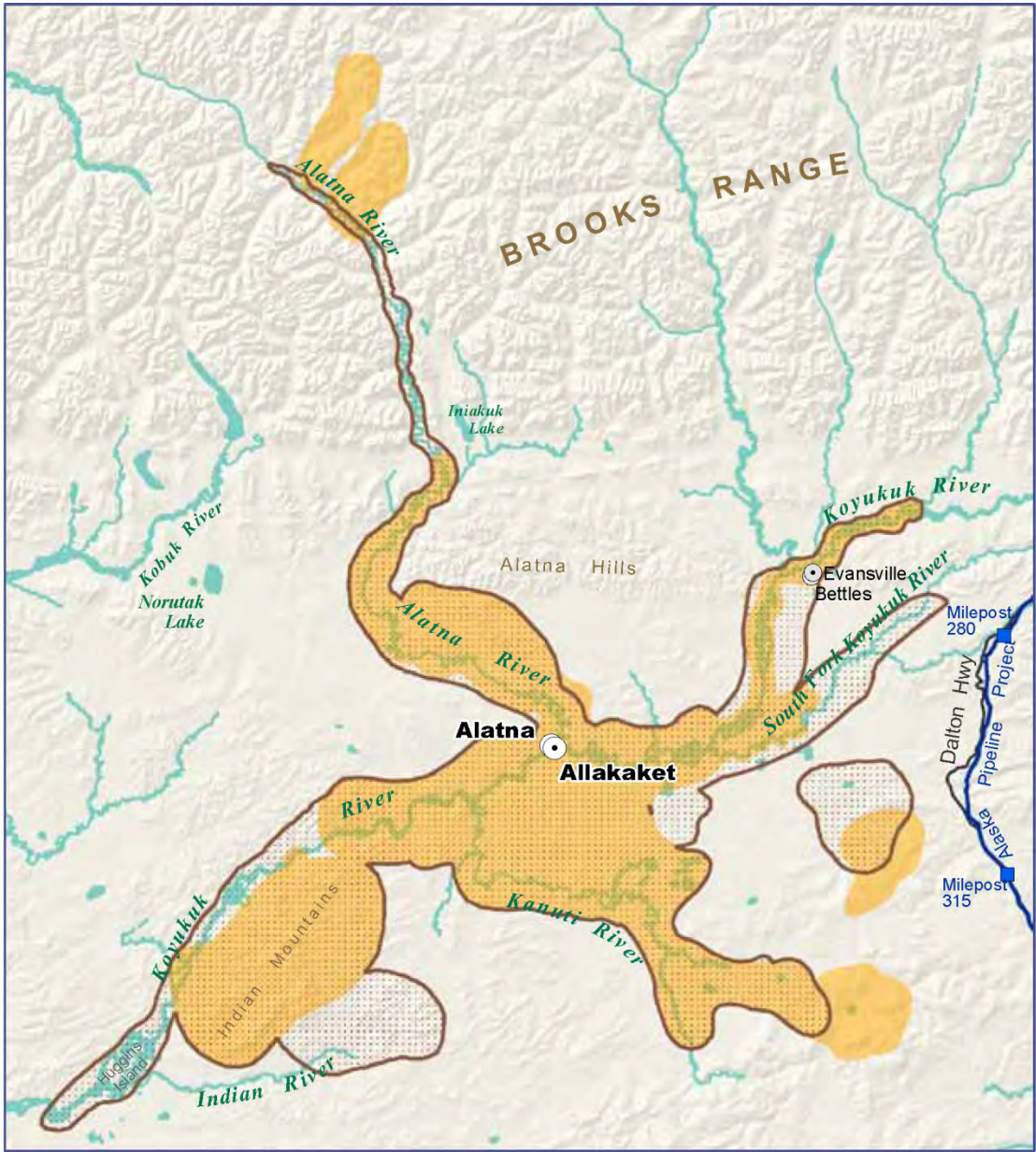
	Caribou Search Area		Highway
	Moose Search Area		Alaska Pipeline Project

Alaska Department of Fish and Game collected the data in cooperation with Stephen R. Braund and Associates (SRB&A), and SRB&A digitized the data and prepared the maps. The subsistence maps were prepared for purposes of the Alaska Pipeline Project studies.

Source: Holen, D., S.M. Hazell, and D.S. Koster, editors. 2012. Subsistence harvests and uses of wild resources by communities in the eastern interior of Alaska, 2011. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 372, Anchorage, Alaska.

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Figure 11.—Alatna caribou and moose search areas, 2011.



Map Scale 1:1,250,000

Allakaket - Caribou and Moose, 2011

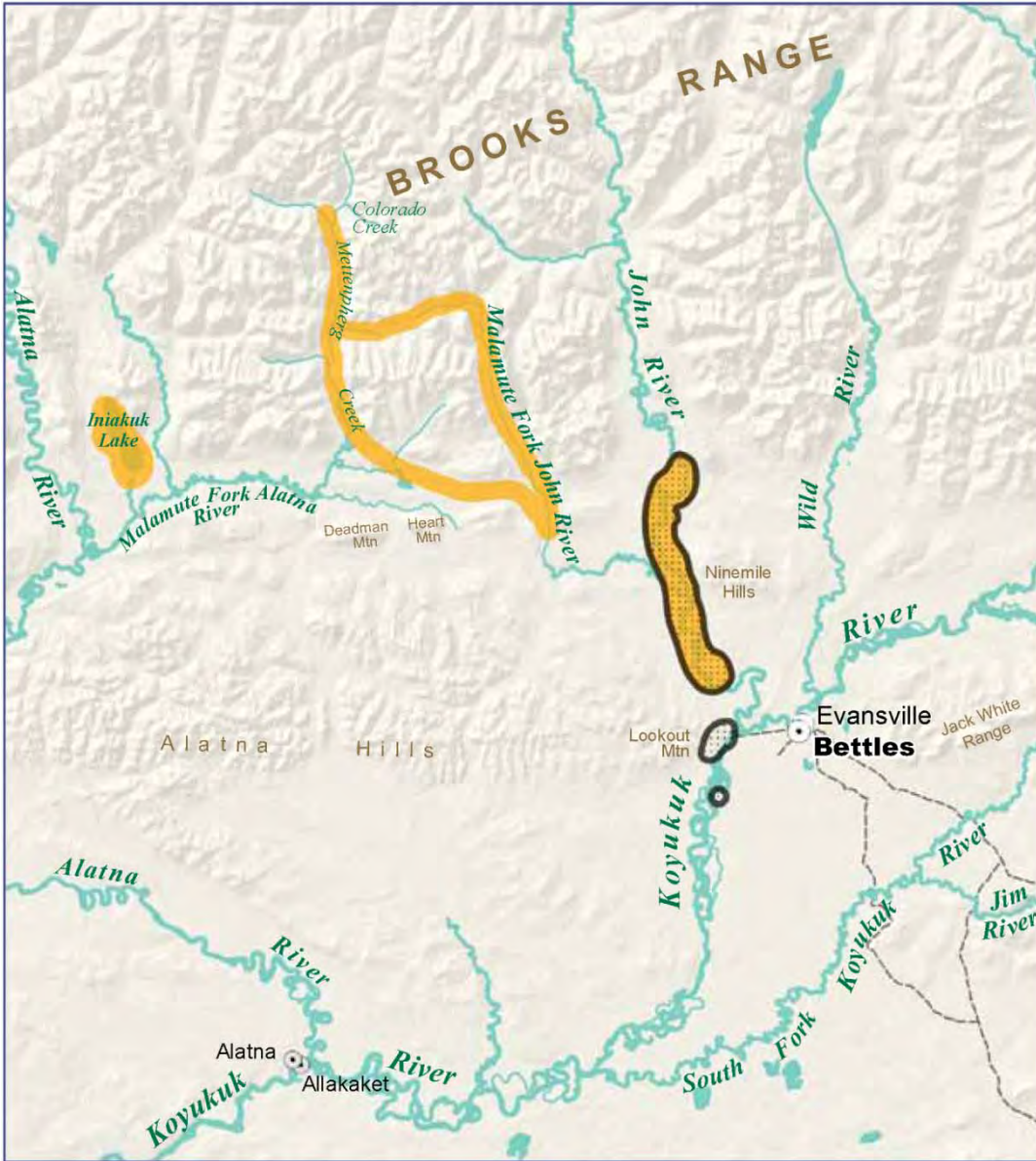
- Moose Search Areas
- Caribou Search Areas
- Highway
- Alaska Pipeline Project

Alaska Department of Fish and Game collected the data in cooperation with Stephen R. Braund and Associates (SRB&A), and SRB&A digitized the data and prepared the maps. The subsistence maps were prepared for purposes of the Alaska Pipeline Project studies.

