Technical Paper No. 305

The 2004–2005 Harvest of Moose, Caribou, Bear, and Gray Wolf in the Lower-Middle Yukon River Communities of Grayling, Anvik, Shageluk, and Holy Cross

by

Caroline L. Brown

and

David Koster

April 2015

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

Alaska Administrative Code	AAC
all commonly-accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly-accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
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	two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-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_O
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

TECHNICAL PAPER NO. 305

THE 2004–2005 HARVEST OF MOOSE, CARIBOU, BEAR, AND GRAY WOLF IN THE LOWER-MIDDLE YUKON RIVER COMMUNITIES OF GRAYLING, ANVIK, SHAGELUK, AND HOLY CROSS

by

Caroline L. Brown
Alaska Department of Fish and Game, Division of Subsistence, Fairbanks

and

David Koster
Alaska Department of Fish and Game, Division of Subsistence, Anchorage

Alaska Department of Fish and Game
Division of Subsistence
1300 College Road, Fairbanks, AK 99701-1551

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Caroline L. Brown
Alaska Department of Fish and Game, Division of Subsistence
1300 College Road, Fairbanks, AK 99701-1551

and
David Koster
Alaska Department of Fish and Game, Division of Subsistence
333 Raspberry Road, Anchorage, AK 99518-1599

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ABSTRACT

This report summarizes the harvest and use of moose, caribou, black bear, brown bear, and gray wolf during the 12-month period from April 2004 through March 2005 in select communities along the lower-middle Yukon River. This was the third year of data collection in the communities of Anvik, Grayling, Holy Cross, and Shageluk. Information on the number of animals harvested, the sex, location and month of harvests, and the percentage of households hunting, harvesting, and sharing each resource is presented. The research was funded by the U.S. Fish and Wildlife Service through an ANILCA Section 809 agreement and carried out by the Alaska Department of Fish and Game, Division of Subsistence. Data were collected through household surveys administered by locally-hired research assistants in each community.

In 2005, surveys were completed with a total of 174 of 184 households (95%) in the communities of Grayling, Anvik, Shageluk, and Holy Cross. Hunters in these communities took an estimated 94 moose during the study year. An estimated 164 individuals, or just under one-third of the area population, spent an average of 8 hunter-days, or a total of 1306 hunter-days, in pursuit of moose. Data from the 2004–2005 survey year are compared with data from 1990–1991 and the preceding two survey years (2002–2003 and 2003–2004) to provide context and comparison. The report concludes with an updated discussion of the regulatory context of moose hunting and the moose planning effort in GMU 21E.

Key words: subsistence hunting, Anvik, Grayling, Holy Cross, Shageluk, moose, caribou, black bear, brown bear, gray wolf

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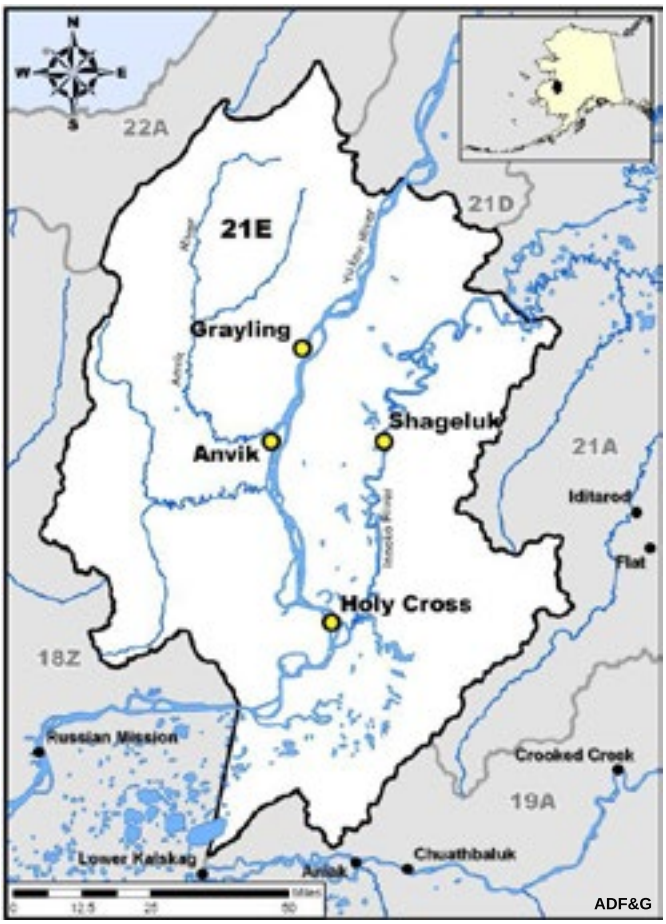
Figure 1.–Map of GASH region.



INTRODUCTION

This report documents the harvest and use of moose *Alces alces*, caribou *Rangifer tarandus*, black bear *Ursus americanus*, brown bear *Ursus arctos*, and gray wolf *Canis lupus* for the 12-month period between April 2004 and March 2005 by residents the 4 lower-middle Yukon Alaska communities of Grayling, Anvik, Shageluk, and Holy Cross. Figure 1 shows locations of these communities in what is referred to as the "GASH" area. This report presents the third year of data collection in this area, using the same methods employed in the 2 previous years, as well as in an earlier project that focused on 10 communities on the middle Yukon and Koyukuk River region (Andersen et al. 2001, 2004; Brown and Koster 2005; Brown et al. 2004). The 2004–2005 data provide an additional year of harvest data to be considered alongside the data from the 2002–2003 and 2003–2004 survey years. As the third and final year of data collection in the GASH area, this report necessarily covers some information originally discussed in the prior 2 reports (Brown and Koster 2005; Brown et al. 2004). However, it also accounts for inter-annual variability in harvest and updates the progress of the Yukon-Innoko Moose Management Working Group.

Accurate harvest estimates are among the most basic and essential pieces of information needed for the sound management of wildlife populations. In Alaska, wildlife populations, especially big game, are important subsistence food resources; harvest data serve to document and monitor levels of subsistence use as required under the state subsistence statute (AS 16.05.094). These data are also essential to federal subsistence and state wildlife management.

Studies in Alaska have illustrated that the harvest ticket system for reporting big game harvests may substantially underestimate harvests of big game taken by hunters residing in Alaska's rural communities (Andersen and Alexander 1992). Andersen and Alexander compared harvests reported through harvest tickets[1] to subsistence baseline studies for 10 Interior Alaska communities during the regulatory year 1987–1988 and found that the harvest ticket system did not accurately estimate subsistence harvest in rural Alaska. The reported harvest of the 10 communities represented a range of 0% to 76% of the harvest estimates recorded in household survey studies conducted within those same communities (Andersen and Alexander 1992). On average, the reported harvest represented approximately 28% of the harvest estimates documented in the baseline studies.

Harvest tickets do not capture the majority of harvests by rural communities for a variety of reasons. Andersen and Alexander contend that although hunters in rural Interior Alaska generally accept the need for management, they are concerned that the harvest ticket system is not compatible with local patterns of group hunting and sharing networks that characterize many subsistence-based communities. Some individuals hunt and harvest without ever obtaining a license or harvest ticket. Hunting is typically done by groups in which the individuals represent different households, and harvests are shared between these households. Alternatively, 1 hunter (hunting alone or as part of a group) may be responsible for providing moose meat for a large, extended family of several inter-related households in addition to his or her own. Finally, for households that are heavily reliant on wild foods to meet their needs, 1 moose may simply not be enough. In these cases, a harvest ticket may not be returned until all harvest is complete, or if the hunter does return the harvest ticket, it may only reflect a portion of the actual harvest. As Andersen and Alexander (1992:17) explain:

> Despite the almost universal demand for moose meat, there are a limited number of individuals who have the equipment, expertise, and time necessary to hunt moose. Thus, it is from a relatively small group of hunters and long-established patterns of sharing that the community need for moose meat is met. This conforms to the 'super-household' phenomenon found to be common in many Alaska communities where specialization occurs among households and a majority of a community's wild food supply is supplied by a minority of households.

For all these reasons, household surveys are likely to provide more accurate harvest reporting than the harvest ticket system for rural Alaska in general. In addition to providing current, accurate information on harvests, uses, sharing, and hunting effort, these data can be compared to earlier baseline studies to provide some sense of how or if harvest patterns have changed over time. Wheeler (1992) conducted the baseline study in the GASH communities (Wheeler et al. 1992). This study contains a rich body of information documenting the subsistence harvest and resource use patterns in these 4 communities between September 1990 and August 1991.[2] It also provides an historical context for contemporary use patterns.[3]

Finally, local residents have expressed growing concern over the health and density of moose populations in the region as well as increasing competition with hunters from other parts of Alaska and nonresidents. These issues will be discussed in the final section of this report.

1. Winfonet is the ADF&G Division of Wildlife Conservation's intranet website. The site provides a wide variety of tools to allow users to access, update, and download different kinds of data, including harvest data for big game species.

2. Data from Wheeler (1992) can be found in the ADF&G Community Subsistence Information System. https://www.adfg.alaska.gov/sb/CSIS

3. ADF&G Division of Subsistence harvest estimates based on in-person household surveys are extrapolated based on the average harvest of reporting households to account for households that cannot or choose not to participate; it is unclear if an identical extrapolation method was used in the 1990 study.

Table 1.–Survey design and sample sizes, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

		Households						Population	
Community	Type of design	Total number of households	Household sample goal	Number of surveyed households	Percentage of households sampled	Unable to contact	Declined survey	Sampled household population	Estimated community population
Anvik	Census	36	36	33	91.7%	1	1	106	115.6
Grayling	Census	50	50	50	100.0%	0	0	174	174.0
Holy Cross	Census	59	59	52	88.1%	6	1	167	189.5
Shageluk	Census	39	39	39	100.0%	0	0	112	112.0
All communities		**184**	**184**	**174**	**94.6%**	**7**	**2**	**559**	**591.1**

Source ADF&G Division of Subsistence household surveys, 2005.

METHODS

Community approval for the survey project was obtained from the village or tribal council in each community prior to beginning the research effort. For this third year of data collection, the Division of Subsistence worked directly with individual tribal councils to select one local resident from each community who would conduct the surveys using face-to-face interviews. Research assistants for the 2004–2005 survey year are identified in the Acknowledgements section.

Following community approval for the project, Division of Subsistence staff followed the method employed in the second year of data collection and traveled to each community to train research assistants individually. The first year, local research assistants met during the month of March in Fairbanks for group training. This method was chosen to allow for a group conversation about issues facing area residents and to raise questions or concerns about the survey process. Traveling to each community, however, provided the opportunity to talk with other residents about their hunting experiences, especially in light of locally expressed concerns about seasonal changes affecting the ability to hunt and increasing nonlocal hunting pressure. A 2-page survey form was used to collect information from hunters and household heads. A copy of the survey form is included as Appendix A.

As occurred in each study year, local research assistants compiled current household lists for each community immediately prior to the survey effort. In the 2004–2005 study year, a total of 184 households were identified in the 4 communities. Surveys were completed with 174 households (95%), and a breakdown by community is shown in Table 1. Due to the small size of these communities, a census of all occupied households was attempted. The lowest sample achievement rate occurred in Holy Cross with 52 of 59 (88%) households surveyed, and the highest occurred in Grayling and Shageluk with 100% of the households surveyed. In general, the refusal rate was very low, possibly because of the use of local research assistants, growing familiarity with the study and the planning effort, and local concerns about the moose population. In most communities, surveys were administered in May and June 2005.

Prior to being sent in for analysis, completed survey forms underwent several reviews. Surveyors were asked to review forms for completeness and legibility prior to submitting them back to the project coordinators at Alaska Department of Fish & Game (ADF&G). Project coordinators then reviewed the completed forms for logic errors or omissions and resolved any problems with the surveyors. The completed forms were then sent to the Division of Subsistence Information Management section.

After receipt by the Subsistence Information Management group, a double data-entry method was used to enter information into a computerized system for data analysis. Data were validated against standard division processing rules, in which use of a resource, including one given away, can only be indicated if the resource was obtained during the survey period.

