

**The 2003-2004 Harvest of Moose, Caribou, Bear and Wolves  
in the Lower-Middle Yukon River Communities of  
Grayling, Anvik, Shageluk, and Holy Cross**

by

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## ABSTRACT

This report summarizes the harvest and use of moose, caribou, black bear, brown bear, and wolves during the 12-month period from April 2003 through March 2004 in select communities along the lower-middle Yukon River. This was the second year of data collection in the communities of Grayling, Anvik, Shageluk, and Holy Cross. 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 2004, surveys were completed with a total of 180 of 188 households (96%) in the communities of Grayling, Anvik, Shageluk, and Holy Cross. Hunters in these communities took an estimated 118 moose during the study year. An estimated 176 individuals, or one-third of the area population, spent an average of 6 hunter days and a total of 1,041 hunter-days in pursuit of moose. Data from the 2003-2004 survey year are compared with data from 1990-1991 and the first survey year (2002-2003) to provide context and comparison. The report concludes with an updated discussion of the regulatory context of moose hunting and the new moose planning effort in GMU 21E.



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## INTRODUCTION

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 and harvest data serve to document and monitor levels of subsistence use as required under the state subsistence statute. These data are important to and used in federal and state wildlife management. This report documents the harvest and use of moose, caribou, black bear, brown bear, and wolf for the 12-month period between April 2003 and March 2004 by residents of four lower middle Yukon Alaska communities. Surveyed communities for the 2003-2004 survey year included Grayling, Anvik, Shageluk, and Holy Cross. Locations of these communities are shown in Figure 1 in what is referred to as the “GASH” area. This project represents the second year of data collection in this area and relies on methods employed in the previous year, as well as a project that focused on ten communities on the middle Yukon and Koyukuk River region (Andersen et al. 2001, 2004 and Brown et al. 2004).

Earlier studies in Alaska have shown 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). According to Andersen and Alexander, a comparison of harvest reported through harvest tickets to subsistence baseline studies for nine interior Alaskan communities during the regulatory year 1987-1988 confirmed these concerns about the overall success of the harvest ticket system in accurately estimating subsistence harvest in rural Alaska. Among these nine communities, the reported harvest represented a range of 0% to 76% of the harvests recorded in baseline studies conducted within those same communities. On average, the reported harvest represented approximately 28% of the harvest documented in the baseline studies (Andersen and Alexander 1992).

Harvest tickets do not capture the majority of harvests by rural communities for a variety of reasons. According to Andersen and Alexander, while hunters in rural interior Alaska generally accept the need for management, concern was widely expressed that the harvest ticket system is not compatible with local patterns of group hunting and sharing networks that characterize many local subsistence-based communities. Some individuals hunt and harvest

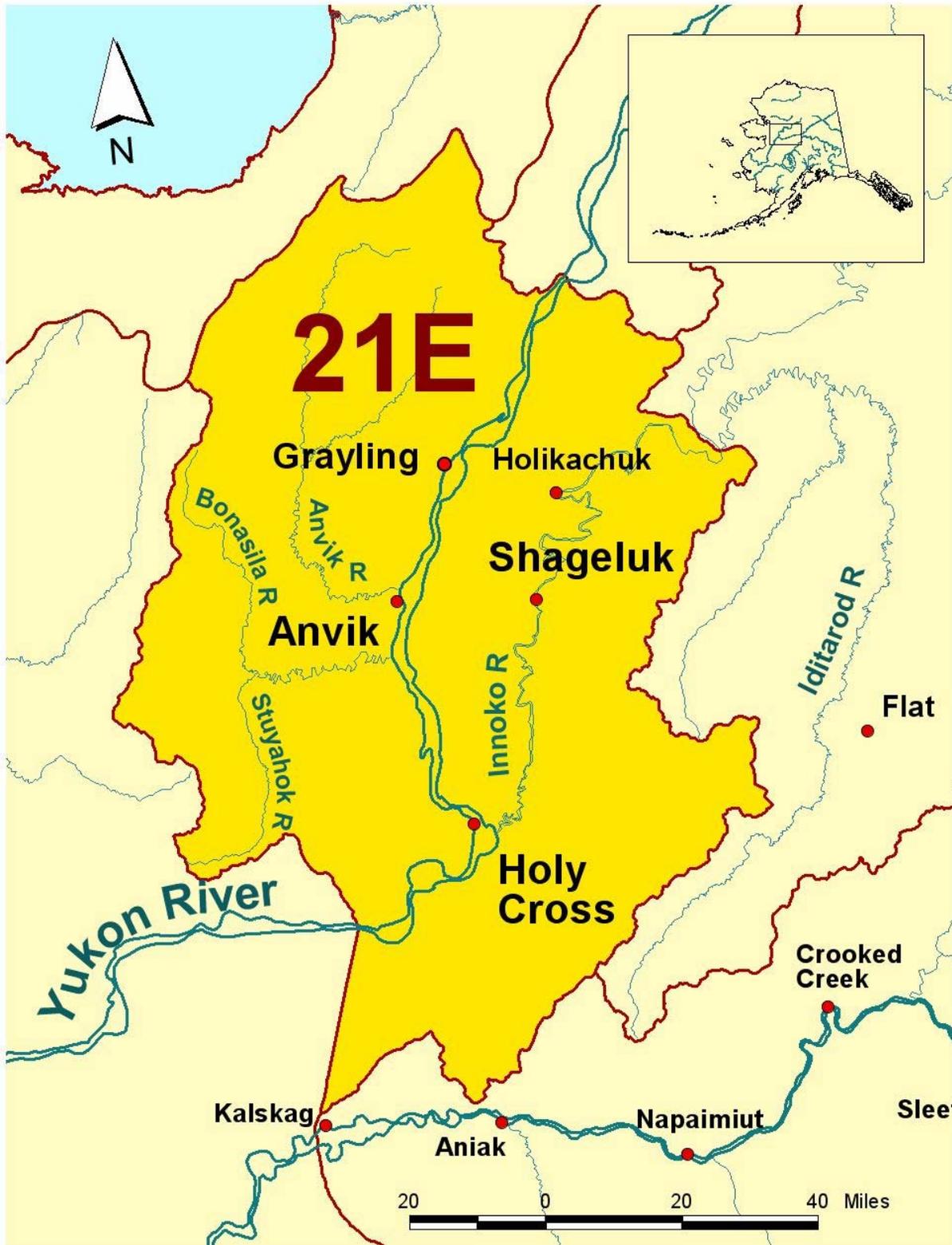
without ever obtaining a license or harvest ticket. Hunting is typically done by groups in which the individuals represent different households, and harvests are shared between these households. Alternatively, one hunter (hunting alone or as part of a group) may be responsible for providing moose meat 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, one 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.

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 'superhousehold' 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 (Andersen and Alexander 1992:17).

For all these reasons, household surveys are likely to provide more accurate harvest reporting than the harvest ticket system for rural Alaska in general and this area in particular. In addition to providing current, accurate information on harvests, these data can be usefully compared to earlier baseline studies to provide some sense of how or if harvest patterns have changed in the past 10 years (Wheeler 1998 and ADF&G Community Profile Database). The only baseline study conducted in the GASH communities was done in 1990-1991, and was funded through USFWS/OSM as one of the first ANILCA 809 agreements.

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

Figure 1. Map of the GASH Region



## 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 the second year of data collection, the Division of Subsistence worked in partnership with the Tanana Chiefs Conference (TCC) subregional office in Holy Cross and individual tribal councils to select a local resident who would conduct the surveys using face-to-face interviews. Research assistants for the 2003-2004 survey year are identified in the Acknowledgements section.

Following community approval for the project, subsistence staff traveled to each village 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. However, since the same research assistants conducted the survey in this second year, subsistence staff traveled to each village for the opportunity to talk with other village residents about their hunting experiences. A two-page survey form was used to collect information from hunters and household heads. A copy of the survey form is included as Appendix A.