Source: Holen, D., S.M. Hazell, and D.S. Koster, editors. 2012. Subsistence harvests and uses of wild resources by communities in the eastern interior of Alaska, 2011. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 372, Anchorage, Alaska.

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Figure 12.—Allakaket caribou and moose search areas, 2011.



Map Scale 1:650,000

Bettles - Caribou and Moose, 2011

Moose Search Areas

Caribou Search Areas

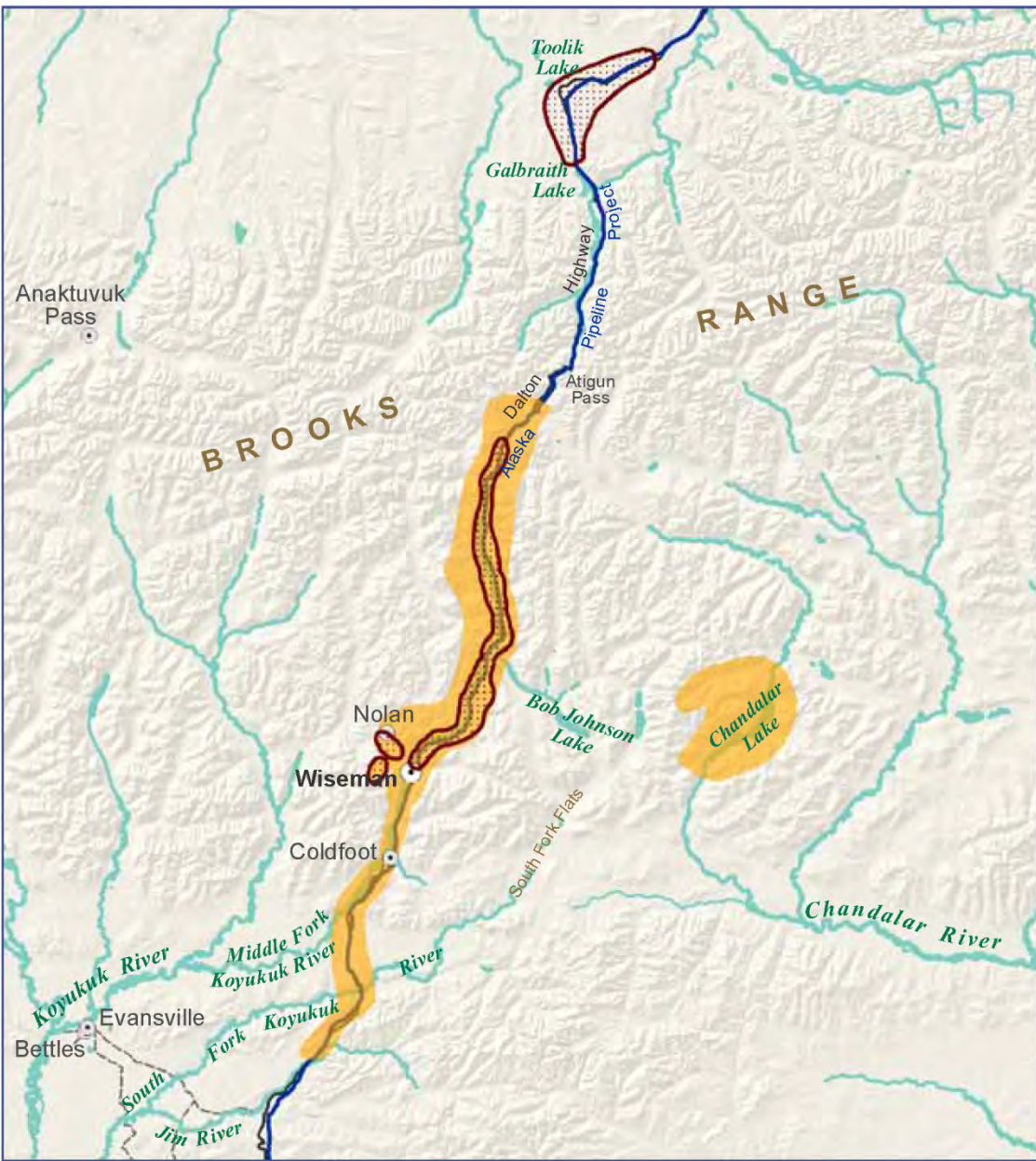
Road/Trail

Alaska Department of Fish and Game collected the data in cooperation with Stephen R. Braund and Associates (SRB&A), and SRB&A digitized the data and prepared the maps. The subsistence maps were prepared for purposes of the Alaska Pipeline Project studies.

Source: Holen, D., S.M. Hazell, and D.S. Koster, editors. 2012. Subsistence harvests and uses of wild resources by communities in the eastern interior of Alaska, 2011. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 372, Anchorage, Alaska.

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Figure 13.—Bettles caribou and moose search areas, 2011.



Map Scale 1:1,200,000

Wiseman - Caribou and Moose, 2011

- Caribou Search Areas
- Moose Search Areas
- Road or Trail
- Alaska Pipeline Project

Alaska Department of Fish and Game collected the data in cooperation with Stephen R. Braund and Associates (SRB&A), and SRB&A digitized the data and prepared the maps. The subsistence maps were prepared for purposes of the Alaska Pipeline Project studies.

Source: Holen, D., S.M. Hazell, and D.S. Koster, editors. 2012. Subsistence harvests and uses of wild resources by communities in the eastern interior of Alaska, 2011. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 372, Anchorage, Alaska.

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Figure 14.—Wiseman caribou and moose search areas, 2011.

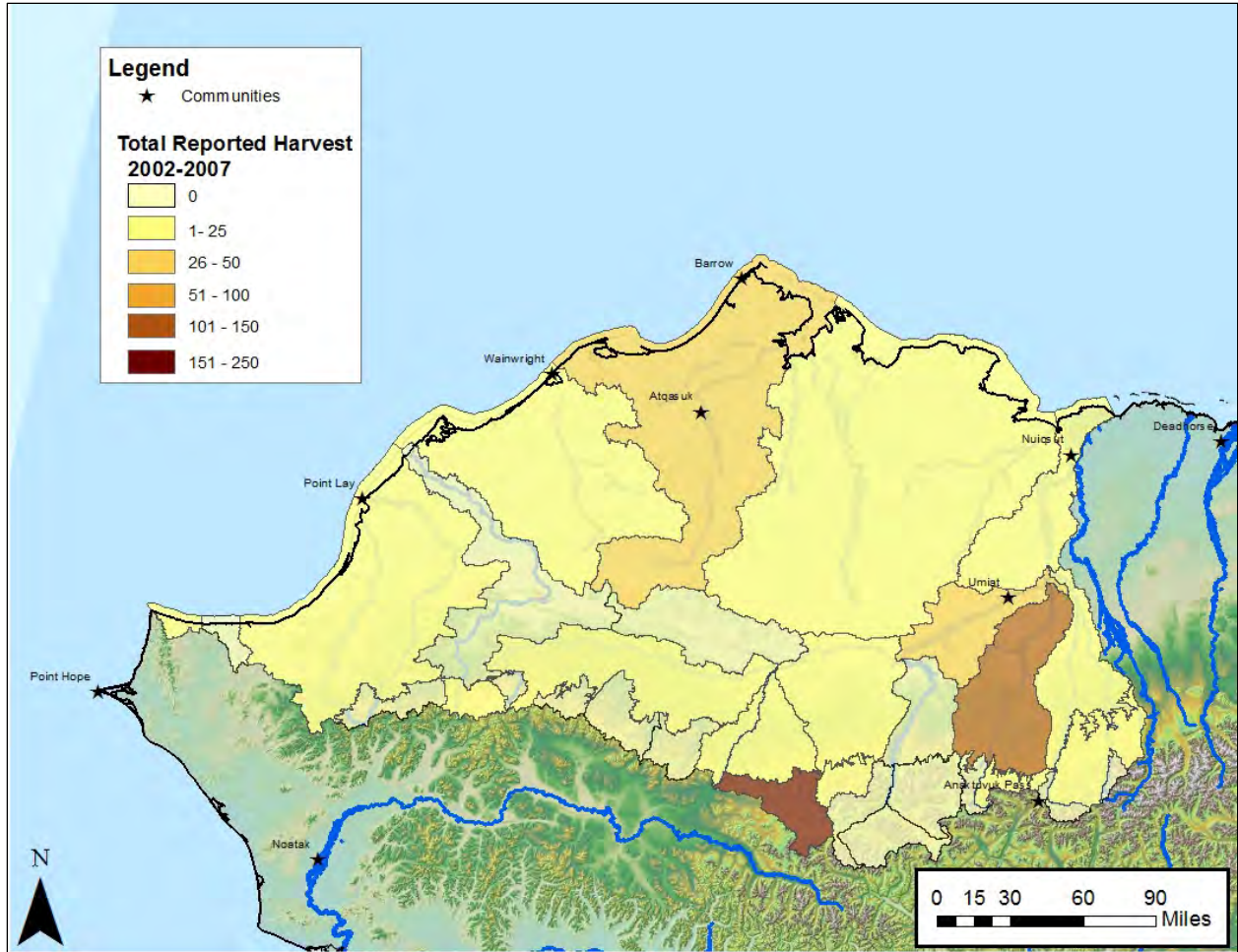


Figure 15.—Reported caribou harvests tracked in the state harvest ticket database, by UCU in GMU 26A, 2002–2007.