Results from surveyed households were extrapolated to unsurveyed households to derive total harvest estimates for each community. Fractions of animals result from the expansion procedure and are rounded to the nearest tenth in accompanying report tables. The estimates of harvests and levels of participation in this study were calculated based upon the application of weighted means (Cochran 1997). These calculations

are standard methods for extrapolating sampled data. The sample mean of the harvest is applied to any household that was not contacted, or whose real harvest is not known. The formula for the standard expansion is:

$$X_C = \frac{N}{n}\sum_{i=1}^{n} x_i$$

where:

x = household harvest,

i = i^{th} household in the community,

n = number of sampled households in the community,

N = total number of households in the community, and

X_C = total estimated community harvest

A calculation for the relative precision of the mean, or likelihood that an unknown value falls within a certain distance from the mean, is also produced. This value is shown as a confidence interval (CI), expressed as a percent. A standard of 95% CI is used for all calculations. The first step in calculating the confidence interval is the calculation of the standard error of the mean, which includes the finite population correction factor:

$$s_{\bar{x}} = \frac{s}{\sqrt{n}} \times \sqrt{1 - \frac{n}{N}}$$

The standard error of the mean can be used in the following formula to express the confidence interval as a percent range around the mean:

$$CI\,\%(\pm) = \frac{t_{\alpha/2} \times s_{\bar{x}}}{\bar{x}}$$

where:

$t_{\alpha/2}$ = Student's t statistic for given alpha level (α) with n-1 degrees of freedom (95%) (CI with n-1 degrees of freedom),

s = the standard deviation of household harvest,

$\bar{x}$ = sample mean of household harvest,

n = number of households in the community, or sample size, and

N = total households in the community,

Small CI percentages indicate that an estimate is likely to be very close to the actual mean of the sample. Larger percentages mean that estimates could be further from the mean of the sample.

The corrected final data from the household survey will be added to the Division of Subsistence CSIS. This publicly-accessible database includes community-level study findings.[4]

4. Alaska Department of Fish and Game (ADF&G) Division of Subsistence, Juneau. "Community Subsistence Information System: CSIS." https://www.adfg.alaska.gov/sb/CSIS

SURVEY FINDINGS

Moose

As with the first 2 years' surveys, moose was the most widely used big game animal in all 4 communities. Table 2 shows the levels of participation in the harvest and use of moose. The right side of the table describes estimated hunter information and divides these data into *all hunters* and *successful hunters*, a subset of all hunters. For example, in the community of Grayling, there were 48 moose hunters in total representing 28% of the population of the community. Of these 48 hunters, 27 were successful, harvesting an average of 1 moose per hunter. Overall in all 4 communities, 97% of all households used moose, 64% attempted to harvest moose, and 47% of all households harvested 1 or more moose. The percentage of households harvesting moose ranged from 41% in Shageluk to 64% in Anvik. The percentage of households using moose ranged from 92% in Holy Cross to 100% in Grayling and Shageluk. During the study period of April 2004–March 2005, hunters harvested an estimated 94 moose in the 4 survey communities. The total moose harvest consisted of 83 bulls (88% of the total harvest) and 8 cows (9% of the total harvest) (Table C1). This pattern of the majority of subsistence harvest comprising bulls is evident in all 4 communities. Only 2 communities harvested cows: Grayling hunters took 5 cows, and Shageluk hunters harvested 3.

Between April 2004 and March 2005, moose were harvested in 6 of 12 months, including: April, August, September, December, January, and February (Figure 2). However, 90% of the moose harvest occurred in September and consisted of 81 bulls, 2 cows, and 2 moose of unreported sex. The late winter hunting season in January and February accounted for an additional 5 moose (5% of the overall harvest), all of which were cows. The majority of the total cow harvest occurred in February (4 cows, 50%); 2 cows (25% of the cow harvest) were taken in September, and 1 each in December and January (Figure 2, Table C1). Although bulls make up the large majority of the moose harvest in all survey years, the percentage of the total harvest that was cows has ranged from 8–12% between the 3 survey years. The GASH Fish and Game Advisory Committee (AC) has recommended that the Board of Game not authorize a winter antlerless moose season in order to preserve the cow moose population since 2002. However, there remained a federal winter season on federal lands. This season is only open to federally qualified users; in GMU 21E, this means residents of Grayling, Anvik, Shageluk, Holy Cross, and Russian Mission.

Participation in moose hunting is high in all 4 communities. Two of the most significant pieces of information collected in the survey are the per capita rates of harvest and the hunter-effort data. To account for variations in community populations, especially over time, it is useful to examine per capita rates of harvest for moose. Because of the consistency of need and long-term harvest patterns of moose in this area, we expect that per capita rates should generally remain the same. During the 2004–2005 survey year, the per capita rates for moose ranged from 0.14 to 0.21 moose per person (Table 2). Based on this, it appears that per capita rates have declined slightly over the last 3 survey years; per capita rates of harvest averaged 0.22 and 0.19 for the 2002–2003 and 2003–2004 survey years respectively compared to the average of 0.16 moose per person in the 2004–2005 survey year (Table 2; Brown and Koster 2005; Brown et al. 2004). However, compared to the 1990 baseline, per capita rates of harvest have fallen significantly, as discussed later (Wheeler et al. 1992). Lower per capita harvest rates indicate that fewer moose are being harvested per household and family. There are likely multiple reasons for this, including a possible decrease in moose abundance, possible increased predation, increasing effort required to harvest, or all of these. During meetings in late 2004, hunters in the GASH area expressed their concern that per capita rates of harvest would decrease and hunter-effort would increase in the 2004–2005 survey year because of low moose abundance, increasing hunter pressure, and extremely lower water levels combined with warm temperatures through the fall 2004 hunting season. The results of the survey did indeed show these effects.

The locations of moose harvests for each community also were collected and are summarized by Game Management Unit (GMU), subunit, and Uniform Coding Unit (UCU) in Table C2. Of the 94 moose harvested by the 4 survey communities, 100% were taken in GMU 21 (subunits 21A, 21D and 21E). Hunters in the 4

Table 2.–Participation in the harvest and use of moose, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

	Percentage of households					Estimated harvest levels						Estimated hunter information				
						Number of moose harvested			95% conf. limit of total harvest			All hunters			Successful hunters[b]	
Community	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total	Per household	Per person	Percentage	Low[a]	High	Number	Percentage of population	Harvest per hunter	Number	Harvest per hunter
Grayling	100.0 %	68.0 %	42.0 %	84.0 %	60.0 %	28.0	0.6	0.2	0.0 %	28.0	28.0	48.0	27.6 %	0.6	27.0	1.0
Anvik	97.0 %	69.7 %	63.6 %	57.6 %	48.5 %	24.0	0.7	0.2	0.1 %	22.0	26.0	29.5	25.5 %	0.8	24.0	1.0
Shageluk	100.0 %	61.5 %	41.0 %	64.1 %	30.8 %	16.0	0.4	0.1	0.0 %	16.0	16.0	41.0	36.6 %	0.4	16.0	1.0
Holy Cross	92.3 %	59.6 %	44.2 %	55.8 %	28.8 %	26.1	0.4	0.1	0.1 %	23.2	29.0	45.4	24.0 %	0.6	26.1	1.0
All communities	**97.1 %**	**64.4 %**	**46.6 %**	**66.1 %**	**42.0 %**	**94.1**	**0.5**	**0.2**	**5.2 %**	**89.2**	**99.0**	**163.8**	**27.7 %**	**0.6**	**93.1**	**1.0**

Source ADF&G Division of Subsistence household surveys, 2005.

a. Low harvest estimate is based on reported harvest, if greater than calculated lower limit.

b. Number of successful harvesters based on number of moose harvested. Only one hunter per household is counted for each moose.

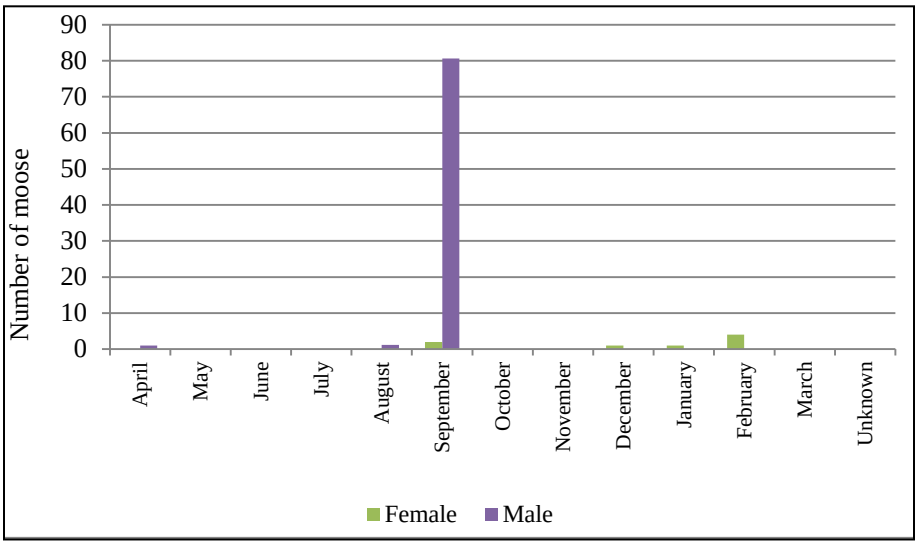


Figure 2.–Estimated moose harvest by sex and month, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

communities reported harvesting moose in a total of 11 UCUs. Figure 3 shows a graphic representation of moose harvest density for subunit 21E. Residents of subunit 21E reported widely varying hunting patterns for moose. Similar to each of the preceding survey years, the community of Shageluk utilized just 1 UCU for moose hunting during the 2004–2005 survey year (Figure 4). In contrast to this very localized hunting pattern, hunters in the community of Holy Cross reported moose harvests in 5 UCUs (Table C2). In general, the largest percentage (45%) of moose harvests from all 4 communities combined came from 1 UCU, 21E 0501, repeating the pattern from the 2003–2004 survey year.

Hunter effort data collected on the survey measure the amount of hunter-time required to harvest each moose. Increasing hunter-time, or effort per harvested moose, may indicate a declining moose population if hunters spend more time to harvest similar numbers of moose. Participants were asked how many people in their household participated in moose hunting and how many days each of those individuals spent hunting for moose. These data are presented in Table 3. An estimated 164 individuals, or approximately one-third of the area's population, spent a total of 1,306 hunter-days in pursuit of moose. To put this number of hunter-days in perspective, 1,306 days is equivalent to a period of just over 3.5 years; the amount of time devoted to hunting is a clear testament to the importance of moose as a food resource in this region. For all of the communities, hunters in successful households spent an average of 8.3 hunter-days for each moose harvested. Hunters in Holy Cross and Shageluk reported the lowest number of hunter-days per harvested moose with 7.7 and 7.1 hunter-days respectively. Hunters in Anvik had the highest number of hunter-days per harvested moose at 9.7 hunter-days.

Although many factors contribute to the duration and success of individual and household moose hunting efforts, these data can provide a useful index of relative moose densities throughout the study area when viewed on a community-wide basis. For example, the 26 hunters from successful Holy Cross households had one of the lowest number of hunter-days (7.7), but utilized 5 UCUs and harvested 26 moose. In comparison, the 24 successful hunters from Anvik spent an average of 9.7 hunter-days per moose harvested, utilizing only 3 UCUs to harvest a roughly equivalent number of moose (Tables 3 and C2). Based on population estimates conducted during the spring of 2005, higher moose densities were found on the islands in the Yukon River primarily between Anvik and Holy Cross, while lower moose densities were generally found near the community of Grayling and the area immediately around Shageluk. Medium level densities of moose were found around the Innoko River and near the historic settlement of Holikachuk, upriver of Shageluk.[5] Although these characterizations of moose density reflect spring movements of moose, not

5. According to the Area Biologist Toby Boudreau, the average moose density in the low units was 0.033 moose/mi^2 and in the high units was 1.56 moose/mi^2.