Local research assistants compiled current household lists for each community immediately prior to the survey effort. A total of 188 households were identified in the four communities. Surveys were completed with 180 households (96%), a breakdown by community is shown in Table 1. Due to the small size of these communities, only one of which had a population that totaled over 200, a census of all occupied households was chosen as the sampling strategy. The lowest contact rate occurred in Holy Cross, with 54 of 60 (90%) households surveyed and the highest occurred in Grayling and Shageluk, with 100% of the households surveyed (Table 1). Surveys were administered in May and June 2004. 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.

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 logical errors or omissions and resolved any problems with the surveyors. The completed forms were then sent to the Division of Subsistence Information Management section where a double-entry method was used to enter information into a computerized system for data analysis.

**Table 1. Survey Design and Sample Sizes Utilized in the 2003-2004 Harvest Survey.**

Community	Type of Design	Total Number of Households	Household Sample Goal	Number of Surveyed Households	Percent of Households Sampled	Unable to Contact	Declined Survey	Sampled Household Population	Estimated Community Population
Grayling	Census	53	53	53	100.00%	0	0	183	183
Anvik	Census	33	33	31	93.94%	0	2	102	109
Shageluk	Census	42	42	42	100.00%	0	0	135	135
Holy Cross	Census	60	60	54	90.00%	6	0	184	204
<b>All Communities</b>		<b>188</b>		<b>180</b>	<b>95.74%</b>	<b>6</b>	<b>2</b>	<b>604</b>	<b>631</b>

## SURVEY FINDINGS

### Moose

Similar to the previous year's survey, moose was the most widely used big game animal in all four communities. Table 2 shows the levels of participation in the harvest and use of moose. Tables 7, 10, and 13 show these same data for caribou, black bear and wolves. The right side of the table notes estimated hunter information and breaks this data down into *all hunters* and *successful hunters*, a sub-set of all hunters. For example, in the community of Shageluk, there were 41 moose hunters total, or 30% of the population of the community. Of these 41 hunters, 26 were successful and harvested an average of 1.1 moose per hunter. Overall in all four villages, 94% of all households used moose, 66% attempted to harvest moose, and 54% of all households harvested one or more moose (Table 2). The percentage of households using moose ranged from 81% in Anvik to 100% in Grayling. The percentage of households harvesting moose ranged from 45% in Anvik to 59% in Holy Cross. During the study period of

April 2003 – March 2004, hunters harvested an estimated 118 moose in the four survey communities (Table 2). The total moose harvest consisted of 104 bulls (88% of the total harvest) and 14 cows (12% of the total harvest) (Table 3). This pattern of the majority of subsistence harvest being comprised of bull moose is evident in all four communities. The percentage of cows harvested ranged from 0% in Anvik to 25% in Grayling. Essentially, two communities harvested cows – Grayling hunters took nine and Shageluk hunters harvested five cows.

Moose were harvested in the months of August, September, November, and February (Figure 2). Eighty-one (81%) percent of the moose harvest occurred in September, and consisted of all bulls (100%). The late winter hunting season in February accounted for an additional 16 moose (14% of the overall harvest) and over half of those animals (68%) were cows. The majority take of cows occurred in the February hunt (79%), while 2 cows (14% of the cow harvest) were taken in August (Figure 2, Table 3).

The locations of moose harvests for each community were also collected and are summarized by game management unit (GMU), subunit, and uniform coding unit (UCU) in Table 4. Of the 118 moose harvested by the four survey communities, all (100%) were taken in GMU 21 (subunits 21D and 21E). Hunters in the four communities reported harvesting moose in a total of 11 UCUs. Figure 3 is a graphic representation of moose harvest densities for 21E. Communities in 21E reported widely varying hunting patterns for moose. Similar to the last survey year (2002-2003), the community of Shageluk utilized just 1 UCU for moose hunting during the 2003-2004 survey year. In contrast to this very localized hunting pattern, hunters in the community of Holy Cross reported moose harvests in 6 UCUs. In general, 52.6% of all moose harvest came from one UCU, 21E 0501 (see Figure 3).

Finally, the survey also collected data on the land status of reported harvest sites. Respondents were 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, 40% of harvests occurred on federal land while 58% occurred on state lands (the locations of 1.7% or 2 moose harvests were unknown or not identifiable). On an individual level, the communities reported slightly differing patterns, likely due to the particular configuration of federal and state land holdings in the UCUs where they traditionally hunt. For example, Anvik

and Holy Cross residents reported the majority of their harvests on state land (87% and 71%, respectively), while Grayling and Shageluk reported harvest locations split nearly evenly between federal and state land (Table 6).

The survey provided a means of measuring moose hunting effort by asking households to estimate the number of days each hunter in that household spent hunting for moose. These data are presented in Table 5. An estimated 176 individuals, or one-third of the area population, spent a total of 1,041 hunter-days in pursuit of moose. To put this number of hunter-days in perspective, it is equivalent to a period of nearly 3 years, and 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 5.6 hunter days for each moose harvested. Hunters in Shageluk and Grayling reported the lowest number of hunter days per harvested moose with 4.3 and 5.7 hunter days respectively. Successful hunters in Anvik had the highest number of hunter days per harvested moose at 7.1 hunter days. While 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 Shageluk households had the lowest number of hunter days (4.3), utilized just 1 UCU but harvested 28 moose. In comparison, 16 hunters in successful Anvik households from spent an average of 7.1 hunter days per moose harvested, utilizing 3 UCUs to harvest an equivalent number of moose per hunter.

The hunting effort measured in the 2003-2004 survey year decreased significantly from the 7.9 hunting days per moose harvested in the 2002-2003 harvest year. This appears to be due to the effort reported by Anvik hunters. In 2002-2003, Anvik hunters reported an average of 20.4 days per moose harvested, while in 2003-2004, they reported 7.1 days. While this is a dramatic decrease in hunting effort, it remains the highest reported level of effort for all four communities. It is unclear why such a high level of effort was reported in 2002-2003. The use of the same survey form and surveyor suggests consistency in survey implementation. Considering the other communities, hunting effort went up by 1.3 days and .4 days in Holy Cross and Shageluk respectively, while going down in Grayling by 2.8 days.

Hunter effort data were also collected in the Koyukuk and Middle Yukon region for three separate survey years, 1999-2000 (Andersen, Utermohle, and Jennings 2001), 2001-2002

(Andersen, Brown, and Walker 2004), and 2002-2003 (Brown and Walker 2004). By comparison, hunter effort in the GASH area appears to be less than that reported in the Middle Yukon-Koyukuk project. However, it is important to note that in the subsequent years of data collection in the middle Yukon region, hunter effort increased steadily every year to 10.8 days per moose harvested, attesting to the increasing difficulty hunters experienced in harvesting moose for their communities.

**Table 2. Levels of Participation in the Use and Harvest of Moose, April 2003 - March 2004.**

Community	Participation of Households					Estimated Harvest Levels						Estimated Hunter Information				
	Use (%)	Att (%)	Hrv (%)	Rec (%)	Gav (%)	Total	Per		95% Confidence Limit of Total Harvest			Total Hunters		Successful Hunters**		
							Household	Person	%	Low*	High	Number	% of Pop	Hvst/Hunter	Number	Hvst/Hunter
All	94.4	65.6	53.9	55.6	36.1	<b>117.7</b>	0.6	0.2	3.9	113.1	122.3	176.3	27.9	0.7	114.7	1.0
Grayling	100.0	75.5	52.8	71.7	54.7	<b>36.0</b>	0.7	0.2	0.0	36.0	36.0	62.0	33.9	0.6	35.0	1.0
Anvik	80.6	58.1	45.2	48.4	19.4	<b>16.0</b>	0.5	0.1	10.6	14.3	17.7	26.6	24.5	0.6	16.0	1.0
Shageluk	97.6	64.3	54.8	57.1	21.4	<b>28.0</b>	0.7	0.2	0.0	28.0	28.0	41.0	30.4	0.7	26.0	1.1
Holy Cross	94.4	61.1	59.3	42.6	38.9	<b>37.8</b>	0.6	0.2	7.7	34.9	40.7	46.7	22.8	0.8	37.8	1.0