Source ADF&G Division of Wildlife Conservation.

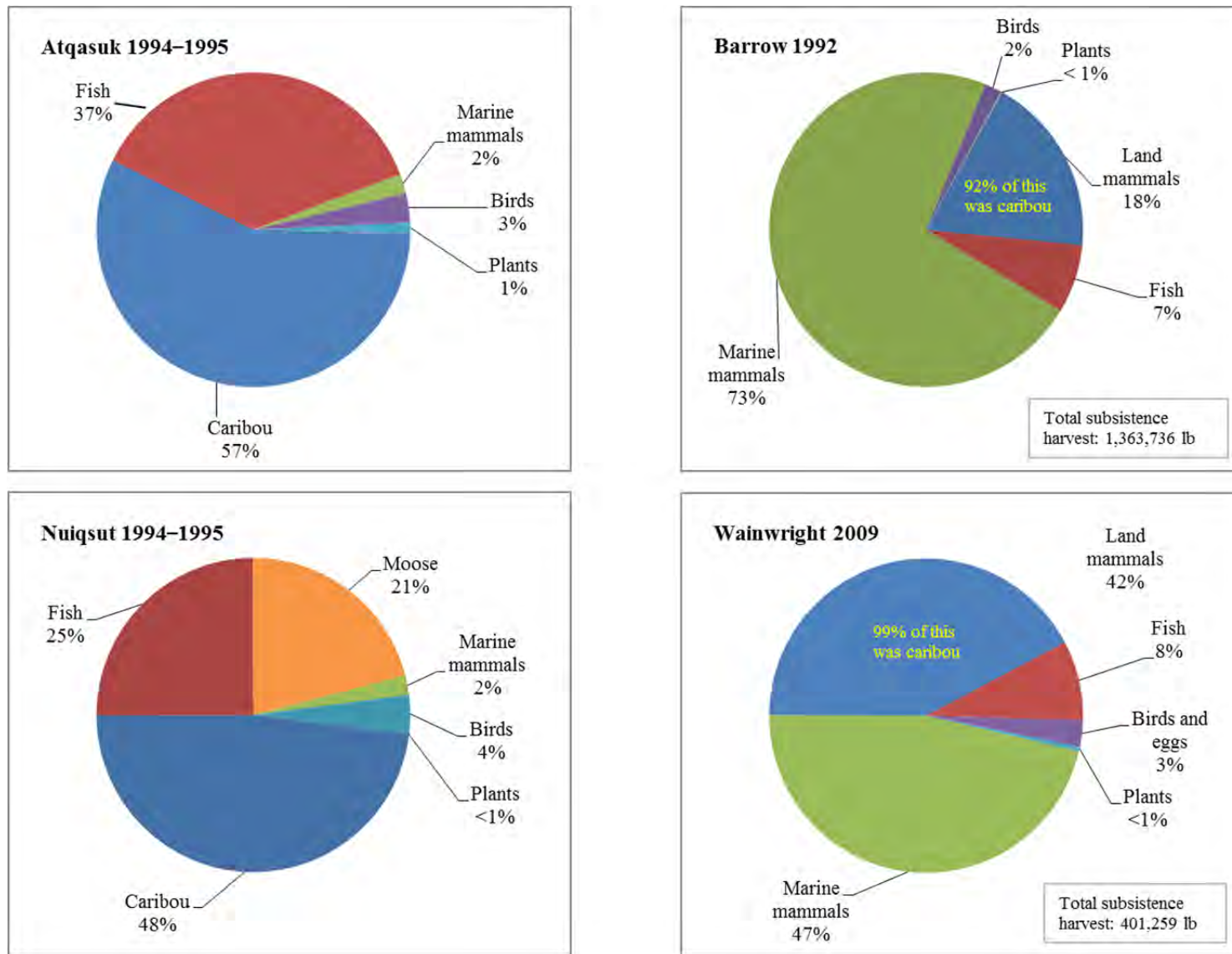


Figure 16.—Caribou as a percentage of total harvest, selected comprehensive subsistence survey results, GMU 26A and GMU 24B communities of Atqasuk, Barrow, Nuiqsut, and Wainwright.

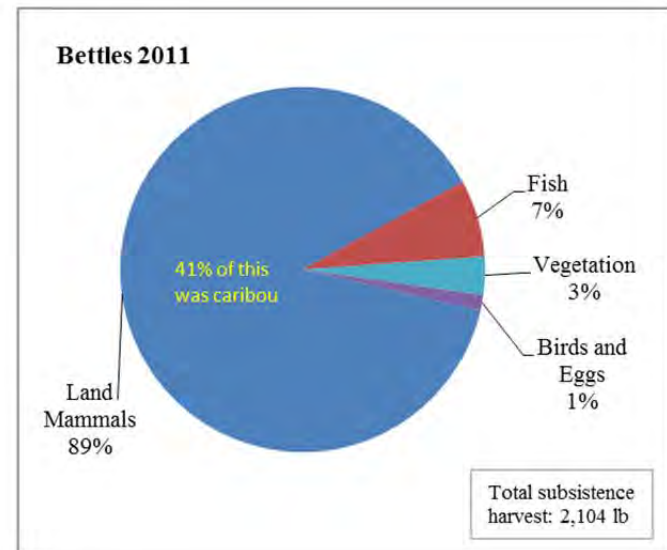
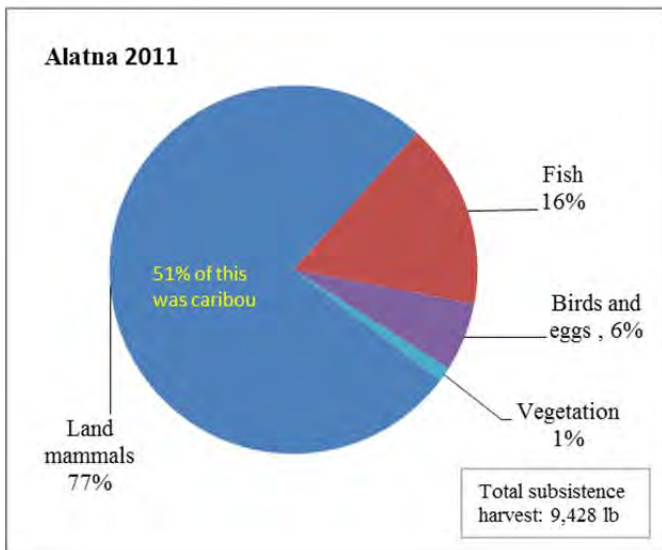
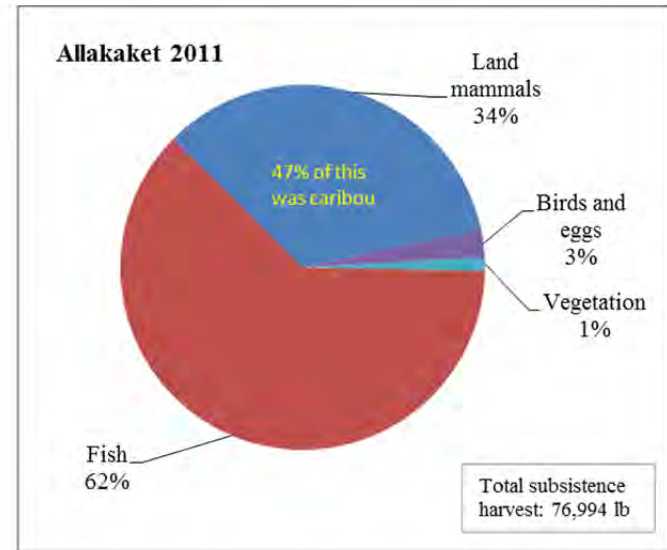
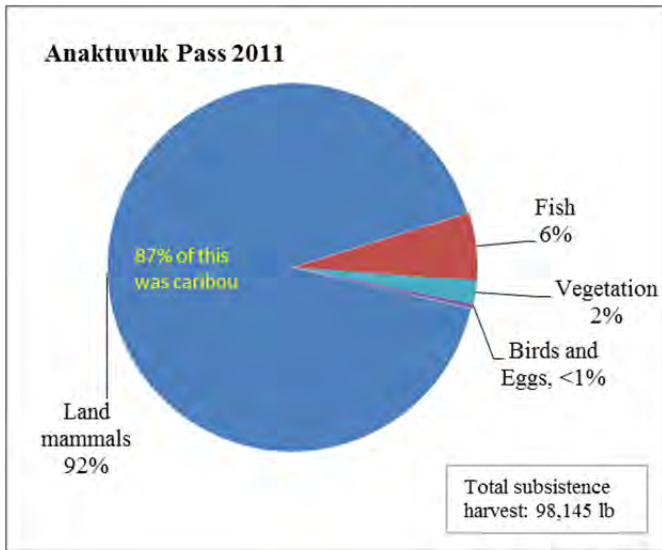