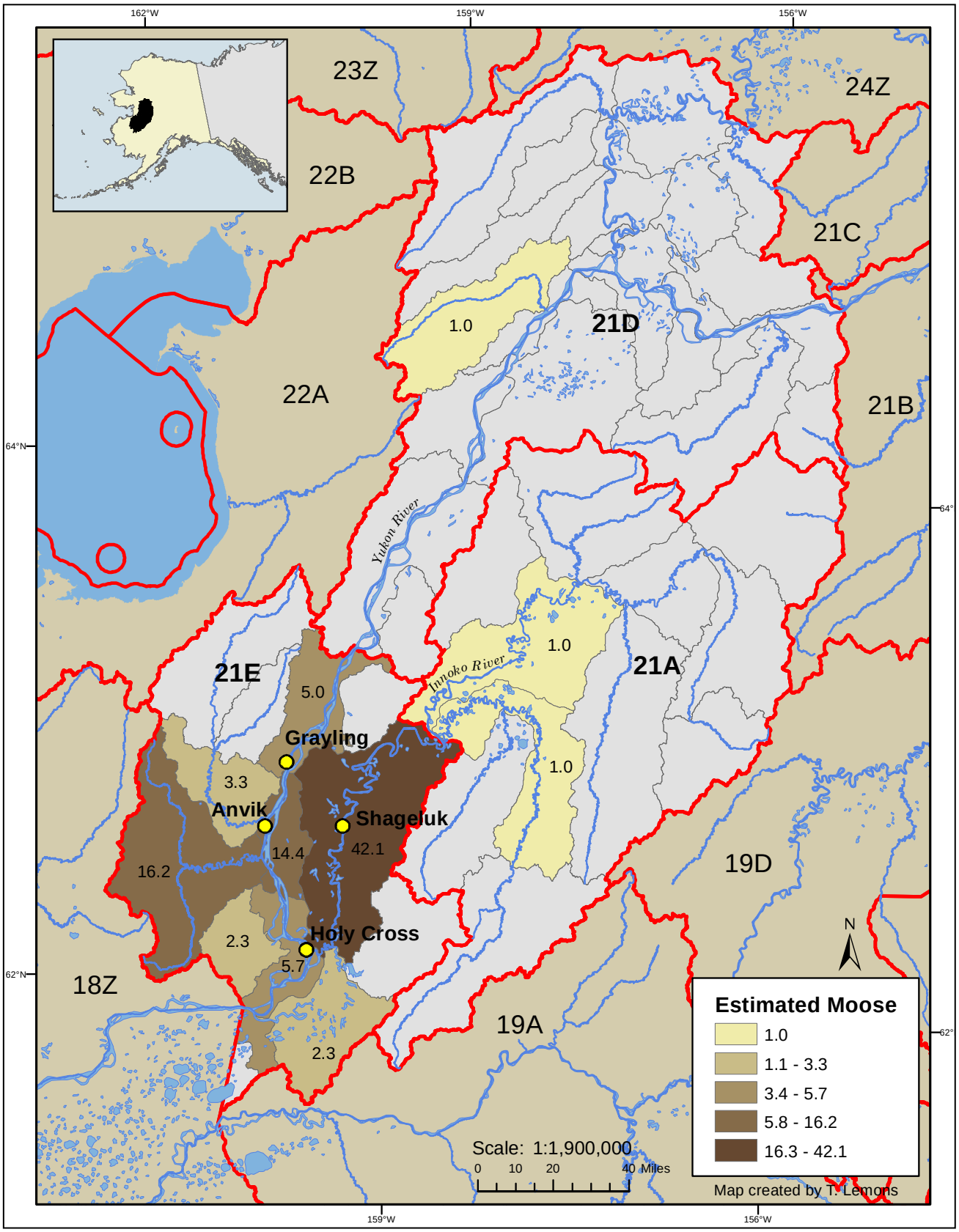


Figure 3.–Estimated moose harvest by Game Management Unit, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

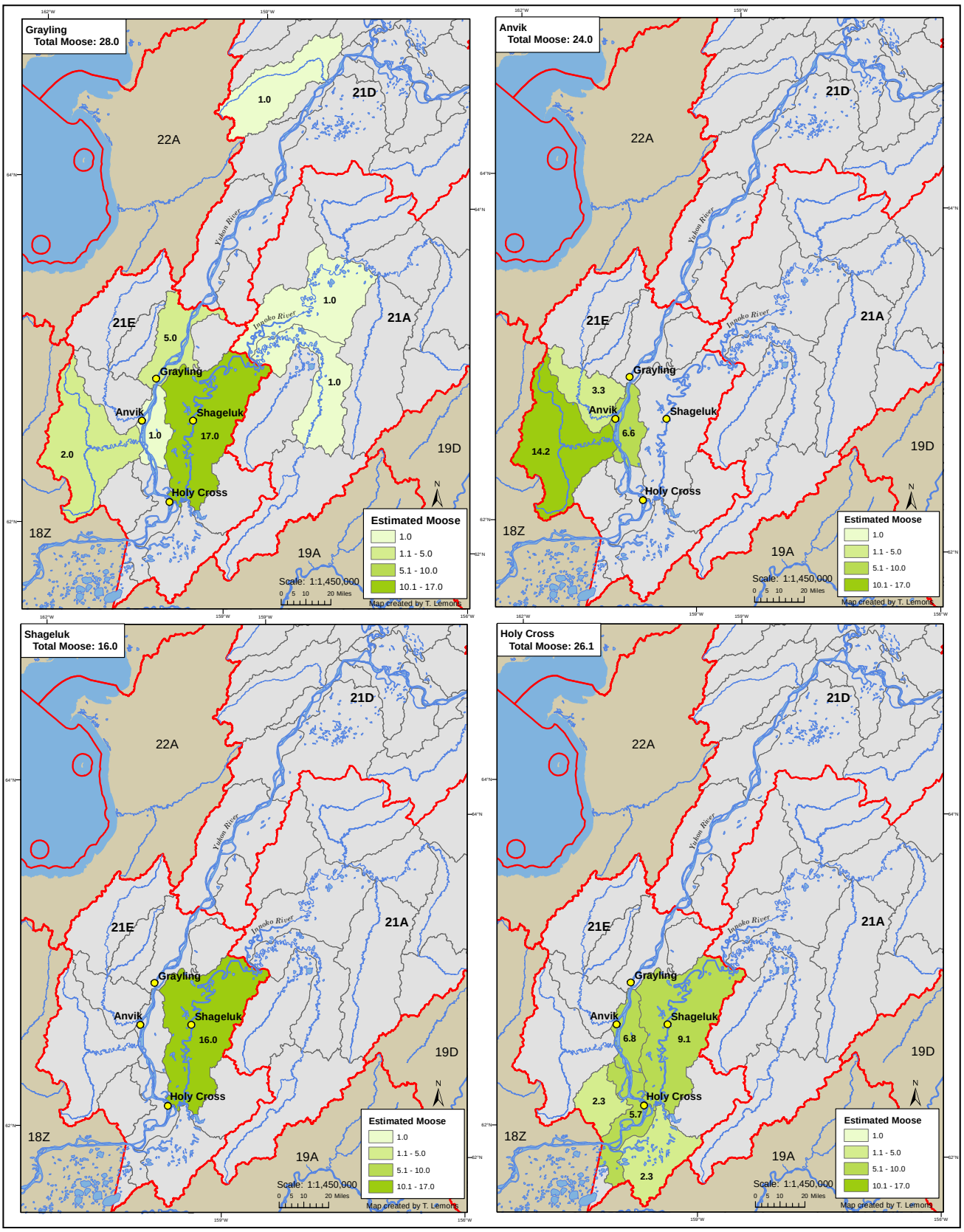


Figure 4.–Estimated moose harvest by Game Management Unit and community, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

Table 3.–Estimated moose hunting effort, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

		All hunters			Successful (harvesting) hunters			
Community	Total number of moose harvested	Number of hunters	Days hunted	Hunting days per hunter	Number of hunters[a]	Days hunted	Hunting days per hunter	Hunting days per moose harvested
Grayling	28.0	48.0	381.0	7.9	27.0	230.0	8.5	8.2
Anvik	24.0	29.5	300.0	10.2	24.0	232.4	9.7	9.7
Shageluk	16.0	41.0	271.0	6.6	16.0	113.0	7.1	7.1
Holy Cross	26.1	45.4	354.0	7.8	26.1	199.7	7.7	7.7
All communities	**94.1**	**163.8**	**1306.0**	**8.0**	**93.1**	**775.1**	**8.3**	**8.2**

Source ADF&G Division of Subsistence household survey, 2005.

a. A maximum of one hunter is counted per moose harvested.

distributions in the fall when most of the hunting takes place, the highest densities remain along the Yukon River downriver of Anvik. Further, these patterns of population densities correlate to fall harvest densities depicted in Figure 3. Figure 4 shows this same distribution by community.

It is difficult to assess a trend in hunter effort on a regional level. In the 2002–2003 survey year, hunters from the 4 communities spent an average of 8 days per moose harvested (Brown et al. 2004). In the 2003–2004 survey year, this average dropped to 6 days per moose harvested, reflecting a decrease in hunter-days reported by Anvik hunters (Brown and Koster 2005).[6] Successful hunter effort during the 2004–2005 survey year returned to 8 days per moose harvested (Table 3). However, variation can be seen more readily on the community level. For example, hunter effort increased in Holy Cross by 1.3 days between the first two survey years (2002–2003 and 2003–2004) and increased again by 1.7 days in the 2004–2005 survey year (Table 3; Brown and Koster 2005; Brown et al. 2004). Although all of the communities appear to have expended a greater amount of effort to harvest fewer moose, hunters in Anvik reported the greatest hunter effort in the region, harvesting 24 moose but spending an average of 2 days more per moose.

Hunter effort data also were collected in the Koyukuk and middle Yukon region for three separate survey years, 1999–2000 (Andersen et al. 2001), 2001–2002 (Andersen et al. 2004), and 2002–2003 (Brown et al. 2004). By comparison, hunter effort in the GASH area appears to be less than that reported in the middle Yukon-Koyukuk project. Comparisons of hunter effort between different regions should be approached with caution in the absence of a detailed analysis of localized hunting patterns and practices, habitat assessment, accurate and current moose population estimates, and consideration of the geography. Nonetheless, according to the 2004–2005 survey, hunter effort continues to increase in the GASH area, just as it did in the middle Yukon region, attesting to the increasing difficulty hunters experienced in harvesting moose for their communities.

Finally, for the last 2 years, the survey also collected data on the land management status of reported harvest sites. Each respondent was asked to identify on a map where his or her harvest occurred; the surveyor then identified whether the site was federal or state-managed land. According to these responses, 21% of harvests occurred on federal land, while 76% occurred on state lands (the locations of 2.3% or 2 moose harvests were unknown or not identifiable), showing slightly more harvest occurring on state land than in 2003–2004 (Table C3). There were some changes on the community level as well; Anvik and Shageluk hunters reported 100% of their known harvest locations on state land, while hunters from Grayling (61% on state land, 39% on federal land) and Holy Cross (65% on state land, 35% on federal land) were more divided in the locations of their harvests. These shifting patterns might have to do with the particular configuration of federal and state land holdings in the UCUs where residents traditionally hunt; it might also be related to accommodations that hunters have made as a result of low water or other environmental changes.

6. Although the first year of hunter-effort data from Anvik was extremely high (20.4 days), the last two survey years have estimated 7.1 days and 9.7 days per moose harvested, respectively. Reasons for the level of hunter-effort reported by Anvik hunters in 2002–2003 are unclear. Survey methods, protocol, and personnel remained the same; the difference in reported hunter effort levels indicates the need for multiple years of data in order to accommodate year-to-year variability.