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

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

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

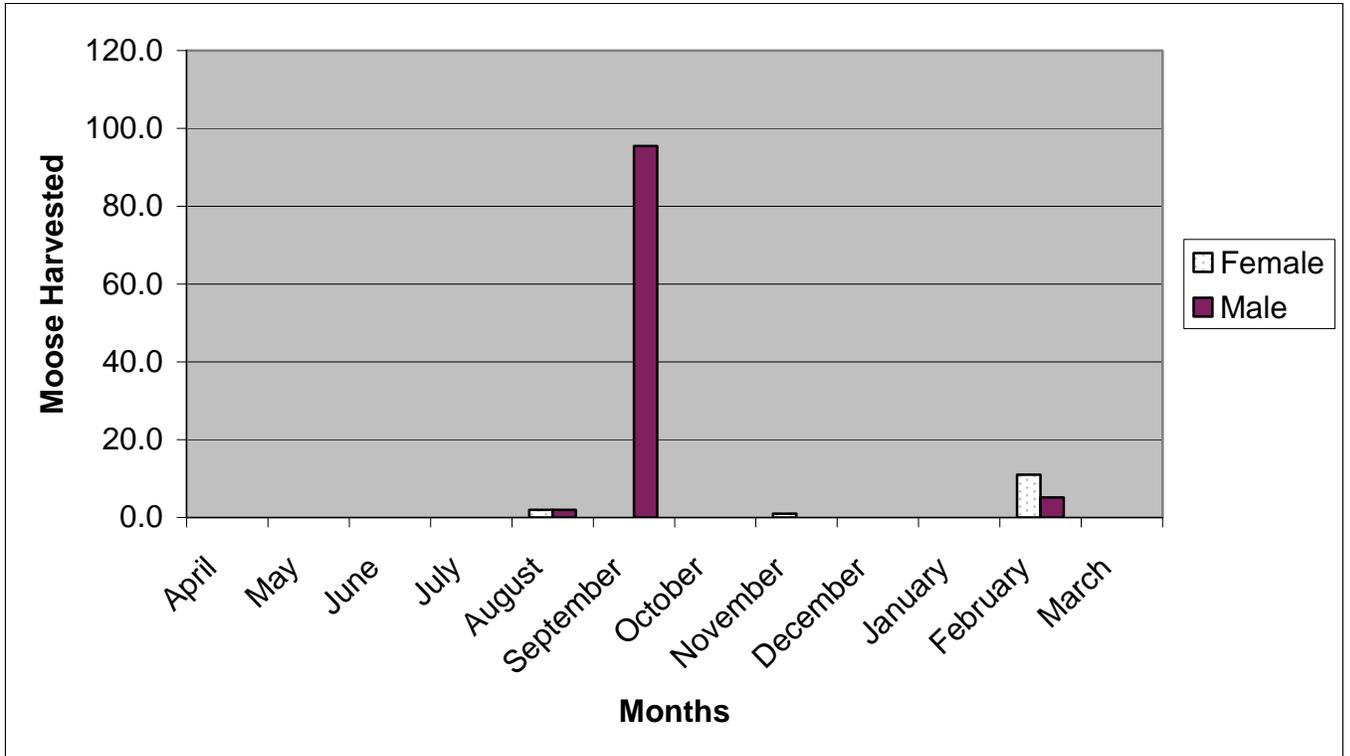
Key	
Use =	Used Moose
Att =	Attempted to Harvest Moose
Hrv =	Harvested Moose
Rec =	Received Moose
Gav =	Gave Moose

**Table 3. Estimated Moose Harvest by Sex and Month, April 2003 - March 2004.**

Community	Sex	April	May	June	July	August	September	October	November	December	January	February	March	Unknown	Total
All	All	0.0	0.0	0.0	0.0	4.0	95.5	0.0	1.0	0.0	0.0	16.2	0.0	1.1	117.7
	Female	0.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.0	0.0	11.0	0.0	0.0	14.0
	Male	0.0	0.0	0.0	0.0	2.0	95.5	0.0	0.0	0.0	0.0	5.2	0.0	1.1	103.7
	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
Grayling	All	0.0	0.0	0.0	0.0	3.0	24.0	0.0	1.0	0.0	0.0	8.0	0.0	0.0	36.0
	Female	0.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.0	0.0	6.0	0.0	0.0	9.0
	Male	0.0	0.0	0.0	0.0	1.0	24.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	27.0
	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
Anvik	All	0.0	0.0	0.0	0.0	0.0	14.9	0.0	0.0	0.0	0.0	1.1	0.0	0.0	16.0
	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	14.9	0.0	0.0	0.0	0.0	1.1	0.0	0.0	16.0
	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
Shageluk	All	0.0	0.0	0.0	0.0	1.0	21.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	28.0
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	5.0
	Male	0.0	0.0	0.0	0.0	1.0	21.0	0.0	0.0	0.0	0.0	1.0	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
Holy Cross	All	0.0	0.0	0.0	0.0	0.0	35.6	0.0	0.0	0.0	0.0	1.1	0.0	1.1	37.8
	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	35.6	0.0	0.0	0.0	0.0	1.1	0.0	1.1	37.8
	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

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

**Figure 2. Reported Moose Harvests by Sex and Month, April 2003- March 2004.**



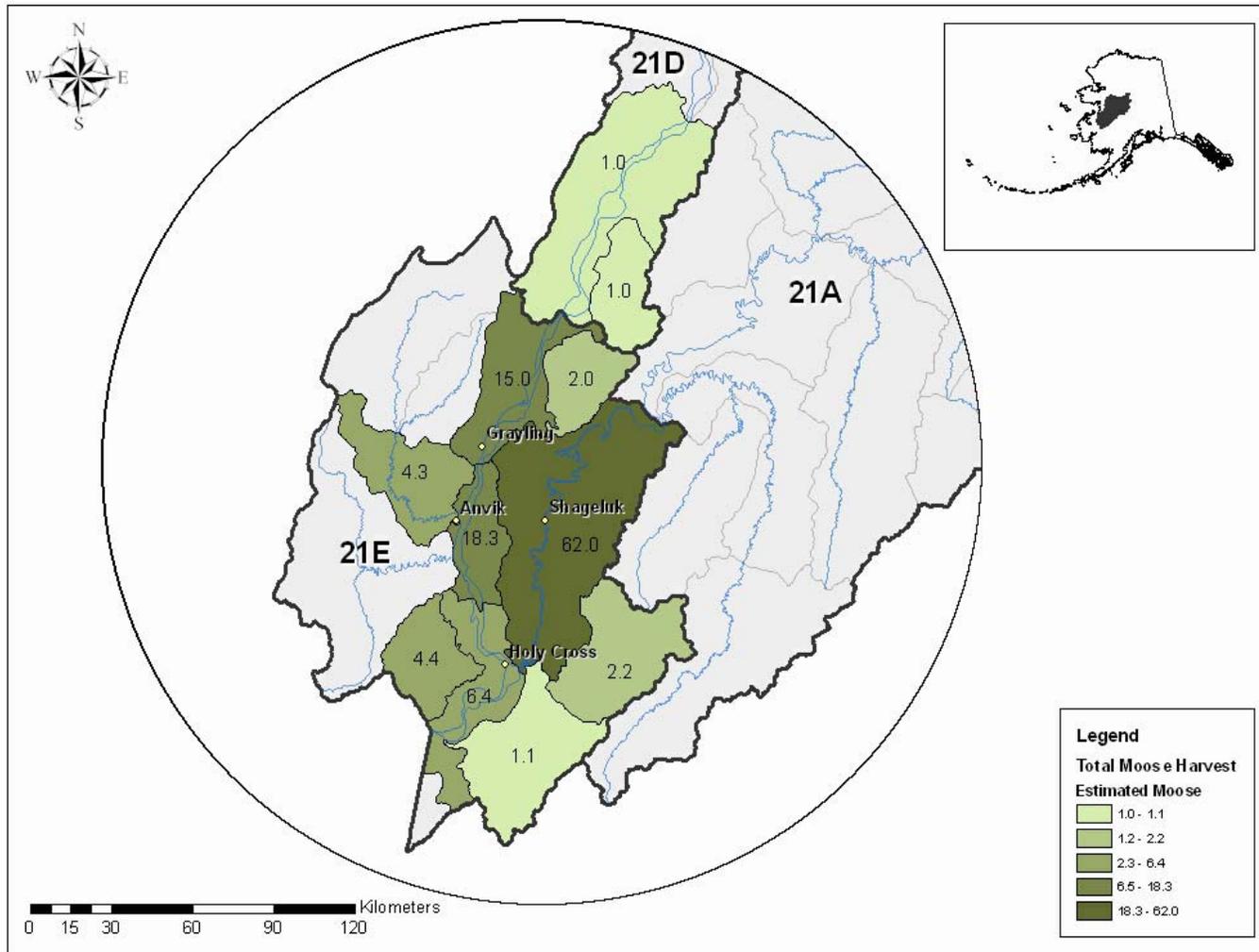
Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2004.