Figure 17.—Caribou as a percentage of total harvest, selected comprehensive subsistence survey results, GMU 26A and GMU 24B communities of Anaktuvuk Pass, Allakaket, Alatna, and Bettles.

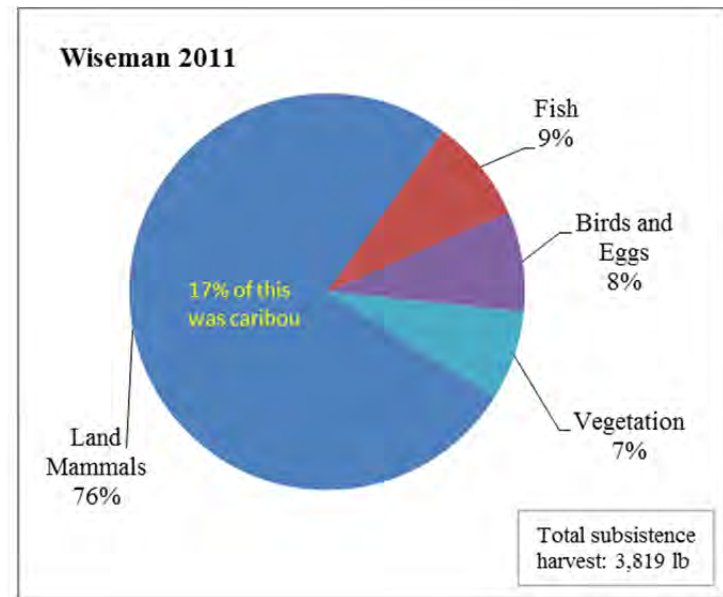
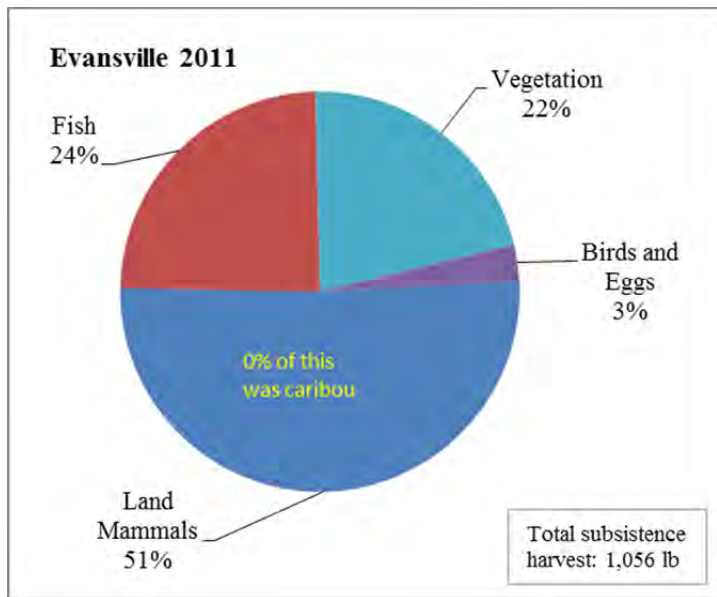


Figure 18.—Caribou as a percentage of total harvest, selected comprehensive subsistence survey results, GMU 26A and GMU 24B communities of Evansville and Wiseman.

SECTION 2: OPTIONS FOR AMOUNTS REASONABLY NECESSARY FOR SUBSISTENCE, TESHEKPUK CARIBOU HERD

This section of the report provides options for amounts reasonably necessary for subsistence (ANS) for consideration by the BOG as it discusses Proposal 23 during its January 2014 meeting and Proposal 50 at its February 2014 meeting. These proposals ask that the BOG review the customary and traditional use worksheet for the Teshekpuk caribou herd (TCH) and determine whether there are customary and traditional uses; if so, to establish amounts reasonable necessary for subsistence (ANS).

HARVEST ATTRIBUTED BY HERD

As mentioned earlier, 4 caribou herds are seasonally present on the North Slope: the Western Arctic (WAH), Central Arctic (CAH), Porcupine (PCH), and Teshekpuk. The communities of Barrow, Atqasuk, and Nuiqsut are the primary harvesters of TCH animals, although Wainwright and Anaktuvuk Pass also take caribou from the herd.

Use of TCH caribou by other communities is infrequent and rare due to the overwhelming presence of the WAH, CAH, and PCH on the periphery of the TCH range. While collaring data show that TCH caribou are occasionally present in GMU 23—for example, near Noatak and the upper Kobuk drainage—there are so few relative to WAH animals that any harvest is likely negligible and impossible to identify. Harvests of TCH caribou by non-local Alaskan and nonresident hunters in GMU 26A (as documented in the harvest ticket database) are minimal.

In the early 1990s, little quantitative information existed on subsistence caribou harvests by residents of GMUs 26A and 24B. Since then, subsistence harvest surveys conducted by ADF&G Division of Subsistence, the North Slope Borough Wildlife Management Department, and various contractors have documented substantial caribou harvests by North Slope residents (Table 1; figures 15–18). Harvests by non-local Alaska residents and nonresident hunters in GMU 26A have been tracked through the harvest ticket reporting system (figures 2–3). Paired with biologists' increased understanding of the seasonal distribution of the herd, it is possible to estimate, in some data years, what portion of community harvest (from survey data), and non-local Alaskan and nonresident harvest (from the harvest ticket reporting system) is from the TCH, WAH, CAH, and the PCH.

Earlier in this report, harvest information for caribou (in general) was presented. This section will describe harvests of TCH animals specifically, where such information is available.

Only recently have researchers been able to use satellite collar-data (coupled with geographic information system [GIS] software) to attribute harvests to specific herds; as a result, while community harvest estimates exist going back to the 1980s, this approach can only be applied to the most recent datasets. Therefore, the data presented in this section are confined to the time period 2002 to 2012 (last 11 years). In addition, it is an important caveat that these apportionments only apply for identified years because harvests from any specific herd can vary year to year subject to harvest timing and caribou migratory patterns (Table 4). They should not be considered applicable to earlier or later harvest estimates.

The variability in the percentage of annual harvest from a given herd is seen in Table 4, where in the 2 recent years, nearly all Atqasuk and Barrow harvests (98% and 97%) likely came from the TCH.

For caribou harvests documented in the state harvest ticket database, analysis by ADF&G Division of Wildlife Conservation estimates that over the time period 2002–2012, 90% of harvest was from the WAH and 10% was from the TCH.

Table 4.–Apportionment of harvest by herd, based on community harvest estimates, 2002–2012.

Community	Percentage of harvest from herd						
	2002–2007				2009		2011–2012
	WAH	TCH	CAH	Unknown	WAH	TCH	TCH
Atqasuk	2%	84%		14%			98%
Barrow	1%	66%		33%			97%
Nuiqsut	1%	77%	11%	11%			77%
Wainwright ^a	a	a	a	a	80%	20%	60%
Anaktuvuk Pass ^b	80%	20%					30%

Source ADF&G Division of Wildlife Conservation.

a. It is not possible to apportion Wainwright harvest between 2002 and 2007.

b. Between 2002–2007, Anaktuvuk Pass harvest can only be apportioned for the 2006–2007 study year.