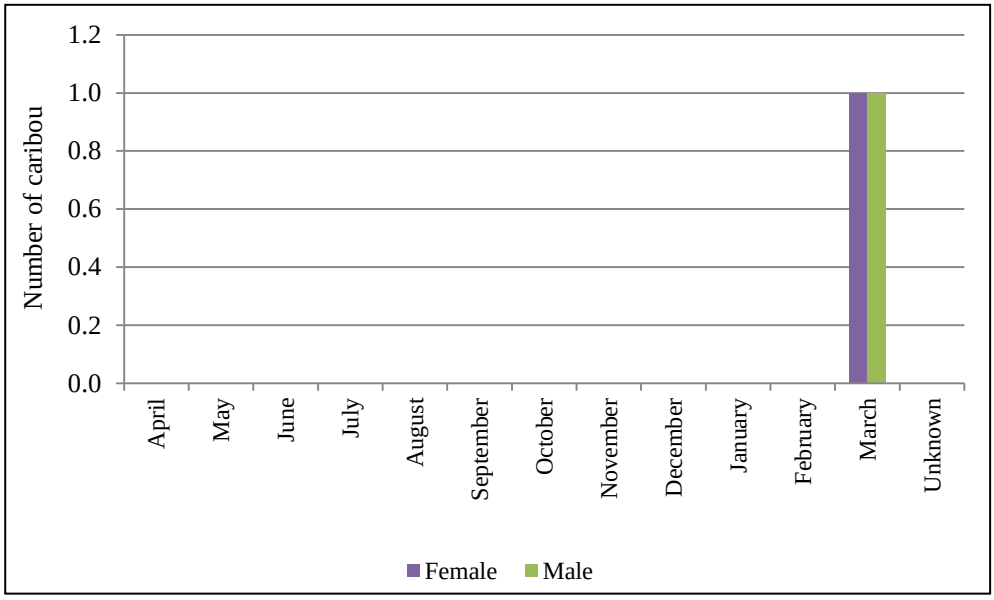


Figure 5.–Estimated caribou harvest by sex and month, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

Caribou

The 2004–2005 survey documented an estimated total harvest of just 2 caribou—both taken by hunters in the community of Grayling (Table 4). The percentage of households attempting to harvest caribou ranged from 0% in Anvik and Shageluk to 2% in Grayling and Holy Cross. Although only 2% of Grayling households reported harvesting caribou, 10% of the households reported using caribou, suggesting that households shared the resource. Figure 5 shows the caribou harvest by month and sex. The 2004–2005 caribou harvest consisted of 1 bull and 1 cow (Table C4); both animals were taken during the month of March. The locations of caribou harvests are summarized by GMU, subunit, and UCU in Table C5. The 2 caribou harvested by hunters in surveyed communities during the 2004–2005 survey period were both taken in a single UCU (19A 0101) located in GMU 19A. This UCU is located just north of the central Kuskokwim River between the communities of Upper Kalskag and Aniak to the west of the Aniak River in the vicinity of Whitefish Lake. Unit 19A is included in the northern reaches of the migratory range of the Mulchatna caribou herd.

On average, hunters from the 4 communities take about 2 animals per year, which they generally share within their own community and sometimes between communities (Brown et al. 2004; Wheeler et al. 1992). Caribou harvests in the GASH area vary widely depending on the movement of the Mulchatna Caribou Herd, which is primarily located far to the south of 21E communities. This caribou distribution pattern makes them generally unavailable to hunters in the GASH communities.

Black Bear

Black bears are not harvested in large numbers by hunters residing in the lower-middle Yukon area; they are not generally targeted for hunting, and most are taken opportunistically. For 2004–2005, an estimated total of 3 black bears was harvested by hunters in the 4 survey communities (Table 5). These 3 bears were harvested by hunters from Anvik and Grayling. Of the 4 communities, the use of black bear was reported only by 6% of households in Grayling and 3% of the households in Anvik. The absence of reported use of black bear in the other survey communities suggests that these households did not necessarily share their harvest with these other communities, nor did Shageluk or Holy Cross households report receiving black bear from communities outside of the survey area. However, 4% of households in Grayling (2 hunters) and 3% of households in Anvik (1 hunter) did attempt to harvest black bears. Only 2% of the households

Table 4.–Participation in the harvest and use of caribou, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

	Percentage of households					Estimated harvest levels						Estimated hunter information				
						Number of caribou harvested			95% conf. limit of total harvest			All hunters			Successful hunters [b]	
Community	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total	Per household	Per person	Percentage	Low[a]	High	Number	Percentage of population	Harvest per hunter	Number	Harvest per hunter
Grayling	10.0 %	2.0 %	2.0 %	8.0 %	4.0 %	2.0	0.04	0.01	0.0 %	2.0	2.0	1.0	0.6 %	2.0	1.0	2.0
Anvik	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0	0.00	0.00	0.0 %	0.0	0.0	0.0	0.0 %	0.0	0.0	0.0
Shageluk	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0	0.00	0.00	0.0 %	0.0	0.0	0.0	0.0 %	0.0	0.0	0.0
Holy Cross	0.0 %	1.9 %	0.0 %	0.0 %	0.0 %	0.0	0.00	0.00	0.0 %	0.0	0.0	1.1	0.6 %	0.0	0.0	0.0
All communities	**2.9 %**	**1.1 %**	**0.6 %**	**2.3 %**	**1.1 %**	**2.0**	**0.01**	**0.00**	**0.0 %**	**2.0**	**2.0**	**2.1**	**0.4 %**	**1.0**	**1.0**	**2.0**

Source ADF&G Division of Subsistence household surveys, 2005.

a. Low harvest estimate is based on reported harvest, if greater than calculated lower limit.

b. Number of successful harvesters based on number of caribou harvested. Only one hunter per household is counted for each caribou.

Table 5.–Participation in the harvest and use of black bear, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

	Percentage of households					Estimated harvest levels						Estimated hunter information				
						Number of black bears harvested			95% conf. limit of total harvest			All hunters			Successful hunters [b]	
Community	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total	Per household	Per person	Percentage	Low[a]	High	Number	Percentage of population	Harvest per hunter	Number	Harvest per hunter
Grayling	6.0 %	4.0 %	2.0 %	4.0 %	4.0 %	2.0	0.04	0.01	0.0 %	2.0	2.0	2.0	1.1 %	1.0	1.0	2.0
Anvik	3.0 %	3.0 %	3.0 %	0.0 %	0.0 %	1.1	0.03	0.01	0.6 %	1.0	1.7	1.1	0.9 %	1.0	1.1	1.0
Shageluk	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0	0.00	0.00	0.0 %	0.0	0.0	0.0	0.0 %	0.0	0.0	0.0
Holy Cross	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0	0.00	0.00	0.0 %	0.0	0.0	0.0	0.0 %	0.0	0.0	0.0
All communities	**2.3 %**	**1.7 %**	**1.1 %**	**1.1 %**	**1.1 %**	**3.1**	**0.02**	**0.01**	**0.0 %**	**3.0**	**3.7**	**3.1**	**0.5 %**	**1.0**	**2.1**	**1.5**

Source ADF&G Division of Subsistence household surveys, 2005.

a. Low harvest estimate is based on reported harvest, if greater than calculated lower limit.

b. Number of successful harvesters based on number of black bears harvested. Only one hunter per household is counted for each black bear.

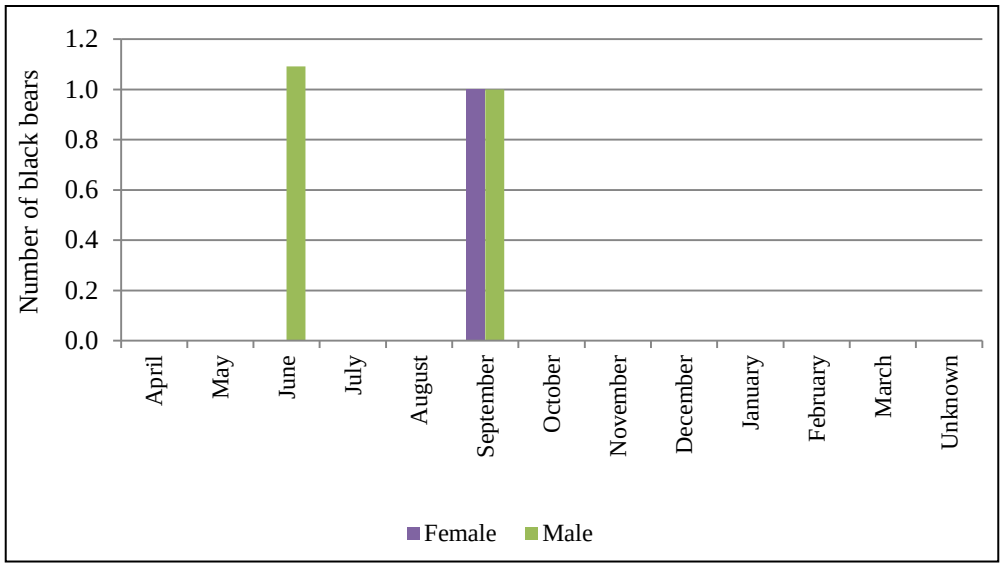


Figure 6.–Estimated black bear harvest by sex and month, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

in Grayling reported an actual take of black bear. Of these, 4% reported sharing and 4% stated that they received black bear within Grayling, indicating a pattern of sharing within, but not outside of the community for this species.

Black bears display significant annual and individual variability in their denning dates. In Interior Alaska, however, most black bears enter their winter dens by mid-October and emerge from their dens by mid-April (Andersen et al. 2001). Black bear meat and fur are generally considered to be prime in the fall and spring just prior to and immediately following denning. Reported black bear harvests are consistent with this information: harvests were reported in June (1 bear) and September (2 bears) (Table C6, Figure 6). Black bear harvests consisted of 2 males (67%) and 1 female (33%). Locations of black bear harvests for each community are summarized by GMU, subunit, and UCU in Table C7. Of the 3 black bears harvested, all were taken in GMU 21, with all 3 bears taken in subunit 21E.

According to state regulations, all licensed hunters—state residents and nonresidents—may take up to 3 black bears per year in all of GMU 21E (5 AAC 85.015). In GMU 21E, black bear meat must be salvaged and removed from the field from bears taken between January 1 and May 31; from June 1 through December 31, either the hide or the meat must be salvaged and removed from the field. Federal regulations require the salvage of both meat and hides throughout the July 1 through June 30 federal season. In the case of a black bear killed in defense of life or property, the bear must be skinned, and the hide, with claws and evidence of sex attached, must be turned over to the state. According to local residents, the growing presence of black bears is a concern in the communities. They pose a threat to residents, especially children and dogs, as bears are increasingly drawn to smokehouses located in the communities.

Brown Bear

No area hunters reported taking brown bears in 2004–2005 (Table 6). According to earlier studies, brown bears are infrequently encountered and not heavily harvested by area residents (Stokes 1984; Wheeler et al. 1992). For example, hunters reported harvesting 4 bears for the whole area in 1990–1991 (Wheeler et al. 1992).

Table 6.–Participation in the harvest and use of brown bear, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

	Percentage of households					Estimated harvest levels						Estimated hunter information				
						Number of brown bears			95% conf. limit of total harvest			All hunters			Successful hunters	
Community	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total	Per household	Per person	Percentage	Low [a]	High	Number	Percentage of population	Harvest per hunter	Number	Harvest per hunter
Grayling	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0	0.0	0.0	0.0 %	0.0	0.0	0	0.0 %	0	0	0
Anvik	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0	0.0	0.0	0.0 %	0.0	0.0	0	0.0 %	0	0	0
Shageluk	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0	0.0	0.0	0.0 %	0.0	0.0	0	0.0 %	0	0	0
Holy Cross	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0	0.0	0.0	0.0 %	0.0	0.0	0	0.0 %	0	0	0
All communities	**0.0 %**	**0.0 %**	**0.0 %**	**0.0 %**	**0.0 %**	**0.0**	**0.0**	**0.0**	**0.0 %**	**0.0**	**0.0**	**0**	**0.0 %**	**0**	**0**	**0**

Source ADF&G Division of Subsistence household surveys, 2005.

a. Low harvest estimate is based on reported harvest, if greater than calculated lower limit.