**Table 4. Estimated Harvest of Moose by GMU and Uniform Coding Unit, April 2003 - March 2004.**

GMU / UCU	Study Community					
	Grayling	Anvik	Shageluk	Holy Cross	Total	Percent
Grand Total	36.0	16.0	28.0	37.8	117.7	100.0%
Total GMU 21	36.0	16.0	28.0	37.8	117.7	100.0%
Subtotal GMU 21D	2.0	0.0	0.0	0.0	2.0	1.7%
21D 0101	1.0	0.0	0.0	0.0	1.0	0.8%
Papa Wille Creek (21D 0102)	1.0	0.0	0.0	0.0	1.0	0.8%
21E Subtotal	34.0	16.0	28.0	37.8	115.7	98.3%
(21E 0201)	2.0	0.0	0.0	4.4	6.4	5.5%
21E 0202	1.0	10.6	0.0	6.7	18.3	15.6%
21E 0203	15.0	0.0	0.0	0.0	15.0	12.7%
21E 0401	0.0	0.0	0.0	2.2	2.2	1.9%
21E 0501	14.0	1.1	28.0	18.9	62.0	52.6%
21E 0601	2.0	0.0	0.0	0.0	2.0	1.7%
21E 0701	0.0	0.0	0.0	4.4	4.4	3.8%
21E 0901	0.0	4.3	0.0	0.0	4.3	3.6%
21E 0301	0.0	0.0	0.0	1.1	1.1	0.9%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

**Figure 3. Estimated Harvest of Moose by GMU and Uniform Coding Unit, April 2003 – March 2004**



**Table 5. Estimates of Moose Hunting Effort in Surveyed Communities, April 2003 - March 2004.**

Community	Est. Total Harvest	All Hunters			Successful (Harvesting) Households			
		Number of Hunters	Estimated Days Hunted	Hunting Days/Hunter	Number of Hunters	Estimated Days Hunted	Hunting Days/Hunter	<b>Hunting Days/ Moose Hvstd.</b>
All	117.7	176.3	1040.8	5.9	114.7	663.5	5.8	<b>5.6</b>
Grayling	36.0	62.0	339.0	5.5	35.0	205.0	5.9	<b>5.7</b>
Anvik	16.0	26.6	218.2	8.2	16.0	113.9	7.1	<b>7.1</b>
Shageluk	28.0	41.0	198.0	4.8	26.0	119.0	4.6	<b>4.3</b>
Holy Cross	37.8	46.7	285.6	6.1	37.8	225.6	6.0	<b>6.0</b>

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004

**Table 6. The Estimated Harvest of Moose by GMU and UCU on State and Federal Land, April 2003 – March 2004**

Study Community	21D								21E								TOTAL GMU 21							
	Total		State		Federal		Unknown		Total		State		Federal		Unknown		Total		State		Federal		Unknown	
	No.	Pctg.	No.	Pctg.	No.	Pctg.	No.	Pctg.	No.	Pctg.	No.	Pctg.	No.	Pctg.	No.	Pctg.	No.	Pctg.	No.	Pctg.	No.	Pctg.	No.	Pctg.
<b>Grayling</b>	2.0	0.0	0.0%	2.0	100.0%	0.0	0.0%	34.0	15.0	44.1%	19.0	55.9%	0.0	0.0%	36.0	15.0	<b>41.7%</b>	21.0	<b>58.3%</b>	0.0	0.0%	0.0	0.0%	
<b>Anvik</b>	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	16.0	13.8	86.7%	2.1	13.3%	0.0	0.0%	16.0	13.8	<b>86.7%</b>	2.1	<b>13.3%</b>	0.0	0.0%	0.0	0.0%	
<b>Shageluk</b>	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	28.0	13.0	46.4%	13.0	46.4%	2.0	7.1%	28.0	13.0	<b>46.4%</b>	13.0	<b>46.4%</b>	2.0	7.1%	2.0	7.1%	
<b>Holy Cross</b>	0.0	0.0	0.0%	0.0	0.0%	0.0	0.0%	37.8	26.7	70.6%	11.1	29.4%	0.0	0.0%	37.8	26.7	<b>70.6%</b>	11.1	<b>29.4%</b>	0.0	0.0%	0.0	0.0%	
<b>TOTAL</b>	2.0	0.0	0.0%	2.0	100.0%	0.0	0.0%	115.7	68.5	59.2%	45.2	39.1%	2.0	1.7%	117.7	68.5	<b>58.2%</b>	47.2	<b>40.1%</b>	2.0	1.7%	2.0	1.7%	

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

## **Caribou**

The 2003-2004 survey documented an estimated total harvest of just 2 caribou—all taken by hunters in the community of Grayling (Table 7). In the four communities, 4% of all households used caribou, while less than 1% attempted to harvest and actually harvested one or more caribou (Table 7). The percentage of households attempting to harvest caribou ranged from 0% in Anvik, Holy Cross, and Shageluk, to 2% in Grayling (Table 7). Use of caribou by 2% of the households in Holy Cross and 2.4% of the households in Shageluk, even though no caribou were harvested by hunters from those communities, is attributed to sharing of resources between households in Holy Cross and Shageluk and Grayling, the only community to report any harvest of caribou.

Figure 4 shows the caribou harvest by month and sex. The 2003-2004 caribou harvest consisted of only 2 bulls (Table 8), with both of those animals being taken during the month of March. The locations of caribou harvests are summarized by GMU, subunit, and UCU in Table 9. The 2 caribou harvested by hunters in surveyed communities during the 2003-2004 survey period were both taken in 1 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.

**Table 7. Levels of Participation in the Use and Harvest of Caribou, April 2003 - March 2004.**

Community	Participation of Households					Estimated Harvest Levels						Estimated Hunter Information				
	Use (%)	Att (%)	Hrv (%)	Rec (%)	Gav (%)	Total	Per		95% Confidence Limit of Total Harvest			Total			Successful	
							Household	Person	%	Low*	High	Number	% of Pop	Hvst/Hunter	Number	Hvst/Hunter
All	3.9	0.6	0.6	3.3	1.1	2.0	0.01	0.00	0.0	2.0	2.0	n/a	n/a	n/a	n/a	n/a
Grayling	9.4	1.9	1.9	7.5	3.8	2.0	0.04	0.01	0.0	2.0	2.0	n/a	n/a	n/a	n/a	n/a
Anvik	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0	0.0	n/a	n/a	n/a	n/a	n/a
Shageluk	2.4	0.0	0.0	2.4	0.0	0.0	0.00	0.00	0.0	0.0	0.0	n/a	n/a	n/a	n/a	n/a
Holy Cross	1.9	0.0	0.0	1.9	0.0	0.0	0.00	0.00	0.0	0.0	0.0	n/a	n/a	n/a	n/a	n/a