INTRODUCTION TO DATA SETS AND ANS OPTIONS

The following section will provide the board with information relevant to two choices in setting an ANS:

1. Which of 2 harvest datasets to use in setting the numerical range of the ANS, and
2. How to structure the ANS.

This report will first present the 2 datasets. A set of options in structuring the ANS will follow.

The limited dataset for community harvests limits the numerical approaches available for proposing a range for an ANS. It is not possible, for example, to calculate a standard deviation of mean harvests or provide a range of values based on low or high harvest years; therefore, all options will use a mean value bounded by (\pm) 25%.

Dataset A: Mean of Known Harvests, 2002–2012

In the case of 2 of 3 communities considered the primary users of Teshekpuk caribou (Atqasuk and Nuiqsut), 5 estimates of annual harvest are available (Table 5) for 2002–2012. For Barrow, such information is only available for 2003. There are 2 harvest estimates for Wainwright and 3 for Anaktuvuk Pass. Harvest ticket data are available for the entire time period. Table 5 shows available GMU 26A and 24B caribou harvest information based on both sources of data.

Table 5.–Available community survey data, GMUs 26A and 24B, and harvest ticket information, GMU 26A, all caribou.

Community	2002– 2003	2003	2003– 2004	2004– 2005	2005– 2006	2006– 2007	2008	2009	2010	2011	2012	Mean
Atqasuk	221		352	207	174	157						222.0
Barrow		2,092										2,091.5
Nuiqsut	397		564	546	363	475						469.0
Wainwright	866							1231				1,048.2
Anaktuvuk Pass	436					696				616		582.7
<i>Sources</i> Bacon et al. 2009, Braem et al. 2011, Pedersen and Nageak 2008.											sum	4,413.4
Community	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
Other Alaskan	33	52	65	46	46	65	50	58	39	37	44	48.6
Nonresident	42	48	48	39	44	42	40	19	29	50	38	39.9
<i>Source</i> WinfoNet.												

Based on harvest survey and harvest ticket database information, where available, annual harvests from the TCH herd are shown in Table 6. However, use of these summed means of known values, given lack of reliable harvest estimates for Barrow, may underrepresent actual harvest because of Barrow’s size and the possibility that, in certain years, nearly all of its harvest and that of Atqasuk may come from the TCH (Table 4).

Table 6.–Harvest of TCH caribou, community survey and harvest ticket database information, 2002–2012.

Community	2002– 2003	2003	2003– 2004	2004– 2005	2005– 2006	2006– 2007	2008	2009	2010	2011	2012	Mean
Atqasuk	186		295	173	146	132						186.5
Barrow		1,380										1,380.4
Nuiqsut	306		434	420	280	365						361.1
Wainwright ^a								246				246.1
Anaktuvuk Pass ^b						139				185		162.0
a. It is not possible to apportion Wainwright harvest between 2002 and 2007.											sum	2,336.2
b. Anaktuvuk Pass harvest can only be apportioned for the 2006–2007 and 2011 study year.												
Community	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
Other Alaskan	3.3	5.2	6.5	4.6	4.6	6.5	5	5.8	3.9	3.7	4.4	4.9
Nonresident	4.2	4.8	4.8	3.9	4.4	4.2	4	1.9	2.9	5	3.8	4.0
<i>Source</i> WinfoNet.											sum	8.9

Dataset B: Range of Harvests Based on Mean, Including Estimates Derived from Per Capita Harvests

The following dataset uses calculated estimates of community harvest for years in which harvest can be attributed, but no harvest survey data exist (Table 7). Community harvest estimates were calculated by multiplying Alaska Department of Labor annual population estimates by per capita caribou harvest values documented in previous studies (Appendix C). Shaded cells in Table 7 indicate that the value is estimated based upon prior data. Adding additional data points results in

a higher mean value of community harvests, which may more accurately reflect harvest patterns and reasonable opportunity for subsistence harvest.

Table 7.–Available community survey data, estimated community harvests, harvest ticket data, all caribou, GMU 26A and 24B.

Community	2002– 2003	2003– 2003	2003– 2004	2004– 2005	2005– 2006	2006– 2007	2008	2009	2010	2011	2012	Mean
Atqasuk	221		352	207	174	157				266	256	233.1
Barrow		2,092		2,301	2,201	2,143				2,203	2,361	2,216.8
Nuiqsut	397		564	546	363	475				457	451	464.7
Wainwright	866							1231		880	870	961.6
Anaktuvuk Pass	436					696				616	543	572.8

Sources Bacon et al. 2009, Braem et al. 2011, Pedersen and Nageak 2008.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
Other Alaskan	33	52	65	46	46	65	50	58	39	37	44	48.6
Nonresident	42	48	48	39	44	42	40	19	29	50	38	39.9

Source WinfoNet.

Based on this data set, estimated harvests of TCH animals for the period 2002–2012 is shown in Table 8.

Table 8.–Harvest of TCH caribou, community survey, calculated estimates, and harvest ticket database information, 2002–2012.

Community	2002– 2003	2003– 2003	2003– 2004	2004– 2005	2005– 2006	2006– 2007	2008	2009	2010	2011	2012	Mean
Atqasuk	186		295	173	146	132				260	251	206.3
Barrow ^c		1,380		1,519	1,453	1,415				2,137	2,290	1,698.9
Nuiqsut	306		434	420	280	365				352	347	357.8
Wainwright ^{a,c}								246		528	522	432.0
Anaktuvuk P. ^{b,c}						139				185	163	162.3

a. It is not possible to apportion Wainwright harvest between 2002 and 2007.

subtotal 2,857.3

b. Anaktuvuk Pass harvest can only be apportioned for 2006–2007, 2011, and 2012.

c. Shaded values are estimates based on multiplying population estimates by per capita values derived from other studies.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
Other Alaskan	3.3	5.2	6.5	4.6	4.6	6.5	5	5.8	3.9	3.7	4.4	4.9
Nonresident	4.2	4.8	4.8	3.9	4.4	4.2	4	1.9	2.9	5	3.8	4.0

Source WinfoNet.

subtotal 8.9

Sum, community means and other Alaskan harvests 2,862.1

ANS STRUCTURAL OPTIONS

With an awareness of the seasonal intermixing of the WAH and TCH, 4 options are presented in structuring the TCH ANS. A fifth option, to set no ANS at this time, is also offered.

Options 1A and 1B: One Combined ANS for both the WAH and TCH Herds

These options would combine the existing WAH ANS with a new TCH ANS, resulting in 1 single value.

Option 1A (Dataset A): One ANS for WAH and TCH combined = 9,800–14,900 caribou

Summed mean TCH harvests for GMUs 26A and 24B	<i>Bounded by</i>	Mean \pm 25%		<i>Equals</i>	ANS range option	
		Low	High		Low	High
2,341		1,756	2,926		1,800	2,900
Thus, 8,000–12,000 WAH + 1,800–2,900 TCH caribou = 9,800–14,900 caribou						

or

Option 1B (Dataset B): One ANS for WAH and TCH combined = 10,100–15,600 caribou

Summed mean TCH harvests for GMUs 26A and 24B	<i>Bounded by</i>	Mean \pm 25%		<i>Equals</i>	ANS range option	
		Low	High		Low	High
2,862		2,147	3,578		2,100	3,600
Thus, 8,000–12,000 WAH + 2,100–3,600 TCH caribou = 10,100–15,600 caribou						

It should be noted that in 1992, when the Board of Game established the WAH ANS of 8,000–12,000 caribou, harvest data from communities considered the primary users of the TCH (Barrow, Wainwright, Nuiqsut, and Anaktuvuk Pass) were included in the information reviewed by the board. While the administrative record of that meeting is limited at best, it may be that the 1992 board set the WAH ANS with TCH animals in mind, in effect, creating a combined ANS for the 2 herds. Combining the 2 ANS as described in options 1A or 1B may result in a range that is too high.

Several potential management issues arise in the case of a combined ANS. For example, hunting regulations could be too liberal with respect to 1 herd, even though the combined harvestable surplus is high enough to provide for a combined ANS. Specifically, if the harvestable surplus for the TCH was very low, but the WAH harvestable surplus was high, there would need to be area-specific regulations that allowed harvest to be controlled within the core of the TCH range; that harvest would not be specifically allocated to Alaska residents, although current patterns would suggest that the vast majority of harvest would be by Alaska residents.