Table 7.–Participation in the harvest and use of gray wolf, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

	Percentage of households					Estimated harvest levels						Estimated hunter information				
						Number of gray wolves harvested			95% conf. limit of total harvest			All hunters			Successful hunters	
Community	Using	Attempting harvest	Harvesting	Receiving	Giving away	Total	Per household	Per person	Percentage	Low[a]	High	Number	Percentage of population	Harvest per hunter	Number	Harvest per hunter
Grayling	0.0 %	2.0 %	0.0 %	0.0 %	0.0 %	0.0	0.0	0.0	0.0 %	0.0	0.0	1.0	0.0 %	0.0	0.0	0.0
Anvik	15.2 %	15.2 %	15.2 %	3.0 %	3.0 %	14.2	0.4	0.1	34.8 %	13.0	19.1	6.5	0.1 %	2.2	6.5	2.2
Shageluk	12.8 %	12.8 %	12.8 %	0.0 %	0.0 %	17.0	0.4	0.2	0.0 %	17.0	17.0	7.0	0.1 %	2.4	7.0	2.4
Holy Cross	13.5 %	15.4 %	13.5 %	0.0 %	1.9 %	22.7	0.4	0.1	0.4 %	20.0	31.5	9.1	0.0 %	2.5	7.9	2.9
All communities	**9.8 %**	**10.9 %**	**9.8 %**	**0.6 %**	**1.1 %**	**53.9**	**0.3**	**0.1**	**25.6 %**	**50.0**	**67.6**	**23.6**	**0.0 %**	**2.3**	**21.5**	**2.5**

Source ADF&G Division of Subsistence household surveys, 2005.

a. Low harvest estimate is based on reported harvest, if greater than calculated lower limit.

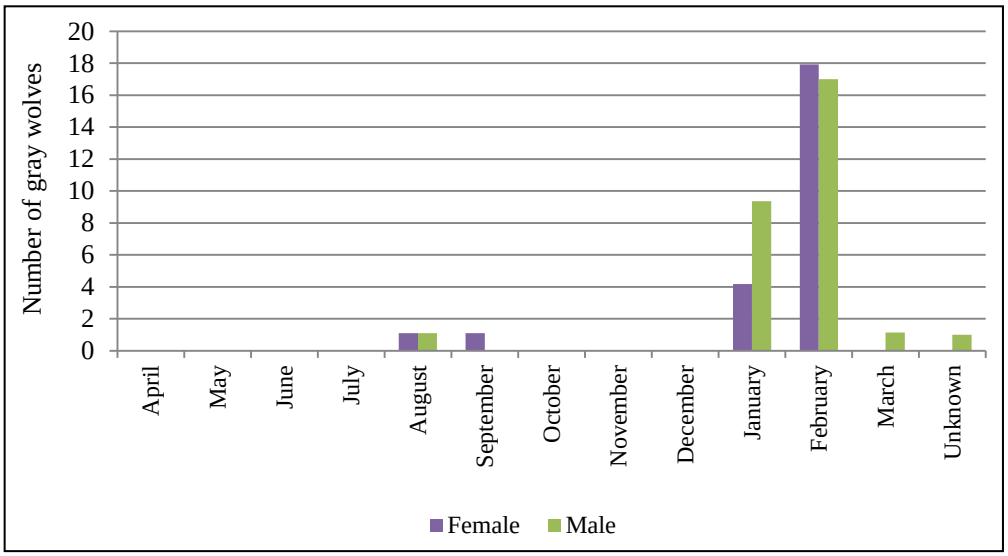


Figure 7.–Estimated gray wolf harvest by sex and month, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

Gray Wolf

Survey data were compiled to measure the levels of gray wolf harvest by hunters and trappers within the 4 survey communities. Households reported taking a total of 54 gray wolves in the area, roughly the same number as the 2003–2004 survey year (Table 7). According to the surveys, 7 hunters in Anvik, 7 hunters in Shageluk, and 8 hunters in Holy Cross reported shooting or trapping gray wolves. No hunters in Grayling reported harvesting any gray wolves. The percentage of household use of gray wolf in individual communities ranged from 0% in Grayling to 15% in Anvik. A few Anvik and Holy Cross households reported giving away gray wolf to other households, but only households in Anvik reported receiving gray wolf. This information may indicate that the species is sold or shared with communities or individuals outside the survey area.

Gray wolf harvests consisted of 30 males (55%) and 24 females (45%) (Figure 7; Table C8). Hunters and trappers reported taking the majority of the total gray wolf harvest (90%) in January and February, likely reflecting primary trapping months.

The locations of gray wolf harvests for each community are summarized by GMU, subunit, and UCU in Table C9. The 54 wolves harvested were taken in subunit GMU 21E, GMU 18Z, and GMU 19A. The 4 communities utilized a total of 8 UCUs, with harvest areas for each community ranging from 6 UCUs in Holy Cross to 1 UCU in Shageluk. With some exception of Holy Cross hunters, most area hunters trapped or shot gray wolves in the same UCUs where they reported moose harvests. Hunters are likely to find gray wolves where they find moose because of the predator/prey relationship; trappers may also maintain trap-lines in these same areas for this reason. Harvest areas may also reflect traditional or family hunting territories.

Finally, gray wolf harvests appear to have increased slightly between the three survey years. Each tribal council maintains an incentive program designed to encourage and support community-level trapping and harvest of gray wolves as an informal predator control program and economic supplement to many community households.

SURVEY COMMENTS

In addition to recording harvests and effort data, the survey form included space for respondents to submit comments on any issues relating to hunting or wildlife resources in their area. Comments were received from 53 households, roughly a third of the 174 households surveyed. No comments were received from Anvik or Grayling residents. Comments fell into 7 general categories: predator issues (11 comments), hunting competition (21 comments—a dramatic increase from the 4 comments on the previous year's survey), assessments of game populations (11 comments), regulatory suggestions (4 comments), comments regarding increased effort in hunting moose (4 comments), sharing of moose meat (3 comments), environmental observations (9 comments), and miscellaneous (4 comments). Many comments dealt with multiple issues and are included in more than 1 category. Among those comments on predators, 10 were specifically directed at bears, and 6 mentioned wolves. Among those comments on hunting competition, concerns were specifically voiced toward "outside," "white," "nonlocal," and "trophy" hunters. All environmental observations included comments on the low water that has characterized hunting in the GASH area since the fall of 2004. In past surveys and in this year's survey, comments have suggested high levels of sharing between households. High levels of sharing are characteristic of subsistence economies, but might also indicate an increased need to share meat between families if households are not able to meet their needs. Verbatim comments are listed by community in Appendix B.

DISCUSSION

Comparison of Community Harvests to Earlier Surveys

The final reports for the first 2 big game survey years in the GASH area (2002–2003 and 2003–2004) compared those harvest surveys to earlier survey work in the area (see Brown and Koster 2005 and Brown et al. 2004 for detailed comparisons). For the purposes of this report, a summary of these earlier data is provided here alongside summarized results of all 3 survey years in order to provide an overview of all available data. As noted, this was the third and final year of data collection in the GASH communities of Grayling, Anvik, Shageluk, and Holy Cross. The collection of multiple years of harvest data with a consistent methodology allows the examination of interannual variability in harvests and harvest patterns. Table 8 compares the results of all three survey years (2002–2005).

Two primary studies since the mid-1980s have traced big game harvest and use in the GASH area: the Division of Subsistence 1983–1984 preliminary survey and Wheeler's USFWS-Tanana Chiefs Conference Study (1992).

Table 8.–Estimated harvests of moose, caribou, black bear, brown bear, and gray wolf, Grayling, Anvik, Shageluk, and Holy Cross, 2002–2005.

	Resource														
	Moose			Caribou			Black bear			Brown bear			Gray wolf		
Community	2002–2003	2003–2004	2004–2005	2002–2003	2003–2004	2004–2005	2002–2003	2003–2004	2004–2005	2002–2003	2003–2004	2004–2005	2002–2003	2003–2004	2004–2005
Grayling	33	36	28	0	2	2	9	4	2	0	1	0	15	7	0
Anvik	21	16	24	0	0	0	0	0	1	0	0	0	14	9	14
Shageluk	31	28	16	0	0	0	0	1	0	0	0	0	0	13	17
Holy Cross	48	38	26	2	0	0	0	0	0	0	0	0	10	23	23
All communities	**133**	**118**	**94**	**2**	**2**	**2**	**9**	**5**	**3**	**0**	**1**	**0**	**39**	**52**	**54**

Source Brown et al. 2004, Brown and Koster 2005, ADF&G Division of Subsistence household surveys, 2005.

Between November 1983 and January 1984, and again in December 1984, Division of Subsistence staff initiated research on the resource use areas and seasonal rounds for Shageluk, Holy Cross, Anvik, and Grayling (Stokes 1984). According to that preliminary study, residents of Shageluk and Holy Cross cited moose as the most significant large game resource harvested. This research employed ethnographic methods of key-respondent interviews and mapping sessions, but it did not contain a harvest survey; thus no harvest estimates resulted from this work. However, the study did produce detailed descriptions of use areas for big game by residents of each community, and it also tracked gray wolf trapping efforts. These observations may be compared to those of the present study to confirm the continued use of customary and traditional hunting areas.

Wheeler (1992) confirmed that residents of the GASH area rely heavily on fish and game resources, specifically salmon, moose, and black bear, for their dietary needs. In terms of harvest timing, Wheeler's 1990–1991 baseline research found that residents of the GASH region hunted in both fall and winter to provide meat for their communities, with the majority of harvest occurring in the fall. The 1991 winter hunt was a significant opportunity for community residents to obtain meat during the slim winter months; the hunt yielded approximately one-third of the total annual harvest.

A comparison between the 1990 study and the first survey year of this project (2002–2003) shows marked declines in annual harvests of all big game species. Table 9 compares the 1990–1991 and 2002–2003 survey years, showing moose, caribou, black bear, and brown bear harvests.

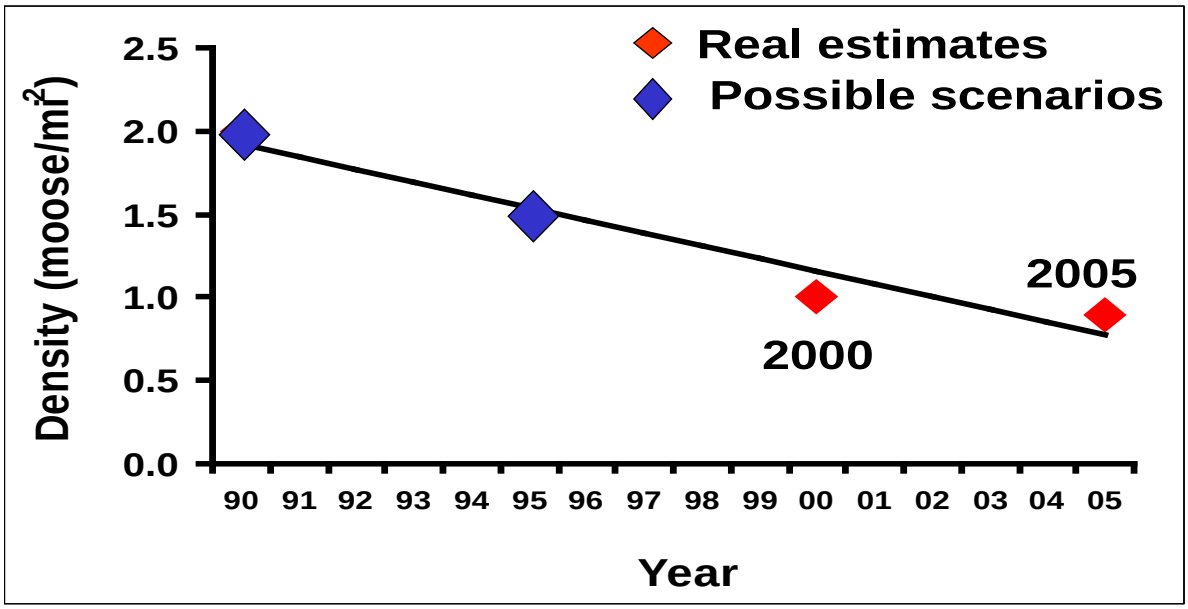
Decreasing moose harvests might also indicate a decline in the moose population; many local residents have expressed concern about seeing fewer moose in the area over the last 10 years. However, based on surveys conducted by ADF&G Division of Wildlife Conservation, there has not been a measurable decline in the moose population estimates (Lenart 2005). According to the area biologist, 1 possible explanation is that moose distribution in the area has changed in the past decade. Another possible explanation is that a decline may have originated during the 1990s (when harvest estimates were also much higher), but have slowed down since 2000. Other moose populations in the Interior declined during the 1990s, and the timing of such a decline would be consistent with other local observations, such as an increase in bears and wolves. The figure below was presented to the Yukon-Innoko Moose Management Working Group for use in their discussions about future regulatory action in the area (Figure 8). However, this figure does not indicate a trend in the population. According to ADF&G Division of Wildlife Conservation moose population surveys in 2000 and 2005, the moose population in GMU 21E is relatively stable (Peirce 2006). Figure 8 suggests one possible scenario for understanding moose populations over a longer period of time, taking into account both biological survey data and local knowledge.