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

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

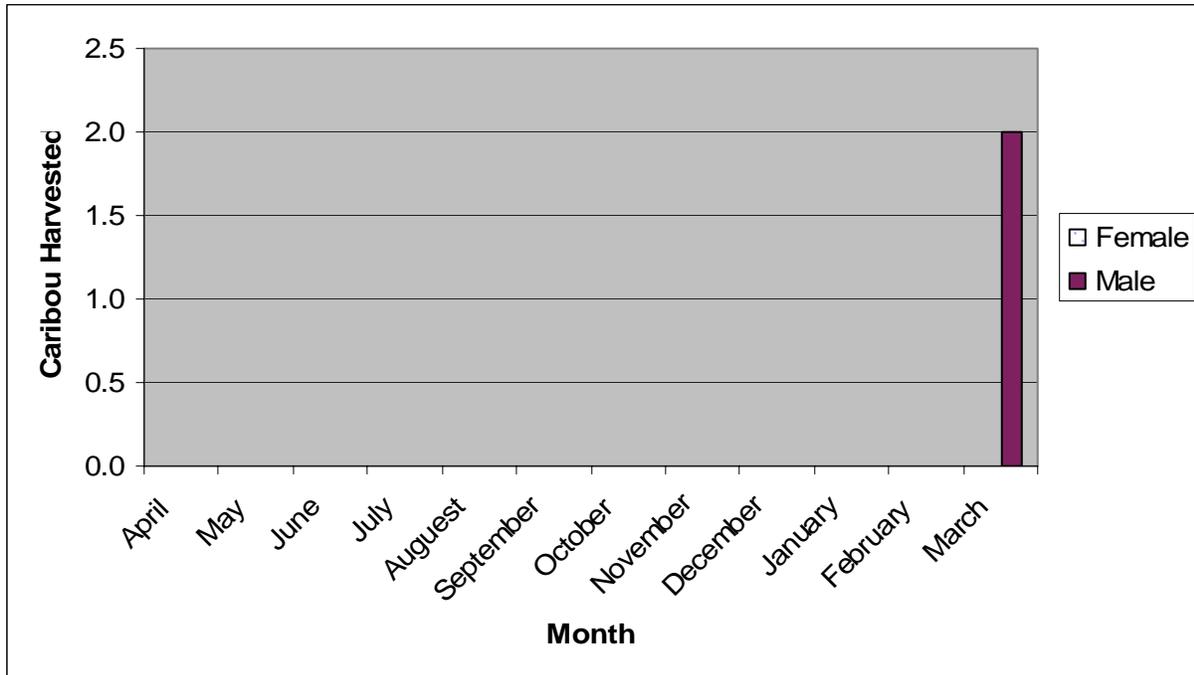
Key	
Use =	Used Caribou
Att =	Attempted to Harvest Caribou
Hrv =	Harvested Caribou
Rec =	Received Caribou
Gav =	Gave Caribou

**Table 8. Estimated Caribou Harvest by Sex and Month, April 2003 - March 2004.**

Community	Sex	April	May	June	July	August	September	October	November	December	January	February	March	Unknown	Total
All	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
	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	2.0	0.0	2.0
	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
Grayling	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
	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	2.0	0.0	2.0
	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
Anvik	All	no harvest													
	Female														
	Male														
	Unknown														
Shageluk	All	no harvest													
	Female														
	Male														
	Unknown														
Holy Cross	All	no harvest													
	Female														
	Male														
	Unknown														

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

**Figure 4. Reported Caribou Harvests by Sex and Month, April 2003 - March 2004.**



Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2004.

**Table 9. Estimated Harvest of Caribou by GMU and Uniform Coding Unit, April 2003 - March 2004.**

GMU / UCU	Study Community				Total	Percent
	Grayling	Anvik	Shageluk	Holy Cross		
Grand Total	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%
Subtotal GMU 19A	2.0	0.0	0.0	0.0	2.0	100.0%
19A 0101	2.0	0.0	0.0	0.0	2.0	100.0%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

## **Black Bear**

For 2004, an estimated total of 5 black bears were harvested by hunters in the four survey communities. These 5 bears were harvested by hunters from Grayling and Shageluk (Table 10). Of the four communities, the use of black bear was only reported by 9.4% of households in Grayling. The absence of reported use of black bear in the other survey communities suggests that Grayling households did not necessarily share their harvest with these other communities, nor did Anvik, Shageluk, or Holy Cross households receive black bear from communities outside of the survey area. However, 7.5% of households in Grayling (4 hunters) and 2.4% of households in Shageluk (1 hunter) did attempt to harvest black bears. Only 7.5% of the households in Grayling reported an actual take of black bear. Of these, 7.5% reported sharing and 1.9% stated that they received black bear within Grayling, indicating a pattern of sharing within, but not outside, of the community for this species. Also, 2% of the households in Shageluk reported giving but not receiving black bear meat, possibly sharing with Grayling residents or residents of other communities outside of 21E.

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 and Alexander 1998). Black bear harvests 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, as harvests were reported in May, June, July, and September with 40% of the total black bear harvest occurring in May (Figure 5). Black bear harvests consisted of 4 males (80%) and 1 female (20%) (Table 11). Locations of black bear harvests for each community are summarized by GMU, subunit, and UCU in Table 11. Of the 9 black bears harvested, all were taken in GMU 21, with all five bears taken in subunit 21E. Harvest areas for Grayling consisted of 2 UCUs.

According to state regulations, state residents and non-residents may currently take up to three black bears per year in all off GMU 21E. In GMU 21E, black bear meat must be salvaged and removed from the field from bears taken between January 1 – May 31; from June 1 – December 31, either the hide or meat must be salvaged and removed from the field. Federal regulations require the salvage of both meat and hides throughout the July 1 – 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 presence of black bears are a growing 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.

**Table 10. Levels of Participation in the Use and Harvest of Black Bear, April 2003 - March 2004.**

Community	Participation of Households					Estimated Harvest Levels						Estimated Hunter Information				
	Use (%)	Att (%)	Hrv (%)	Rec (%)	Gav (%)	Total	Per		95% Confidence Limit of Total Harvest			Total		Successful		
							Household	Person	%	Low*	High	Number	% of Pop	Hvst/Hunter	Number	Hvst/Hunter
All	2.8	2.8	2.8	0.6	2.8	5.0	0.03	0.01	0.0	5.0	5.0	5.0	0.8	1.0	5.0	1.0
Grayling	9.4	7.5	7.5	1.9	7.5	4.0	0.08	0.02	0.0	4.0	4.0	4.0	2.2	1.0	4.0	1.0
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	2.4	2.4	0.0	2.4	1.0	0.02	0.01	0.0	1.0	1.0	1.0	0.7	1.0	1.0	1.0
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

\* Low harvest estimate is based on reported harvest, if greater than calculated lower limit.  
 Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