A second management scenario might occur if the harvestable surplus from both herds, or just the WAH in particular, was relatively low with respect to the ANS. In that case, specific regulations would be needed to ensure that early season harvest (July–August) in GMU 26A did not consume such a large portion of the harvestable surplus that little or no harvestable surplus remained to provide reasonable opportunity for users who hunt later in the fall or winter. Although these scenarios do not necessarily demand herd- or area-specific ANS values, they do require some guidance regarding seasonal allocation of harvest, perhaps through a harvest management plan.

Options 2A and 2B: Separate ANS for TCH

These options would retain the current WAH ANS of 8,000–12,000 and create a separate ANS for the TCH.

Option 2A (Dataset A): Separate ANS for TCH = 1,800–2,900 TCH caribou; WAH remains same at 8,000–12,000

Mean harvests for GMUs 26A and 24B	<i>Bounded by</i>	Mean $\pm 25\%$		<i>Equals</i>	ANS range option	
		Low	High		Low	High
2,341		1,756	2,926		1,800	2,900
Thus, 1,800–2,900 TCH caribou.						

or

Option 2B (Dataset B): Separate ANS for TCH = 2,100–3,600 TCH caribou; WAH remains same at 8,000–12,000

Mean harvests for GMUs 26A and 24B	<i>Bounded by</i>	Mean $\pm 25\%$		<i>Equals</i>	ANS range option	
		Low	High		Low	High
2,862		2,147	3,578		2,100	3,600
Thus, 2,100–3,600 TCH caribou.						

Options 2A and 2B deal with the TCH herd exclusively. While they simplify the approach to an ANS, they do not take into account the extensive overlap of the WAH and TCH ranges and the intermixing of 2 herds. Should either herd's population size decline so that its harvestable surplus falls below the lower bounds of its ANS, the department may need a harvest management plan to provide reasonable opportunities for subsistence uses that are spread across a broad geographic area. The ranges of both the WAH and TCH encompass multiple GMUs with subsistence users that have access to caribou in different times of the year.

Options 3A and 3B: Combined or Separate WAH and TCH ANSs, Geographically Nested

Options 3 and 4 nest ANS geographically and deal with WAH and TCH herd overlap. The board may wish to see more information related to WAH harvest in consideration of the following options. The following options would nest portions of the TCH herd's ANS geographically. No specific breakdown of the WAH ANS is provided: those data have not been presented in this report. These options include GMU 23 harvests in the TCH ANS. As noted earlier, use of TCH animals in GMUs other than 26A and 24B is rare and infrequent because of the overwhelming presence of WAH, CAH, and PCH caribou in the periphery of the TCH range. Of the other subunits, GMU 23¹⁰ harvests are more likely candidates for inclusion within the TCH ANS, given the intermixing of the WAH and TCH in winter. ADF&G Division of Wildlife staff roughly estimate the ratio of WAH animals to TCH animals in GMU 23 during winter to be 99

10. Unit 23 has no subunits and is equivalent to a subunit for this option.

WAH: 1 TCH caribou. Applying that ratio to the WAH ANS of 8,000–12,000 animals results in a range of 80–120 animals.

Option 3A (Dataset A): One ANS for WAH and TCH combined, geographically nested = 10,000–15,000 caribou, to be allocated by the Board of Game into the GMUs

	Mean TCH harvests for GMUs 26A and 24B		Mean ±25%			ANS range option	
			Low	High		Low	High
GMUs 26A and 24B	2,341	<i>Bounded by</i>	1,756	2,926	<i>Equals</i>	1,800	2,900
GMU 23	–		<i>Plus</i>	80		120	
Thus, 8,000–12,000 WAH + 1,900–3,000 TCH caribou = 9,900–15,000 caribou							
Combined WAH and TCH ANS, by GMU, to be allocated by the Board of Game							
GMU 26A						X	X
GMU 24B						X	X
GMU 23						X	X
GMU 22						X	X

or

Option 3B (Dataset B): One ANS for WAH and TCH combined, geographically nested = 10,200–15,700 caribou, to be allocated by the Board of Game into the GMUs

	Mean TCH harvests for GMUs 26A and 24B		Mean ±25%			ANS range option	
			Low	High		Low	High
GMUs 26A and 24B	2,862	<i>Bounded by</i>	2,147	3,578	<i>Equals</i>	2,100	3,600
GMU 23	–		<i>Plus</i>	80		120	
Thus, 8,000–12,000 WAH + 2,200–3,700 TCH caribou = 10,200–15,700 caribou							
Combined WAH and TCH ANS, by GMU, to be allocated by the Board of Game							
GMU 26A						X	X
GMU 24B						X	X
GMU 23						X	X
GMU 22						X	X

Options 4A and 4 B: Separate, Geographically Nested ANSs for WAH and TCH

Another approach would be to set separate ANSs for each herd, and nest those geographically. As described under options 3A and 3B, use of TCH animals in GMUs other than 26A and 24B is rare and infrequent because of the overwhelming presence of WAH, CAH, and PCH caribou in the periphery of the TCH range. Of other subunits, GMU 23¹¹ is the most likely candidate for inclusion within the TCH ANS, given the intermixing of the WAH and TCH in winter. ADF&G Division of Wildlife staff roughly estimate the ratio of WAH animals to TCH animals in GMU 23 during winter to be 99 WAH: 1 TCH caribou. Applying that ratio to the WAH ANS of 8,000–12,000 animals results in a range of 80–120 animals.

11. Unit 23 has no subunits and is equivalent to a subunit for this option.

TCH Option 4A (Dataset A): Separate WAH and TCH ANSs, nested geographically =
A total TCH ANS of 1,800–3,000, with

- 1,600–2,700 TCH caribou necessary in GMU 26A, and
- 100–200 TCH caribou necessary in GMU 24B, and
- 80–120 TCH caribou necessary in GMU 23.

A total WAH ANS = to be allocated by the Board of Game; e.g.,
A total WAH ANS of 8,000–12,000 caribou, with

- X–X WAH caribou necessary in GMU 26A,
- X–X WAH caribou necessary in GMU 24B,
- X–X WAH caribou necessary in GMU 23, and
- X–X WAH caribou necessary in GMU 22.

TCH	Mean		Mean ±25%			ANS range option	
			Low	High		Low	High
GMU 26A	2,179	<i>Bounded by</i>	1,634	2,724	<i>Equals</i>	1,600	2,700
GMU 24B	162		122	203		100	200
GMU 23	–					<i>Plus</i>	80

Thus, TCH ANS = 1,800–3,000, with 1,600–2,700 TCH in GMU 26A, 100–200 TCH in GMU 24B, and 80–120 TCH in GMU 23

WAH to be allocated by the Board of Game	ANS range option	
	Low	High
GMU 26A	X	X
GMU 24B	X	X
GMU 23	X	X
GMU 22	X	X

or

TCH Option 4B (Dataset B): Separate WAH and TCH ANSs, nested geographically =
A total TCH ANS of 2,200–3,700, with

- 2,000–3,400 TCH caribou necessary in GMU 26A, and
- 100–200 TCH caribou necessary in GMU 24B, and
- 80–120 TCH caribou in GMU 23.

A total WAH ANS = to be allocated by the Board of Game; e.g.,
A total WAH ANS of 8,000–12,000 caribou, with

- X–X WAH caribou necessary in GMU 26A, and
- X–X WAH caribou necessary in GMU 24B, and
- X–X WAH caribou necessary in GMU 23, and
- X–X WAH caribou necessary in GMU 22.

TCH	Mean		Mean ±25%			ANS range option	
			Low	High		Low	High
GMU 26A	2,700	<i>Bounded by</i>	2,025	3,375	<i>Equals</i>	2,000	3,400
GMU 24B	162		122	203		100	200
GMU 23	–					<i>Plus</i>	80

Thus, TCH ANS = 2,200–3,700, with 2,000–3,400 TCH in GMU 26A, 100–200 TCH in GMU 24B, and 80–120 TCH in GMU 23

WAH to be allocated by the Board of Game	ANS range option	
	Low	High
GMU 26A	X	X
GMU 24B	X	X
GMU 23	X	X
GMU 22	X	X

Option 5: Do not Establish a TCH ANS

The BOG may wish to forego setting an ANS for the TCH due to the fact that caribou harvest data from communities considered the primary users of the TCH (Barrow, Wainwright, Nuiqsut, and Anaktuvuk Pass) were included in the information reviewed by the Board of Game in 1992 when the WAH ANS of 8,000–12,000 caribou was established. While the administrative record of that meeting is limited at best, it may be that the board set the WAH ANS with TCH animals in mind, in effect, creating a combined ANS for the two herds.