As discussed earlier, per capita harvest rates help to measure harvest rates by community while accounting for fluctuations in community population. Although ADF&G Community Subsistence Information System does not include per capita rates of individual moose harvested (only pounds per capita), per capita rates

Table 9.–Estimated harvests of moose, caribou, black bear and brown bear, Grayling, Anvik, Shageluk, and Holy Cross, 1990–1991 and 2002–2003.

	Resource							
	Moose		Caribou		Black bear		Brown bear	
Community	1990–1991	2002–2003	1990–1991	2002–2003	1990–1991	2002–2003	1990–1991	2002–2003
Grayling	76	33	1	0	9	9	1	0
Anvik	45	21	9	0	8	0	3	0
Shageluk	20	31	0	0	0	0	0	0
Holy Cross	111	48	4	2	26	0	0	0
All communities	**252**	**133**	**14**	**2**	**43**	**9**	**4**	**0**

Source Brown et al. 2004, Wheeler 1992.



Source Toby Boudreau, Yukon-Innoko Moose Management Working Group meeting, Shageluk, April 2005.

Figure 8.–Possible scenario for understanding moose populations in GMU 21E, 1990–2005.

can be calculated by dividing the number of moose harvested for a community by the population of the community for that survey. According to this calculation, Grayling residents harvested 0.37 moose per person in 1990 (Table 10). Anvik residents harvested 0.46 moose per person; Shageluk residents harvested 0.16 moose per person, and Holy Cross residents harvested 0.40 moose per person. By comparison, the 2002–2003 survey reported lower per capita rates for Grayling, Anvik, and Holy Cross (0.19, 0.23, and 0.27 moose per person, respectively); Shageluk was the only community reporting higher per capita rates (0.25 moose per person). Since that first survey year, moose harvest estimates have continued to decline, driving per capita rates for moose down as well. Using the same calculations, the regional averages show similar declines, ranging from 0.35 moose per person in 1990 to 0.24 in 2002 and down again to 0.16 in 2004–2005. It is important to understand these estimates and comparisons especially within the context of contemporary concerns of the local residents.

The significant decline in moose harvest is likely partially related to a declining area moose population; however, there are likely additional reasons for the declining harvest. Local residents have expressed concern about an increase in competition with other hunters. Additionally, changing weather patterns may prohibit hunting in traditional areas because of low water and warmer temperatures late into the fall.

Regulatory Context

Beginning in January 2005, ADF&G facilitated the Yukon-Innoko Moose Management Working Group in order to actively involve local communities and stakeholders in defining appropriate management of moose populations and regulation of hunting activity in GMU 21E. The Working Group consisted of individuals representing the main user groups who harvest moose in GMU 21E, including community residents, the federal Western Interior (WIRAC) and Yukon-Kuskokwim regional advisory councils (YKRAC), hunting guides and transporters, several members of the local GASH Fish and Game Advisory Committee, nonlocal resident hunters, and a representative of the Lower Yukon Advisory Committee. The Working Group was advised by ADF&G Divisions of Wildlife Conservation and Subsistence staff, as well as federal representatives from the U.S. Fish and Wildlife Service Office of Subsistence Management, the Bureau of Land Management, and the Innoko National Wildlife Refuge. Tanana Chiefs Conference and the Association of Village Council Presidents also participated as time allowed. These individuals

Table 10.–Estimated per capita moose harvests, Grayling, Anvik, Shageluk, and Holy Cross, 1990 and 2002–2005.

	Per capita rates			
Community	1990–1991	2002–2003	2003–2004	2004–2005
Grayling	0.37	0.19	0.2	0.21
Anvik	0.46	0.19	0.15	0.16
Shageluk	0.16	0.25	0.21	0.14
Holy Cross	0.4	0.26	0.18	0.14

Source Brown et al. 2004, Brown and Koster 2005, Wheeler 1992, ADF&G Division of Subsistence household surveys, 2005.

gathered to discuss the biological and harvest concerns regarding moose in GMU 21E in order to develop recommendations to the Board of Game and Federal Subsistence Board. Members raised concerns about a lack of local control, an increase in nonlocal hunters, and increased hunting pressure in surrounding areas provide less subsistence opportunities, increased predator populations of bears and wolves, and a potentially declining moose population.

As part of this effort, the group discussed regulatory actions in place that affect the harvest of moose in GMU 21E. The 2002–2003 harvest survey report outlined the primary regulatory concerns for 21E including: (1) the moose hunting moratorium in GMU 18; (2) the proposal to the Federal Subsistence program to add 38 GMU 18 communities to the customary and traditional use determination for moose in GMU 21E, a move strongly opposed by the WIRAC, which represents the GASH area; and (3) the closure of nonresident moose hunting in GMU 19A as a result of the regulatory actions recommended by the Central Kuskokwim Moose Working Group (see Brown et al. 2004 for a more complete description of these concerns as they apply to moose planning in GMU 21E). A fourth concern was raised during the first and second Working Group meetings[7] about increased regulatory restrictions on moose hunting in the middle Yukon-Koyukuk region and other areas that may be redirecting nonlocal hunters to the GASH area.

To produce the Yukon-Innoko Moose Management Plan, the Working Group met 4 times, once in each community to maximize local participation. As a result, the Working Group submitted several proposals to the Board of Game for consideration at its March 2006 meeting in Fairbanks. These proposals outlined several priorities for the Working Group, including limiting nonresident harvest in GMU 21E and facilitating local efforts towards predator control. Specifically, the Working Group proposed to shorten the nonresident season in GMU 21E by 5 days and make it a drawing hunt (Proposal 90), increase the bag limits for wolves (Proposal 123), allow the pursuit of wolves with snow machines (Proposal 124), and waive the resident tag requirement for brown bear in 21E (Proposal 31). The Board of Game met March 10–20, 2006 to discuss these and other proposals.[8]

This was the third and final year of data collection on big game harvests in the GASH area. This report, along with Brown et al. (2004) and Brown and Koster (2005), provided the full context and data set resulting from this 3 year effort. Several concluding points resulted from the three reports taken together. As stated earlier, multiple years of data collection provide a more accurate account of harvest in an area. A longitudinal study, such as this, allows for better understanding of interannual variation and provides a more realistic perspective on subsistence use patterns than single data points.

7. Working Group meetings were conducted in Grayling (January 2005), Shageluk (April 2005), Anvik (July 2005), and Holy Cross (November 2005).

8. The Board of Game carried proposals 90, 123, 124, and 31 in support of the Working Group.

Household surveys continue to be necessary in light of the concern that the existing hunter-harvest database[9], the ADF&G statewide database of harvest information, does not accurately capture the entire harvest of a species in an area. The following tables (Tables 11 and 12) show harvest reports captured by the hunter-harvest database, harvest estimates calculated from the household surveys, and the percentage of the household survey captured by the hunter-harvest database for the first 2 survey years of this project.

Although the percentage of the estimated local harvest based on the household survey that was captured by the hunter-harvest database continued to be low, a comparison between the first 2 survey years on this project showed an increase in reporting for the most part. It is difficult to know why reporting improved with only 2 years to compare; however, the Working Group focused their efforts on educating local residents about the importance of reporting harvests. The collection of this harvest information was critical to the planning efforts of the Working Group. Accurate harvest estimates were an integral component of management decisions. Specifically, the Working Group and ADF&G considered estimates of local harvest to understand the larger picture of harvest in the area as a way to formulate appropriate regulation of moose hunting in the area in compliance with the state subsistence law and also with federal management priorities.

9. Winfonet is the ADF&G Division of Wildlife Conservation's intranet website. The site provides a wide variety of tools to allow users to access, update, and download different kinds of data, including moose harvest data.

Table 11.–Comparison of moose harvest estimates from household surveys to reported moose harvests from ADF&G hunter-harvest database, Grayling, Anvik, Shageluk, and Holy Cross, 2002–2003.

Community	Moose harvest: Household survey estimate	Moose harvest: Hunter-harvest database	Percentage of estimated harvest from household surveys captured in hunter-harvest database
Grayling	33	8	25%
Anvik	21	14	66%
Shageluk	31	2	7%
Holy Cross	48	18	37%

Source Winfonet, Brown et al 2004.

Table 12.–Comparison of moose harvest estimates from household surveys to reported moose harvests from ADF&G hunter-harvest database, Grayling, Anvik, Shageluk, and Holy Cross, 2003–2004.

Community	Moose harvest: Household survey estimate	Moose harvest: Hunter-harvest database	Percentage of estimated harvest from household surveys captured in hunter-harvest database
Grayling	36	12	33%
Anvik	16	13	81%
Shageluk	28	0	0%
Holy Cross	38	19	50%

Source Winfonet, Brown et al 2005.

REFERENCES CITED

Andersen, D.B. and C.L. Alexander
1992. *Subsistence hunting patterns and compliance with moose harvest reporting requirements in rural Interior Alaska.* Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 215. http://www.adfg.alaska.gov/techpap/tp215.pdf

Andersen, D.B., C. Brown, R. Walker, and G. Jennings
2004. *The 2001–2002 harvest of moose, caribou, and bear in middle Yukon and Koyukuk river communities.* Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 278.

Andersen, D.B., C.J. Utermohle, and G. Jennings
2001. *The 1999–2000 harvest of moose, caribou, and bear in ten middle Yukon and Koyukuk river communities.* Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 262: Juneau. http://www.adfg.alaska.gov/techpap/tp262.pdf

Brown, C. and D. Koster
2005. *The 2003–2004 harvest of moose, caribou, bear and wolves in the lower–middle Yukon River communities of Grayling, Anvik, Shageluk, and Holy Cross.* Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 298.

Brown, C.L., R. Walker, and S.B. Vanek
2004. *The 2002–2003 harvest of moose, caribou, and bear in middle Yukon and Koyukuk river communities*. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 280.

Brown, C.L., R.J. Walker, and S.B. Vanek
2004. *The 2002–2003 harvest of moose, caribou, bear and wolves in the lower–middle Yukon River communities of Grayling, Anvik, Shageluk, and Holy Cross.* Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 281.

Lenart, B.
2005. *Results of the winter 2005 Unit 21E moose population estimation survey*, Issue 2. Yukon-Innoko Moose Planning News, pages 2–3.

Peirce, J.M.
2006. "*Units 21A and 21E moose.*" [in] P. Harper, editor *Moose management report of survey and inventory activities 1 July 2003–30 June 2005*. Alaska Department of Fish and Game. Project 1.0: Juneau.

Stokes, J.
1984. *Memorandum to Elizabeth Andrews on Shageluk and Holy Cross resource use mapping*.

Wheeler, P., Tanana Chiefs Conference, Inc., and U.S. Fish and Wildlife Service
1992. *Subsistence Economics and the Use of Fish and Game Resources in Grayling, Anvik, Shageluk and Holy Cross*. Tanana Chiefs Conference, Inc.: Fairbanks.

APPENDIX A: SURVEY INSTRUMENT

2004 - 2005 G.A.S.H. LARGE MAMMAL SURVEY

HOW MANY PEOPLE LIVED IN THE HOUSEHOLD THIS PAST YEAR? _____

ARE ANY MEMBERS OF THIS HOUSEHOLD ALASKA NATIVE? **YES** **NO**

Interviewer's initials _____

COMMUNITY _____

HOUSEHOLD ID NUMBER _____

DATE _____

MOOSE

1 DID MEMBERS OF YOUR HOUSEHOLD USE OR HUNT MOOSE THIS PAST YEAR (BETWEEN APRIL 2004 AND MARCH 2005)? **YES** **NO**

IF YES, PLEASE COMPLETE THE FOLLOWING SECTIONS.