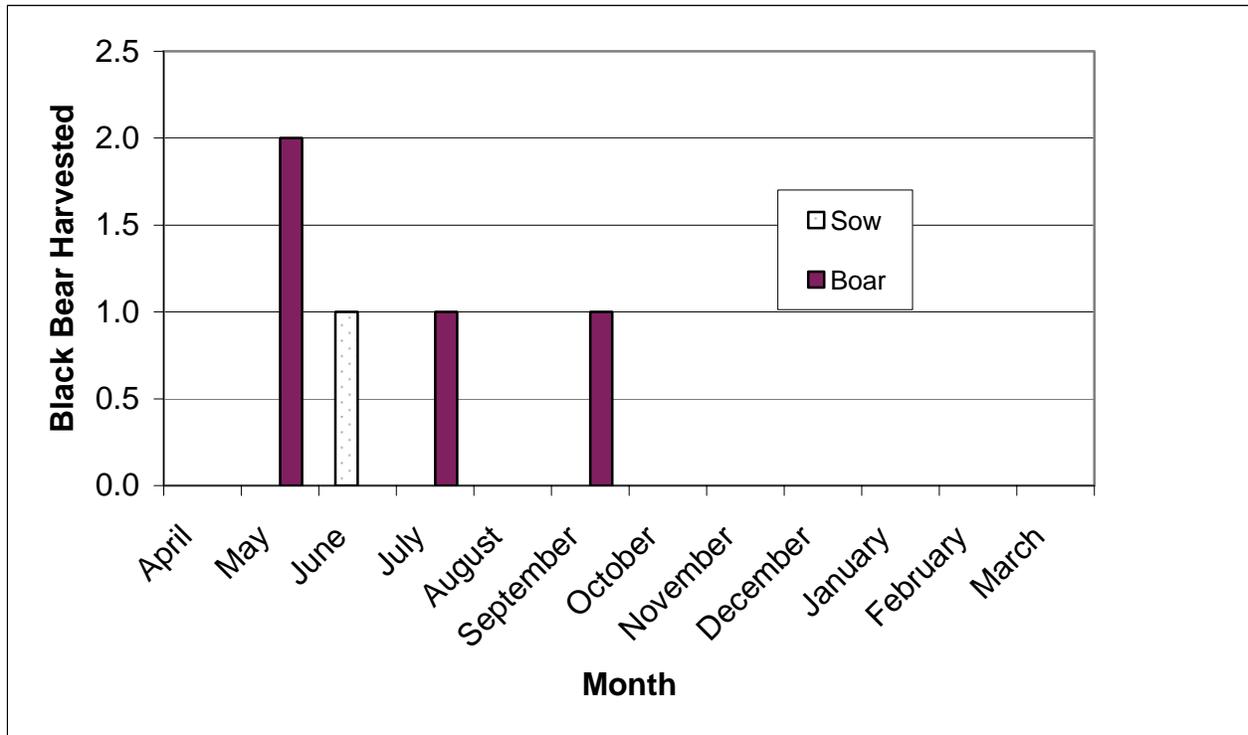
Key	
Use =	Used Black Bear
Att =	Attempted to Harvest Black Bear
Hrv =	Harvested Black Bear
Rec =	Received Black Bear
Gav =	Gave Black Bear

**Table 11. Black Bear Harvests by Sex and Month, April 2003 - March 2004.**

Community	Sex	April	May	June	July	August	September	October	November	December	January	February	March	Unknown	Total
All	All	0.0	2.0	1.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0
	Female	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	Male	0.0	2.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
	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
Grayling	All	0.0	2.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
	Female	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	Male	0.0	2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
	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
Anvik	All	no reported harvest													
	Female														
	Male														
	Unknown														
Shageluk	All	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	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	1.0	0.0	0.0	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
Holy Cross	All	no reported harvest													
	Female														
	Male														
	Unknown														

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

**Figure 5. Reported Black Bear Harvests by Sex and Month, April 2003 - March 2004.**



Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2004.

**Table 12. Estimated Harvest of Black Bear by GMU and Uniform Coding Unit, April 2003 - March 2004.**

GMU / UCU	Study Community				Total	Percent
	Grayling	Anvik	Shageluk	Holy Cross		
Grand Total	4.0	0.0	1.0	0.0	5.0	100.0%
Total GMU 21	4.0	0.0	1.0	0.0	5.0	100.0%
Subtotal GMU	4.0	0.0	1.0	0.0	5.0	100.0%
21E 0203	3.0	0.0	0.0	0.0	3.0	60.0%
(21E 0501)	1.0	0.0	1.0	0.0	2.0	40.0%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

## **Brown Bear**

Survey data indicates that only one brown bear was taken by area hunters in 2003-2004 (see Table13). Interestingly, while Grayling residents reported 1.9% of households giving away brown bear meat, no households in the area reported receiving any, suggesting that this meat was shared outside of the area. According to earlier studies (Wheeler 1993, Stokes 1984), brown bear are infrequently encountered and not heavily harvested by area residents. However, the Division of Subsistence Community Profile Database does document a small but measurable harvest of brown bear in 1990 (Wheeler 1993); four bears were reported harvested for the whole area (see Table 19, page 35).

**Table 13. Levels of Participation in the Use and Harvest of Brown Bear, April 2003 - March 2004.**

Community	Participation of Households					Estimated Harvest Levels						Estimated Hunter Information				
	Use (%)	Att (%)	Hrv (%)	Rec (%)	Gav (%)	Total	Per		95% Confidence Limit of Total Harvest			Total		Successful		
							Household	Person	%	Low*	High	Number	% of Pop	Hvst/Hunter	Number	Hvst/Hunter
All	0.6	0.6	0.6	0.0	0.6	1.0	0.0	0.0	0.0	1.0	1.0	n/a	n/a	n/a	n/a	n/a
Grayling	1.9	1.9	1.9	0.0	1.9	1.0	0.0	0.0	0.0	1.0	1.0	n/a	n/a	n/a	n/a	n/a
Anvik	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	n/a	n/a	n/a	n/a	n/a
Shageluk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	n/a	n/a	n/a	n/a	n/a
Holy Cross	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	n/a	n/a	n/a	n/a	n/a

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

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

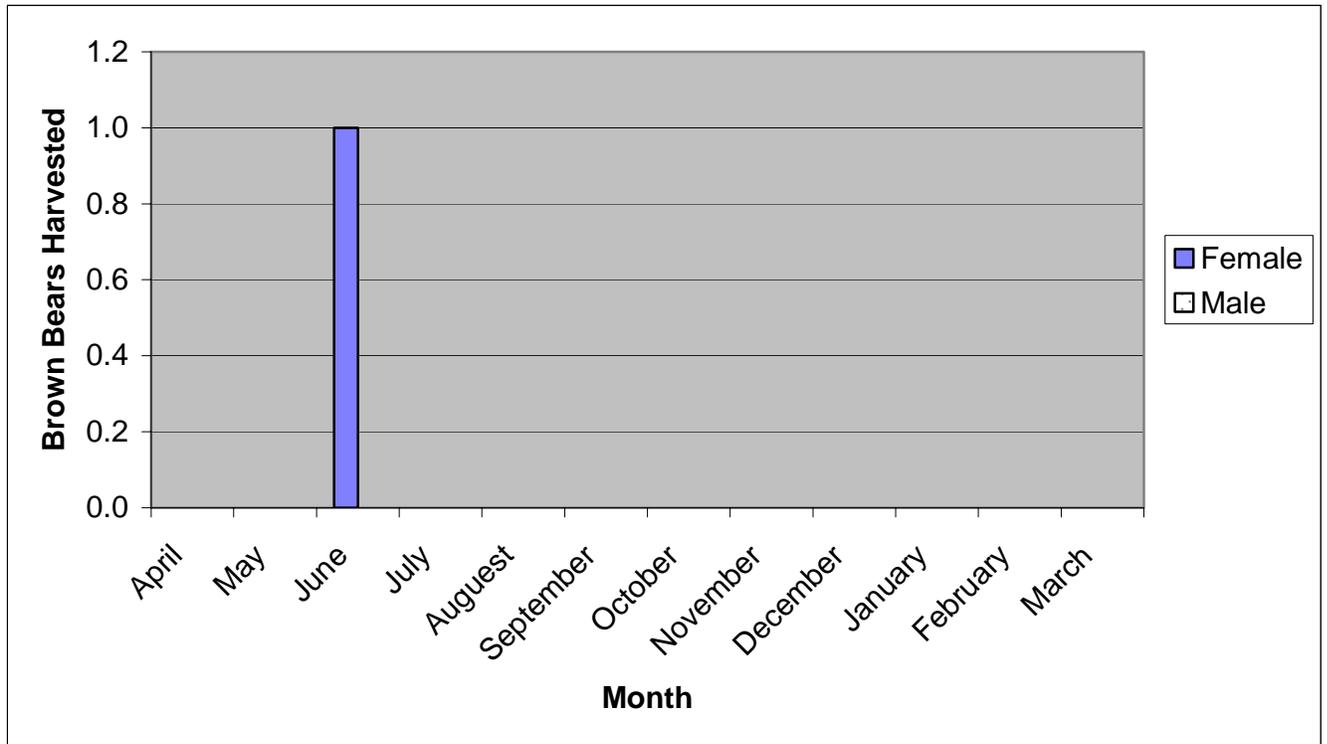
Key	
Use =	Used Brown Bear
Att =	Attempted to Harvest Brown Bear
Hrv =	Harvested Brown Bear
Rec =	Received Brown Bear
Gav =	Gave Brown Bear