Another consideration in not setting a TCH ANS at this time would be the potential availability of better data in the future, although this is not guaranteed.

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**APPENDIX A: 1990 CUSTOMARY AND TRADITIONAL USE
WORKSHEET, TESHEKPUK CARIBOU HERD**

Positive
Prelim. Findings
Nov 1990

EIGHT CRITERIA WORKSHEET, BOARD OF GAME 1990

PROPOSAL NO.:

GMU: 26

SPECIES: Caribou- Teshekpuk Caribou Herd

ALASKA RESIDENTS USING THE SPECIES:

Residents of the Inupiat villages of Nuiqsut, Barrow, and Atkasuk are the primary North Slope users of the Teshekpuk caribou herd. Residents of two other villages, Wainwright and Anaktuvuk Pass, may at times also harvest caribou from this herd.

Because the Teshekpuk caribou herd is not specifically identified in current hunting regulations, there is no specific harvest ticket for the herd, and because so little is actually known about its seasonal movements over time, little information on any hunting of this herd is actually available. Based on caribou harvest ticket returns from GMU 26(A) it appears that the herd is very lightly hunted by non-North Slope residents (within its central range around the Teshekpuk Lake) because of difficult access.

1. LENGTH AND CONSISTENCY OF USE (long-term, consistent, excluding interruptions by circumstances beyond the user's control)

The economic and cultural importance of caribou to the North Slope Inupiat has been amply documented beginning with Maguire 1853, followed by Simpson 1855, Murdoch 1892, and Spencer 1959. Also, the archaeological record indicates that this resource has been relied upon by inhabitants dating back possibly as far as 6,000 years (Wilson 1981). Current use and dependence on caribou by some communities in GMU 26(A) have been documented by Braund 1989 and Pedersen 1985-6.

2. SEASONALITY (recurring in specific seasons of each year)

Caribou are hunted during the entire open season in GMU 26(A), from 1 July to 30 June, but the main harvest usually takes place from July through October, and then again in March and April.

3. MEANS AND METHODS OF HARVEST (efficient, economic, conditioned by local circumstances)

Today GMU 26(A) caribou are harvested largely by Nuiqsut, Barrow, and Atkasuk hunters, although Anaktuvuk and Wainwright hunters also report they harvest caribou in the area apparently utilized by Teshekpuk caribou. Using modern firearms harvesting is carried out by individuals as well as by groups of hunters cooperating under specific rules of sharing. Winter hunting (October to April) is mainly an inland activity using snowmachine transportation, whereas summer hunting is coastal and riverine utilizing boats and all-terrain vehicles.

4. GEOGRAPHIC AREAS (near or reasonably accessible from the user's residence)

Caribou from this herd are at times harvested near the three villages, but the most common harvest sites are from 30 to 80 miles away. Mapping of the traditional community harvest area as well as recent harvest locales indicates that a large area is involved. Some caribou harvest sites appear to be particularly productive over time and receive regular use. There appears to be no significant

competition from other caribou hunters (Wainwright, Anaktuvuk Pass, and sport hunters) who occasionally may be found within the range of the Teshekpuk caribou herd.

5. MEANS OF HANDLING, PREPARING, AND STORING (traditionally used by past generations, but not excluding recent technological advances)

Current Inupiat methods and means of handling, preparing, and storing caribou are based on a long tradition of caribou hunting, and dependence on caribou for food, clothing, shelter, and raw materials. Although bones and scraps are not widely used today, all other parts are processed for some use. Meat, organs, and the head are eaten, bones cracked and boiled to produce soup stock; the hide is used for winter bedding material and arts and crafts projects; leg skins are saved for making mukluk uppers; sinew from lower legs are saved for sewing, and hooves and antlers are crafted into a variety of craft items ranging from antler knife handles to amusing art creations made from caribou hair and hooves.

Caribou meat is sometimes air-dried, but more often is frozen after processing. Community hunters use a combination of both traditional ice cellars and modern freezers for this purpose.

6. INTERGENERATIONAL TRANSMISSION OF KNOWLEDGE, SKILLS, VALUES, AND LORE (handed down between generations)

Caribou hunting is a central land-based hunting activity among North Slope Inupiat today as it has been for generations. Hunters often travel in mixed-age groups to facilitate the transmission of and reinforcement of important values, behaviors, hunting and processing techniques, as well as sharing patterns. Teaching traditional/modern hunting skills is considered of paramount importance among North Slope residents and considerable effort is expended on this. For instance in GMU 26(A) a summer camp for North Slope children, "Upiqsu" on the Meade River, offers first-hand experience and learning about hunting and fishing activities with North Slope Inupiat elders.

7. DISTRIBUTION AND EXCHANGE (customary trade, barter, sharing, and gift giving within a definable community of persons)

Caribou meat and hides have always been a major component of the natural resource trade on the North Slope, and early records indicate that some commercial trade may even have taken place during the whaling era. Today caribou continue to be a valuable trade and barter commodity, and, in some communities on the North Slope, a fat winter caribou might easily be traded for several spotted seals. However, sharing is, as it probably always has been, the major distribution mechanism on the North Slope. Pedersen (1990) has documented sharing of caribou meat from Kaktovik residents [GMU 26(C)] to relatives and friends in Anaktuvuk, Nuiqsut, Barrow, and even Fairbanks. The intra-North Slope community sharing of caribou is particularly evident when one community is blessed with an abundance of caribou meat and relatives and friends in a nearby community are doing poorly. Gift-giving of caribou may also be a mechanism for communities that lack certain resources, such as whales, to acquire some for ceremonial and general consumption. For instance, residents of Anaktuvuk have been known to give caribou to Barrow and Nuiqsut in return for a share in the bowhead whale harvest of these communities.

8. DIVERSITY OF RESOURCES IN AN AREA; ECONOMIC, CULTURAL, SOCIAL, AND NUTRITIONAL ELEMENTS (wide diversity, substantial elements in a subsistence user's life)

Although caribou from the Teshekpuk herd are only one of a host of resources harvested by residents of GMU 26(A), they play a major role in the economy of the communities under discussion. In some

years caribou have been documented as supplying a major percentage of all locally harvested meat, and being the single greatest source of sustenance for residents of some communities. residents. Even in years when other resources may have contributed more pounds of meat to the community, caribou appear to remain the most important, and most productive, terrestrial resource in the area (Braund 1989, Pedersen 1985-86 and 1990).

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**APPENDIX B: 1993 CUSTOMARY AND TRADITIONAL USE
WORKSHEET, TESHEKPUK CARIBOU HERD**

EIGHT CRITERIA WORKSHEET, BOARD OF GAME 1993

GMU: 26A (and possibly 24 - Anaktuvuk Pass)

C & T Finding: None to date

SPECIES: Caribou: Teshekpuk Caribou Herd

ALASKA RESIDENTS USING THE SPECIES: Residents of Nuiqsut, Barrow, and Atkasuk are the primary North Slope users of the Teshekpuk Caribou Herd. Residents of two other villages, Wainwright and Anaktuvuk Pass, may at times also harvest caribou from this herd as well as other Alaskan residents.

Because the Teshekpuk Caribou Herd is not specifically identified in current hunting regulations, there is no specific harvest ticket for the herd, and because so little is actually known about its seasonal movements over time, little information on any hunting of this herd is actually available. Based on caribou harvest ticket returns from GMU 26A it appears that there is little hunting of the herd by non-North Slope residents (within its central range around the Teshekpuk Lake) because of difficult access.

1. LENGTH AND CONSISTENCY OF USE (long-term, consistent, excluding interruptions by circumstances beyond the user's control):

The economic and cultural importance of caribou to the North Slope residents has been amply documented (Maguire 1853; Simpson 1855; Murdoch 1892; Spencer 1959). Also, the archaeological record indicates that this resource has been relied upon by inhabitants dating back possibly as far as 6,000 years (Wilson 1981). Current use and dependence on caribou by some communities in GMU 26A have been documented by Braund (1989) and Pedersen (1985-86).

2. SEASONALITY (recurring in specific seasons of each year):

Caribou are hunted throughout the open season in GMU 26A, from July 1 to June 30, but the main harvest usually takes place from July through October, and then again in March and April.