2 DURING THIS PAST YEAR, DID MEMBERS OF YOUR HOUSEHOLD:

USE Moose? **YES** **NO** HUNT Moose? **YES** **NO** HARVEST Moose? **YES** **NO** RECEIVE Moose? **YES** **NO** GIVE Moose? **YES** **NO**

3 HOW MANY MEMBERS OF THIS HOUSEHOLD HUNTED MOOSE IN THE LAST 12 MONTHS?_____

4 HOW MANY DAYS DID EACH HUNTER SPEND HUNTING MOOSE IN THE LAST 12 MONTHS? **#1_____days #2_____days #3_____days #4_____days #5_____days**

5 HOW MANY MOOSE WERE HARVESTED LAST YEAR BY MEMBERS OF THIS HOUSEHOLD?_____ **(Include any potlatch moose taken by this household)**

MOOSE			2004											2005		
M	LOCATION (UCU)	S or F	M or F	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	UNK
1																
2																
3																
4																
5																

WOLVES

1 DID MEMBERS OF YOUR HOUSEHOLD SHOOT OR TRAP WOLVES THIS PAST YEAR (BETWEEN APRIL 2004 AND MARCH 2005?) **YES** **NO**

IF YES, PLEASE COMPLETE THE FOLLOWING SECTIONS.

2 DURING THIS PAST YEAR, DID MEMBERS OF YOUR HOUSEHOLD: USE Wolves? **YES** **NO** GIVE Wolves? **YES** **NO** RECEIVE Wolves? **YES** **NO**

3 HOW MANY MEMBERS OF THIS HOUSEHOLD TRAPPED OR SHOT WOLVES IN THE LAST 12 MONTHS? _____

4 HOW MANY WOLVES WERE HARVESTED LAST YEAR BY MEMBERS OF THIS HOUSEHOLD? _____

WOLVES

W	LOCATION (UCU)	S or F	M or F	Month	Shoot?	Trap?
1						
2						
3						
4						
5						
6						
7						

WOLVES

W	LOCATION (UCU)	S or F	M or F	Month	Shoot?	Trap?
8						
9						
10						
11						
12						
13						
14						

CARIBOU

1 DID MEMBERS OF YOUR HOUSEHOLD USE OR HUNT CARIBOU THIS PAST YEAR (BETWEEN APRIL 2004 AND MARCH 2005?) **YES NO**

IF YES, PLEASE COMPLETE THE FOLLOWING SECTIONS.

2 DURING THIS PAST YEAR, DID MEMBERS OF YOUR HOUSEHOLD:

USE Caribou? **YES NO** HUNT Caribou? **YES NO** HARVEST Caribou? **YES NO** RECEIVE Caribou? **YES NO** GIVE Caribou? **YES NO**

3 HOW MANY MEMBERS OF THIS HOUSEHOLD HUNTED CARIBOU IN THE LAST 12 MONTHS?_____

4 HOW MANY CARIBOU WERE HARVESTED LAST YEAR BY MEMBERS OF THIS HOUSEHOLD? _____

CARIBOU				2004									2005			
C	LOCATION (UCU)	S or F	M or F	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	UNK
1																
2																
3																
4																
5																

BLACK BEAR

1 DID MEMBERS OF YOUR HOUSEHOLD USE OR HUNT BLACK BEAR THIS PAST YEAR (BETWEEN APRIL 2004 AND MARCH 2005)? **YES NO**

IF YES, PLEASE COMPLETE THE FOLLOWING SECTIONS.

2 DURING THIS PAST YEAR, DID MEMBERS OF YOUR HOUSEHOLD:

USE Black Bear? **YES NO** HUNT Black Bear? **YES NO** HARVEST Black Bear? **YES NO** RECEIVE Black Bear? **YES NO** GIVE Black Bear? **YES NO**

3 HOW MANY MEMBERS OF THIS HOUSEHOLD HUNTED BLACK BEAR IN THE LAST 12 MONTHS?_____

4 HOW MANY BLACK BEAR WERE HARVESTED LAST YEAR BY MEMBERS OF THIS HOUSEHOLD?_____

5 WHAT PARTS OF THE BEAR DID YOU USE? Hide _____ Meat _____ Fat _____

BLACK BEAR				2004									2005			
BL	LOCATION (UCU)	S o r F	M or F	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	UNK
1																
2																
3																

BROWN BEAR **YES NO**

1 DID MEMBERS OF YOUR HOUSEHOLD USE OR HUNT BROWN BEAR THIS PAST YEAR (BETWEEN APRIL 2004 AND MARCH 2005)?

IF YES, PLEASE COMPLETE THE FOLLOWING SECTIONS.

2 DURING THIS PAST YEAR, DID MEMBERS OF YOUR HOUSEHOLD:

USE Brown Bear? **YES NO** HUNT Brown Bear? **YES NO** HARVEST Brown Bear? **YES NO** RECEIVE Brown Bear? **YES NO** GIVE Brown Bear? **YES NO**

3 HOW MANY BROWN BEAR WERE HARVESTED LAST YEAR BY MEMBERS OF THIS HOUSEHOLD?_____

4 WHAT, IF ANY, PARTS OF THE BEAR DID YOU USE? Hide _____ Meat _____ Fat _____

BROWN BEAR				2004									2005			
BR	LOCATION (UCU)	S or F	M or F	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	UNK
1																
2																

APPENDIX B: LOCAL COMMENTS AND CONCERNS

Appendix B.–Comments from surveyed households.

Community	Comments
Anvik	*No comments provided*
Grayling	*No comments provided*
Holy Cross	
	Need to kill more bears, need a market for bear parts.
	Need more moose in the area, freeze and belly.
	Water was too low.
	Moose are harder to get, because of low water. Seen quite a few brown bears too many wolves around.
	Too many outside hunters, not enough moose to go around the villages, can't live off the store, too expensive.
	Long, long time ago there was lots of moose. During my intervillage travels, I have never seen a moose. Need to get rid of predators, brown and black bears and wolves.
	Too low water, didn't see any bull moose.
	Kill moose in fall, fill our freezer.
	Not enough moose. Too many nonlocal hunters in area. Too many brown bears. Too many wolves.
	Seen too many nonlocal hunters in the area. Nonlocal hunters are already camping and hunting on local hunters camping grounds. Local people don't have a job and could only afford one hunt. Don't have the chance for another hunt.
	Too many wolves and bears.
	Shorten seasons and open it earlier. Nonlocal hunters are taking the moose and not using the meat.
	Too many outside hunters are coming in and they should provide more info on what they do with their meat. They should take surveys on when they get their license, on their background, hunting experience.
	Moderate year for moose, not enough moose.
	Not enough moose in the area, slowly diminishing.
	Need moose meat.
	Water too low, walked to searching for moose and packing. Stayed out too long, got sick. Tell Eskimos to hunt in their own country since there is more moose down there.
	Water was too low, lot of work to hunt moose, but sure good to put moose meat on the table.
	Low water, no moose, too many hunters.
	Sure tough, no moose, see more black bears than moose.
	Brown bears are killing all the moose, too many brown bears and wolves in our area (21E).
	Low water kept me from accessing Innoko River, had to go around by Holy Cross. 5 hunters saw only 5 bulls, and took 2 in 8 days. Boat #1=1200 miles, boat #2=900 miles. Very bad hunting.

-continued-

Appendix B.–Page 2 of 2.

Community	Comments
Holy Cross, continued	
	More open seasons to hunt moose; people run out of moose too early.
	Not enough moose in the area. Too many problems to correct the moose problems in our area. Start shooting black and brown bears, no respect for animals that's why they're all leaving.
	No moose, too many nonlocal hunters too many boats.
	Why do trophy hunters take only antlers and no meat. Villagers do not trophy hunt, we use the meat, don't waste meat like trophy hunters.
	We got to have moose meat, nothing this year can't live off the store, lucky people give us meat.
	Water was too low, saw hardly any bulls.
	Didn't go hunting.
	Everything is drying up that's why there is lots of brown bears, nothing to eat. Vegetation is all drying up, hundred years ago used to be lots of berries and game.
	Wants to know about brown bear tags, bears are all around his cabin.
	Lots of nonlocal hunters the past years where there used to be only local, outside hunters have taken over. Local hunters should have priority and nonlocal hunters season should be shortened.
	Not easy to get a moose, family members give me moose.
	Not enough moose meat, store is too high got to eat fish when no meat.
	No moose in the country, no moose at all, see only tracks, moose might be in the timber.
	Looking forward to fall hunt, hopefully water is not too low.
	Hard to get a moose, had to do lots of walking.
	Never see no moose in the area. Hardly any gas to hunt, no money. Too many hunters from out of the local area.
	Water was really low.
Shageluk	
	Too many outside hunters.
	Too much white hunters.
	Too many white hunters come to hunt in our river.
	Too much white hunters and wolves.
	Too much outside hunters.
	Too many white hunters making longer and more expensive to hunt because of raising gas prices.
	Too much white hunters.
	Too much white hunters come and hunt on our river each fall and we can't do anything about it.
	Too many outside hunters going up and down the river making it hard to hunt.

Source ADF&G Division of Subsistence household surveys, 2005.

APPENDIX C: ADDITIONAL TABLES

Table C1.– Estimated moose harvest by sex and month, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

		Month													
Community	Sex	April	May	June	July	August	September	October	November	December	January	February	March	Unknown	Total
Grayling	Female	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.0	2.0	0.0	0.0	5.0
	Male	1.0	0.0	0.0	0.0	0.0	22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**1.0**	**0.0**	**0.0**	**0.0**	**0.0**	**24.0**	**0.0**	**0.0**	**1.0**	**0.0**	**2.0**	**0.0**	**0.0**	**28.0**
Anvik	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Male	0.0	0.0	0.0	0.0	0.0	21.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.8
	Unknown	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.2
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**22.9**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.1**	**24.0**
Shageluk	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0	0.0	3.0
	Male	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**13.0**	**0.0**	**0.0**	**0.0**	**1.0**	**2.0**	**0.0**	**0.0**	**16.0**
Holy Cross	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Male	0.0	0.0	0.0	0.0	1.1	23.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0
	Unknown	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
	All	**0.0**	**0.0**	**0.0**	**0.0**	**1.1**	**25.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**26.1**
All communities	Female	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	1.0	4.0	0.0	0.0	8.0
	Male	1.0	0.0	0.0	0.0	1.1	80.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	82.8
	Unknown	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	1.1	3.3
	All	**1.0**	**0.0**	**0.0**	**0.0**	**1.1**	**84.9**	**0.0**	**0.0**	**1.0**	**1.0**	**4.0**	**0.0**	**1.1**	**94.1**

Source ADF&G Division of Subsistence household survey, 2005.

Table C2.– Estimated moose harvest by Game Management Unit (GMU) and Uniform Coding Unit, 2004–2005.

	Community					
Polygon	Grayling	Anvik	Shageluk	Holy Cross	Total	Percentage of total
21A 0101	1.0	0.0	0.0	0.0	1.0	1.1%
21A 0201	1.0	0.0	0.0	0.0	1.0	1.1%
Subtotal GMU 21A	**2.0**	**0.0**	**0.0**	**0.0**	**2.0**	**2.1%**
21D 0201	1.0	0.0	0.0	0.0	1.0	1.1%
Subtotal GMU 21D	**1.0**	**0.0**	**0.0**	**0.0**	**1.0**	**1.1%**
21E 0201	0.0	0.0	0.0	5.7	5.7	6.0%
21E 0202	1.0	6.5	0.0	6.8	14.4	15.3%
21E 0203	5.0	0.0	0.0	0.0	5.0	5.3%
21E 0301	0.0	0.0	0.0	2.3	2.3	2.4%
21E 0501	17.0	0.0	16.0	9.1	42.1	44.7%
21E 0701	0.0	0.0	0.0	2.3	2.3	2.4%
21E 0801	2.0	14.2	0.0	0.0	16.2	17.2%
21E 0901	0.0	3.3	0.0	0.0	3.3	3.5%
Subtotal GMU 21E	**25.0**	**24.0**	**16.0**	**26.1**	**91.1**	**96.8%**
Total GMU 21	**28.0**	**24.0**	**16.0**	**26.1**	**94.1**	**100.0%**
All polygons	**28.0**	**24.0**	**16.0**	**26.1**	**94.1**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2005.