**Table 14. Brown Bear Harvests by Sex and Month, April 2003 - March 2004.**

Community	Sex	April	May	June	July	August	September	October	November	December	January	February	March	Unknown	Total
All	All	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	Female	0.0	0.0	1.0	0.0	0.0	0.0	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	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
Grayling	All	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	Female	0.0	0.0	1.0	0.0	0.0	0.0	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	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
Anvik	All	no reported harvest													
	Female														
	Male														
	Unknown														
Shageluk	All	no reported harvest													
	Female														
	Male														
	Unknown														
Holy Cross	All	no reported harvest													
	Female														
	Male														
	Unknown														

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

**Figure 6. Reported Brown Bear Harvests by Sex and Month, April 2003 - March 2004.**



**Table 15. Estimated Harvest of Brown Bear by GMU and Uniform Coding Unit, April 2003 - March 2004.**

Study Community						
GMU / UCU	Grayling	Anvik	Shageluk	Holy Cross	Total	Percent
Grand Total	1.0	0.0	0.0	0.0	1.0	100.0%
Total GMU 21	1.0	0.0	0.0	0.0	1.0	100.0%
Subtotal GMU 21E	1.0	0.0	0.0	0.0	1.0	100.0%
21E 0203	1.0	0.0	0.0	0.0	1.0	100.0%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

## **Wolf**

Survey data were compiled to measure the levels of wolf harvest by hunters and trappers within the four survey communities. A total of 52 wolves were reported taken within the area, with 8% of all households reporting the use of wolf. (Table 16). According to the surveys, 3 hunters in Anvik reported shooting or trapping wolves, 5 hunters in Grayling reported shooting or trapping wolves, 4 hunters in Shageluk, and 9 hunters in Holy Cross reported shooting or trapping wolves. The percentage of household use of wolf in individual communities ranged from 2% in Shageluk to 11% in Holy Cross. Grayling, Holy Cross and Shageluk households all reported giving wolf away to other households but only households in Holy Cross reported receiving wolf. This information may indicate that the species is sold or shared with communities and/or individuals outside the survey area.

Wolf harvests consisted of 24 males (46%), 25 females (48%), and 3 wolves of unknown sex (Table 17). Hunters and trappers reported taking the majority of the total wolf harvest (71%) in January, February, and March, likely reflecting primary trapping months (Figure 7). However, the month of harvest was unknown for 15 of the 52 (29%) wolves reported harvested.

The locations of wolf harvests for each community are summarized by GMU, subunit, and UCU in Table 18. Of the 52 wolves harvested, all were taken in GMU 21, within subunit 21E. The four communities utilized a total of 8 UCUs, with harvest areas for each community ranging from 5 UCUs in Holy Cross to 1 UCU in Shageluk. Perhaps not surprisingly, area hunters trapped or shot wolves in the same UCUs where they reported moose harvests. Hunters are likely to find wolves where they find moose, given the predator/prey relationship; hunters may also maintain trap-lines in these same areas for this reason. Other explanations may also hold; for example, harvest areas may reflect traditional or family hunting territories.

**Table 16. Levels of Participation in the Use and Harvest of Wolf, April 2003 - March 2004.**

Community	Participation of Households					Estimated Harvest Levels						Estimated Hunter Information				
	Use (%)	Att (%)	Hrv (%)	Rec (%)	Gav (%)	Total	Per		95% Confidence Limit of Total Harvest			Total		Successful		
							Household	Person	%	Low*	High	Number	% of Pop	Hvst/Hunter	Number	Hvst/Hunter
All	7.8	n/a	n/a	0.6	5.0	51.8	0.28	0.08	17.2	43.0	60.7	21.1	3.3	2.5	21.1	2.5
Grayling	7.5	n/a	n/a	0.0	3.8	7.0	0.13	0.04	0.0	7.0	7.0	5.0	2.7	1.4	5.0	1.4
Anvik	9.7	n/a	n/a	0.0	0.0	8.5	0.26	0.08	31.3	5.9	11.2	3.2	2.9	2.7	3.2	2.7
Shageluk Holy	2.4	n/a	n/a	0.0	7.1	13.0	0.31	0.10	0.0	13.0	13.0	4.0	3.0	3.3	4.0	3.3
Cross	11.1	n/a	n/a	1.9	7.4	23.3	0.39	0.11	26.7	17.1	29.6	8.9	4.3	3.0	8.9	3.0

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

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

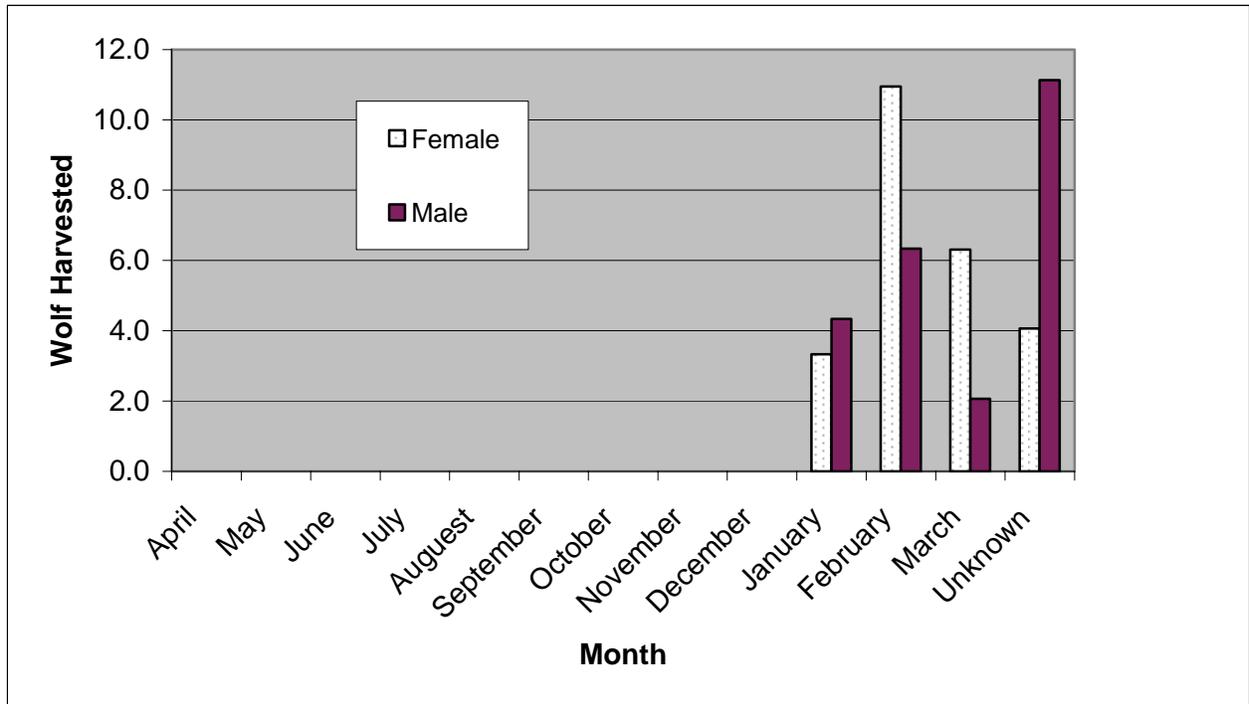
Key	
Use =	Used Wolf
Att =	Attempted to Harvest Wolf
Hrv =	Harvested Wolf
Rec =	Received Wolf
Gav =	Gave Wolf

**Table 17. Wolf Harvests by Sex and Month, April 2003 - March 2004.**

Community	Sex	April	May	June	July	August	September	October	November	December	January	February	March	Unknown	Total
All	All	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	20.6	8.4	15.2	51.8
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	11.0	6.3	4.1	24.7
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	6.3	2.1	11.1	23.9
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	3.3
Grayling	All	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.0	3.0	0.0	7.0
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0	3.0
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	1.0	0.0	4.0
	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
Anvik	All	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	4.3	3.2	8.5
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	3.2	1.1	5.3
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.1	3.2
	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
Shageluk	All	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	12.0	13.0
	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	3.0	3.0
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	9.0	10.0
	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
Holy Cross	All	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	15.6	1.1	0.0	23.3
	Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	8.9	1.1	0.0	13.3
	Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	3.3	0.0	0.0	6.7
	Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	3.3

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

**Figure 7. Wolf Harvests by Sex and Month, April 2003 - March 2004.**



Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2004.