3. MEANS AND METHODS OF HARVEST (efficient, economic, conditioned by local circumstances):

Today GMU 26A caribou are harvested largely by Nuiqsut, Barrow, and Atkasuk hunters, although Anaktuvuk and Wainwright hunters and possibly other Alaskans also harvest caribou in the area apparently utilized by Teshekpuk caribou. Harvesting is carried out by individuals using modern firearms as well as by groups of hunters cooperating under specific rules of sharing. Winter hunting (October to April) is mainly an inland activity using snowmachine transportation, whereas, summer hunting is coastal and riverine involving boats and all-terrain vehicles.

4. GEOGRAPHIC AREAS:

Caribou from this herd are at times harvested near Nuiqsut, Atkasuk, and Barrow, but the most common harvest sites are from 30 to 80 miles away from the community. Mapping of the traditional community harvest area and recent harvest locales indicates that a large area is involved. Some caribou harvest sites appear to be particularly productive over time and receive regular use. There appears to be no significant competition from other caribou hunters (Wainwright, Anaktuvuk Pass, and non-local hunters) who occasionally may be found within the range of the Teshekpuk Caribou Herd.

5. MEANS OF HANDLING, PREPARING, AND STORING (traditionally used by past generations, but not excluding recent technological advances):

Current methods and means of handling, preparing, and storing caribou are based on a long tradition of caribou hunting, and dependence on caribou for food, clothing, shelter, and raw materials. Although bones and scraps are not widely used today, all other parts are processed for some use. Meat, organs, and the head are eaten, bones cracked and boiled to produce soup stock; the hide is used for winter bedding material and arts and crafts projects; leg skins are saved for making mukluk uppers; sinew from lower legs are saved for sewing, and hooves and antlers are crafted into a variety of craft items ranging from antler knife handles to amusing art creations made from caribou hair and hooves.

Caribou meat is sometimes air-dried, but more often is frozen after processing. Local community hunters use a combination of both traditional ice cellars and modern freezers for this purpose.

6. INTERGENERATIONAL TRANSMISSION OF KNOWLEDGE, SKILLS, VALUES, AND LORE:

Caribou hunting is a central land-based hunting activity among North Slope residents today as it has been for generations. Hunters often travel in mixed-age groups to facilitate the transmission of and reinforcement of important values, behaviors, hunting and processing techniques, as well as sharing pattern. Teaching traditional/modern hunting skills is considered of paramount importance among North Slope residents and considerable effort is expended on this. For instance, in GMU 26A a summer camp for North Slope children, "Upiqsu" on the Meade River, offers first-hand experience and learning about hunting and fishing activities with North Slope elders.

7. DISTRIBUTION AND EXCHANGE (customary trade, barter, sharing, and gift giving):

Caribou meat and hides have always been a major component of the natural resource trade on the North Slope, and early records indicate that some commercial trade may even have taken place during the whaling era. Today caribou continue to be a valuable trade and barter commodity, and, in some communities on the North Slope, a fat winter caribou might easily be traded for several spotted seals. However, sharing is, as it probably always has been, the major distribution mechanism on the North Slope. Pedersen (1990) has documented sharing of caribou meat from Kaktovik residents GMU 26C with relatives and friends in Anaktuvuk, Nuiqsut, Barrow, and even Fairbanks. The intra-North Slope community sharing of caribou is particularly evident when one community has an abundance of caribou meat and relatives and friends in a nearby community are doing poorly. Gift-giving of caribou may also be a mechanism for communities that lack certain resources, such as whales, to acquire some for ceremonial and general consumption. For instance, residents of Anaktuvuk have been known to give caribou to Barrow and Nuiqsut in return for a share in the bowhead whale harvest of these communities.

8. DIVERSITY OF RESOURCES IN AN AREA; ECONOMIC, CULTURAL, SOCIAL, AND NUTRITIONAL ELEMENTS (*wide diversity, substantial elements of a subsistence way of life*):

Although caribou from the Teshekpuk herd are only one of a host of resources harvested by residents of GMU 26A, they play a major role in the economy of the communities under discussion. In some years caribou have been documented as supplying a major percentage of all locally harvested meat, and being the single greatest source of sustenance for residents of some communities. Even in years when other resources may have contributed more pounds of meat to the community, caribou appear to remain the most important, and most productive, terrestrial resource in the area (Braund 1989; Pedersen 1985-86, 1990).

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**APPENDIX C: CALCULATED PER CAPITA CARIBOU
HARVESTS, GMU 26A COMMUNITIES, 1988–2011**

Appendix C.– Per capita caribou calculations based on previous survey and estimated values used in Dataset B, GMU 26A communities, 1988–2011.

Community	Year/period	Estimated caribou harvest	Estimated population	Pcap caribou	Source of population estimate
Atqasuk	1994–1995	262	224	1.17	Alaska DOL estimate 1994
	1996–1997	398	225	1.77	Alaska DOL estimate 1996
	1997–1998	266	238	1.12	Alaska DOL estimate 1997
	2002–2003	221	229	0.97	Survey results pop estimate
	2003–2004	352	246	1.43	Survey results pop estimate
	2004–2005	207	254	0.81	Survey results pop estimate
	2005–2006	174	233	0.75	Survey results pop estimate
	2006–2007	157	222	0.71	Survey results pop estimate
		pcap all study years		1.09	
Barrow	2011	266	244	1.09	Alaska DOL estimate 2011
	2012	256	235	1.09	Alaska DOL estimate 2012
	1987–1988	1595	2763	0.58	Census data for 1990
	1988–1989	1533	2763	0.55	Census data for 1990
	1989–1990	1656	2763	0.60	Census data for 1990
	1992	1993	3799	0.52	Alaska DOL estimate 1992
	1995–1996	2155	4178	0.52	Alaska DOL estimate 1995
	1996–1997	1158	4253	0.27	Alaska DOL estimate 1996
	2000	3359	4581	0.73	Alaska DOL estimate 2000
	2001	1820	4450	0.41	Alaska DOL estimate 2001
2003	2092	4428	0.47	Alaska DOL estimate 2003	
		pcap all study years		0.51	
Nuiqsut	2011	2202	4309	0.51	Alaska DOL estimate 2011
	2012	2359	4617	0.51	Alaska DOL estimate 2012
	1985–1986	513			ADF&G unpublished data
	1992	278	424	0.66	Alaska DOL estimate 1992
	1993	672	361	1.86	Survey results pop estimate
	1994–1995	258	413	0.62	Alaska DOL estimate 1994
	1995–1996	362	411	0.88	Alaska DOL estimate 1995
	1999–2000	413	486	0.85	Alaska DOL estimate 1999
	2000–2001	496	433	1.14	Alaska DOL estimate 2000
	2002–2003	397	392	1.01	Survey results pop estimate
	2003–2004	564	421	1.34	Survey results pop estimate
	2004–2005	546	434	1.26	Survey results pop estimate
	2005–2006	363	416	0.87	Alaska DOL estimate 2005
	2006–2007	475	389	1.22	Survey results pop estimate
		pcap from 1990s on		1.05	
	2011	457	434	1.05	Alaska DOL estimate 2011
	2012	451	428	1.05	Alaska DOL estimate 2012

–continued–

Community	Year/period	Estimated caribou harvest	Estimated population	Pcap caribou	Source of population estimate
Anaktuvuk	1990–1991	592	272	2.18	Pedersen and Opie 1991
Pass	1991–1992	536	272	1.97	Pedersen and Opie 1992
	1992	600	271	2.21	Alaska DOL estimate 1992
	1993–1994	574	318	1.81	Alaska DOL estimate 1993
	1994–1995	322	286	1.13	Alaska DOL estimate 1994
	1996–1997	210	306	0.69	Alaska DOL estimate 1996
	1998–1999	500	309	1.62	Alaska DOL estimate 1998
	1999–2000	329	314	1.05	Alaska DOL estimate 1999
	2000–2001	732	282	2.60	US Census 2000
	2001–2002	271	299	0.91	Alaska DOL estimate 2001
	2002–2003	436	302	1.44	Alaska DOL estimate 2002
	2006–2007	696	299	2.33	Alaska DOL estimate 2006
	2011	616	310	1.99	Survey results pop estimate
		pcap all study years		1.67	
	2012	543	325	1.67	Alaska DOL estimate 2012
Wainwright	1988–1989	505	492	1.03	US Census 1990
	1989–1990	711	492	1.45	US Census 1990
	1992	748	532	1.41	Alaska DOL estimate 1992
	2002–2003	866	532	1.63	Alaska DOL estimate 2002
	2009	1231	590	2.09	Survey results pop estimate
		pcap all study years		1.54	
	2011	880	572	1.54	Alaska DOL estimate 2011
	2012	870	565	1.54	Alaska DOL estimate 2012