Table C3.– Estimated moose harvest by Game Management Unit (GMU) and Uniform Coding Unit on state and federal lands, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

	Community																					
	Grayling							Anvik							Shageluk							
	Total	State		Federal		Unknown		Total	State		Federal		Unknown		Total	State		Federal		Unknown		
Polygon	number	Number	Percentage	Number	Percentage	Number	Percentage	number	Number	Percentage	Number	Percentage	Number	Percentage	number	Number	Percentage	Number	Percentage	Number	Percentage	
21A 0101	1.0	1.0	100.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	
21A 0201	1.0	0.0	0.0%	1.0	100.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	
Subtotal GMU 21A	**2.0**	**1.0**	**50.0%**	**1.0**	**50.0%**	**0.0**	**0.0%**	**0.0**	**0.0**	**0.0%**	**0.0**	**0.0%**	**0.0**	**0.0%**	**0.0**	**0.0**	**0.0%**	**0.0**	**0.0%**	**0.0**	**0.0%**	
21D 0201	1.0	0.0	0.0%	1.0	100.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	
Subtotal GMU 21D	**1.0**	**0.0**	**0.0%**	**1.0**	**100.0%**	**0.0**	**0.0%**	**0.0**	**0.0**	**0.0%**	**0.0**	**0.0%**	**0.0**	**0.0%**	**0.0**	**0.0**	**0.0%**	**0.0**	**0.0%**	**0.0**	**0.0%**	
21E 0201	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	
21E 0202	1.0	1.0	100.0%	0.0	0.0%	0.0	0.0%	6.5	5.5	83.3%	0.0	0.0%	1.1	16.7%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	
21E 0203	5.0	4.0	80.0%	1.0	20.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	
21E 0301	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	
21E 0501	17.0	9.0	52.9%	8.0	47.1%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	16.0	16.0	100.0%	0.0	0.0%	0.0	0.0%	
21E 0701	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	
21E 0801	2.0	2.0	100.0%	0.0	0.0%	0.0	0.0%	14.2	13.1	92.3%	0.0	0.0%	1.1	7.7%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	
21E 0901	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	3.3	3.3	100.0%	0.0	0.0%	0.0	0.0%	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	
Subtotal GMU 21E	**25.0**	**16.0**	**64.0%**	**9.0**	**36.0%**	**0.0**	**0.0%**	**24.0**	**21.8**	**90.9%**	**0.0**	**0.0%**	**2.2**	**9.1%**	**16.0**	**16.0**	**100.0%**	**0.0**	**0.0%**	**0.0**	**0.0%**	
Total GMU 21	**28.0**	**17.0**	**60.7%**	**11.0**	**39.3%**	**0.0**	**0.0%**	**24.0**	**21.8**	**90.9%**	**0.0**	**0.0%**	**2.2**	**9.1%**	**16.0**	**16.0**	**100.0%**	**0.0**	**0.0%**	**0.0**	**0.0%**	
All polygons	**28.0**	**17.0**	**60.7%**	**11.0**	**39.3%**	**0.0**	**0.0%**	**24.0**	**21.8**	**90.9%**	**0.0**	**0.0%**	**2.2**	**9.1%**	**16.0**	**16.0**	**100.0%**	**0.0**	**0.0%**	**0.0**	**0.0%**	

-continued-

Table C-3, continued.

	Community													
	Holy Cross							All communities						
	Total	State		Federal		Unknown		Total	State		Federal		Unknown	
Polygon	number	Number	Percentage	Number	Percentage	Number	Percentage	number	Number	Percentage	Number	Percentage	Number	Percentage
21A 0101	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.0	1.0	100.0%	0.0	0.0%	0.0	0.0%
21A 0201	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.0	0.0	0.0%	1.0	100.0%	0.0	0.0%
Subtotal GMU 21A	**0.0**	**0.0**	**0.0%**	**0.0**	**0.0%**	**0.0**	**0.0%**	**2.0**	**1.0**	**50.0%**	**1.0**	**50.0%**	**0.0**	**0.0%**
21D 0201	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	1.0	0.0	0.0%	1.0	100.0%	0.0	0.0%
Subtotal GMU 21D	**0.0**	**0.0**	**0.0%**	**0.0**	**0.0%**	**0.0**	**0.0%**	**1.0**	**0.0**	**0.0%**	**1.0**	**100.0%**	**0.0**	**0.0%**
21E 0201	5.7	5.7	100.0%	0.0	0.0%	0.0	0.0%	5.7	5.7	100.0%	0.0	0.0%	0.0	0.0%
21E 0202	6.8	4.5	66.7%	2.3	33.3%	0.0	0.0%	14.4	11.0	76.6%	2.3	15.8%	1.1	7.6%
21E 0203	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	5.0	4.0	80.0%	1.0	20.0%	0.0	0.0%
21E 0301	2.3	2.3	100.0%	0.0	0.0%	0.0	0.0%	2.3	2.3	100.0%	0.0	0.0%	0.0	0.0%
21E 0501	9.1	4.5	50.0%	4.5	50.0%	0.0	0.0%	42.1	29.5	70.2%	12.5	29.8%	0.0	0.0%
21E 0701	2.3	0.0	0.0%	2.3	100.0%	0.0	0.0%	2.3	0.0	0.0%	2.3	100.0%	0.0	0.0%
21E 0801	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	16.2	15.1	93.3%	0.0	0.0%	1.1	6.7%
21E 0901	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	3.3	3.3	100.0%	0.0	0.0%	0.0	0.0%
Subtotal GMU 21E	**26.1**	**17.0**	**65.2%**	**9.1**	**34.8%**	**0.0**	**0.0%**	**91.1**	**70.8**	**77.8%**	**18.1**	**19.8%**	**2.2**	**2.4%**
Total GMU 21	**26.1**	**17.0**	**65.2%**	**9.1**	**34.8%**	**0.0**	**0.0%**	**94.1**	**71.8**	**76.3%**	**20.1**	**21.3%**	**2.2**	**2.3%**
All polygons	**26.1**	**17.0**	**65.2%**	**9.1**	**34.8%**	**0.0**	**0.0%**	**94.1**	**71.8**	**76.3%**	**20.1**	**21.3%**	**2.2**	**2.3%**

Source ADF&G Division of Subsistence household surveys, 2005.

Table C4.– Estimated caribou harvest by sex and month, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

		Month													
Community	Sex	April	May	June	July	August	September	October	November	December	January	February	March	Unknown	Total
Grayling	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.0**	**0.0**	**2.0**
Anvik	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Shageluk	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Holy Cross	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
All communities	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.0**	**0.0**	**2.0**

Source ADF&G Division of Subsistence household surveys, 2005.

Table C5.– Estimated caribou harvest by Game Management Unit (GMU) and Uniform Coding Unit, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

	Community					
Polygon	Grayling	Anvik	Shageluk	Holy Cross	Total	Percentage of total
19A 0101	2.0	0.0	0.0	0.0	2.0	100.0%
Subtotal GMU 19A	**2.0**	**0.0**	**0.0**	**0.0**	**2.0**	**100.0%**
Total GMU 19	**2.0**	**0.0**	**0.0**	**0.0**	**2.0**	**100.0%**
All polygons	**2.0**	**0.0**	**0.0**	**0.0**	**2.0**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2005.

Table C6.– Estimated black bear harvest by sex and month, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

		Month													
Community	Sex	April	May	June	July	August	September	October	November	December	January	February	March	Unknown	Total
Grayling	Female	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	Male	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.0**
Anvik	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Male	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**1.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.1**
Shageluk	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Holy Cross	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
All communities	Female	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	Male	0.0	0.0	1.1	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**1.1**	**0.0**	**0.0**	**2.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**3.1**

Source ADF&G Division of Subsistence household surveys, 2005.

Table C7.– Estimated black bear harvest by Game Management Unit (GMU) and Uniform Coding Unit, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

	Community					
Polygon	Grayling	Anvik	Shageluk	Holy Cross	Total	Percentage of total
21E 0202	0.0	1.1	0.0	0.0	1.1	35.3%
21E 0203	2.0	0.0	0.0	0.0	2.0	64.7%
Subtotal GMU 21E	**2.0**	**1.1**	**0.0**	**0.0**	**3.1**	**100.0%**
Total GMU 21	**2.0**	**1.1**	**0.0**	**0.0**	**3.1**	**100.0%**
All polygons	**2.0**	**1.1**	**0.0**	**0.0**	**3.1**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2005.

Table C8.– Estimated gray wolf harvest by sex and month, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

		Month													
Community	Sex	April	May	June	July	August	September	October	November	December	January	February	March	Unknown	Total
Grayling	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Anvik	Female	0.0	0.0	0.0	0.0	1.1	1.1	0.0	0.0	0.0	2.2	2.2	0.0	0.0	6.5
	Male	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	1.1	5.5	0.0	0.0	7.6
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**2.2**	**1.1**	**0.0**	**0.0**	**0.0**	**3.3**	**7.6**	**0.0**	**3.2**	**17.4**
Shageluk	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	3.0
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	7.0	0.0	1.0	14.0
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**8.0**	**8.0**	**0.0**	**1.0**	**17.0**
Holy Cross	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.8	0.0	0.0	14.8
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	4.5	1.1	0.0	7.9
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.3**	**19.3**	**1.1**	**0.0**	**22.7**
All communities	Female	0.0	0.0	0.0	0.0	1.1	1.1	0.0	0.0	0.0	4.2	17.9	0.0	0.0	24.3
	Male	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	9.4	17.0	1.1	1.0	29.6
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All	**0.0**	**0.0**	**0.0**	**0.0**	**2.2**	**1.1**	**0.0**	**0.0**	**0.0**	**13.5**	**34.9**	**1.1**	**1.0**	**53.9**

Source ADF&G Division of Subsistence household surveys, 2005.

Table C9.– Estimated gray wolf harvest by Game Management Unit (GMU) and Uniform Coding Unit, Grayling, Anvik, Shageluk, and Holy Cross, 2004–2005.

	Community					
Polygon	Grayling	Anvik	Shageluk	Holy Cross	Total	Percentage of total
18Z 1402	0.0	0.0	0.0	2.3	2.3	4.2%
Subtotal GMU 18Z	**0.0**	**0.0**	**0.0**	**2.3**	**2.3**	**4.2%**
GMU 18	**0.0**	**0.0**	**0.0**	**2.3**	**2.3**	**4.2%**
19A 0102	0.0	0.0	0.0	4.5	4.5	8.4%
19A 0103	0.0	0.0	0.0	1.1	1.1	2.1%
Subtotal GMU 19A	**0.0**	**0.0**	**0.0**	**5.7**	**5.7**	**10.5%**
GMU 19	**0.0**	**0.0**	**0.0**	**5.7**	**5.7**	**10.5%**
21E 0201	0.0	0.0	0.0	9.1	9.1	16.8%
21E 0202	0.0	10.9	0.0	3.4	14.3	26.6%
21E 0401	0.0	0.0	0.0	2.3	2.3	4.2%
21E 0501	0.0	0.0	17.0	0.0	17.0	31.6%
21E 0801	0.0	3.3	0.0	0.0	3.3	6.1%
Subtotal GMU 21E	**0.0**	**14.2**	**17.0**	**14.8**	**45.9**	**85.3%**
GMU 21	**0.0**	**14.2**	**17.0**	**14.8**	**45.9**	**85.3%**
All polygons	**0.0**	**14.2**	**17.0**	**22.7**	**53.9**	**100.0%**

Source ADF&G Division of Subsistence household surveys, 2005.