**Table 18. Estimated Harvest of Wolf by GMU and Uniform Coding Unit, April 2003 - March 2004.**

GMU / UCU	Study Community				Total	Percent
	Grayling	Anvik	Shageluk	Holy Cross		
Grand Total	7.0	8.5	13.0	23.3	51.8	100.0%
Total GMU 21	7.0	8.5	13.0	23.3	51.8	100.0%
Subtotal GMU 21E	7.0	8.5	13.0	23.3	51.8	100.0%
21E 0201	0.0	0.0	0.0	10.0	10.0	19.3%
(21E 0202)	2.0	4.3	0.0	5.6	11.8	22.8%
21E 0203	2.0	0.0	0.0	0.0	2.0	3.9%
(21E 0401)	0.0	0.0	0.0	1.1	1.1	2.1%
21E 0501	2.0	0.0	13.0	5.6	20.6	39.7%
21E 0601	1.0	0.0	0.0	0.0	1.0	1.9%
21E 0801	0.0	4.3	0.0	0.0	4.3	8.2%
21E 0301	0.0	0.0	0.0	1.1	1.1	2.1%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2004.

## **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 56 households, or 31% of the 180 households surveyed. No comments were received from Shageluk residents. Comments fell into 6 general categories: predator issues (9 comments), hunting competition (4 comments), assessments of game populations (27 comments), regulatory suggestions (2 comments), comments regarding increased effort in hunting moose (1 comment), sharing of moose meat (20 comments), and miscellaneous (6 comments). Many comments dealt with multiple issues and are included in more than one category. Among those commenting on predators, 9 were specifically directed at wolves and 4 mentioned bears. Among those comments on hunting competition, concerns were specifically voiced toward “outside”, “sport” and “head” hunters. Among those making observations on game populations, all commented on a local decline or scarcity of moose. Interestingly, a great preponderance of comments appeared during this survey year suggesting 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.

## **COMPARISON OF COMMUNITY HARVESTS TO EARLIER SURVEYS**

The final report for the first year of the big game survey in the GASH area (2002-2003) compared that harvest survey to earlier survey work in the area (see Brown, Walker, and Vanek 2004 for a detailed comparison). For the purposes of this report, earlier data are briefly summarized with a focus on a comparison between the first and second year of data collection for the big game survey.

## Previous Research

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 (1993).

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

Wheeler's "Subsistence Economics and the Use of Fish and Game Resources in Grayling, Anvik, Shageluk, and Holy Cross" (1993) contains a rich body of information documenting the subsistence harvest and resource use patterns of these four communities between September 1990 and August 1991. Importantly, this study does provide harvest estimates and an historical context for contemporary use patterns. According to Wheeler, residents of the GASH area rely most heavily on fish and game resources, specifically salmon, moose and black bear, for their dietary needs.

In terms of harvest timing, residents of the GASH region hunt in both fall and winter to provide meat for their communities, with the majority of harvest occurring in the fall. The winter hunt yields approximately one-third of the total annual harvest and remains a significant opportunity for community residents to obtain meat during the slim winter months.

A comparison between the 1990 and 2002 survey years show marked declines in harvests of all big game species. In 1990, harvest surveys were conducted with 87% of Grayling households, 77% of Anvik households, 80% of Shageluk households, and 62% of Holy Cross

households. Table 19 is a comparison between the 1990-1991<sup>1</sup> and 2002-2003 survey years, showing moose, caribou, black bear and brown bear harvests.

**Table 19. Comparison of Big Game Harvests in the GASH area, 1990-1991 and 2002-2003.**

	<b>Moose</b>		<b>Caribou</b>		<b>Black Bear</b>		<b>Brown Bear</b>	
	1990 - CPDB	2002 - 2003	1990 - CPDB	2002 - 2003	1990 - CPDB	2002 - 2003	1990 - CPDB	2002 - 2003
<b>Grayling</b>	76	33	1	0	9	9	1	0
<b>Anvik</b>	45	21	9	0	8	0	3	0
<b>Shageluk</b>	20	31	0	0	0	0	0	0
<b>Holy Cross</b>	111	48	4	2	26	0	0	0
<b>TOTAL</b>	<b>252</b>	<b>133</b>	<b>14</b>	<b>2</b>	<b>43</b>	<b>9</b>	<b>4</b>	<b>0</b>

To account for variations in community populations, especially over time, it is useful to examine per capita rates of harvest for moose. Although the Division of Subsistence Community Profile Database does not include per capita rates of moose harvested (only pounds per capita), per capita rates 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, in 1990, the per capita rate of moose for Grayling residents was .37 moose per person. Anvik residents reported .46 moose per person, Shageluk residents reported .16 moose per person, and Holy Cross residents reported .4 moose per person. By comparison, the 2002-2003 survey reported lower per capita rates for Grayling, Anvik, and Holy Cross (.19, .19, and .26 moose per person, respectively) while Shageluk was the only community reporting higher per capita rates (.25 moose per person). In general, the regional averages show similar declines, ranging from .35 moose per person in 1990 to .22 in 2002, using the same calculations. It is important to understand these estimates and comparisons within the context of contemporary concerns of the local residents.<sup>2</sup> The significant decline in moose harvest is likely partially related to a declining area population; however, the above per capita comparisons also suggest that area residents are

<sup>1</sup> This information can be found in the ADF&G, Division of Subsistence Community Profile Database.

<sup>2</sup> Additionally, ADF&G harvest estimates 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.

harvesting fewer animals. Local residents have registered their concerns that moose have been declining in the area over the last decade, while competition with other hunters has increased. These concerns include the moratorium on moose hunting in GMU 18, the Board of Game's 2004 action eliminating non-resident hunting in GMU 19A to the south, federal customary and traditional use determination being considered by the Federal Subsistence Board, and increasing restrictions on moose hunting for both state residents and non-residents in the Koyukuk-Middle Yukon area (GMUs 21D and 24). The regulatory concerns will be revisited after a discussion of the 2003-2004 harvest estimates as compared to the 2002-2003 survey year below.

#### COMPARISON BETWEEN 2002-2003 AND 2003-2004 SURVEY YEARS

As noted, this was the second year of data collection in the GASH communities of Grayling, Anvik, Shageluk, and Holy Cross. One advantage of collecting multiple years of harvest data using a consistent methodology is that year-to-year variability in harvests and harvest patterns can be examined. Community harvests by species for each study year are presented in Table 20 and discussed below.

Moose harvests in the GASH region are characterized by high participation rates in each of the four villages. Two of the most significant pieces of information collected in the survey are the per capita rates of harvest and the hunter-effort data. As discussed earlier, per capita rates are important in that they help to measure harvest rates by community while accounting for fluctuations in community population. 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. The survey indicates that per capita rates have remained relatively stable over the last two years; however, compared to the 1990 baseline, per capita rates have fallen significantly (see Table 21). This would 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, increased predation, and/or increasing effort required to harvest.

Hunter-effort data collected on the survey measures the amount of hunter-time required to harvest each moose. Households were asked how many people in their household participated in moose hunting and how many days each of those participants spent hunting for moose.

Increasing hunter-time, or effort per harvested moose, may be an index of a declining moose population if hunters are required to spend more time to harvest similar numbers of moose. In the 2002-2003 survey year, hunters from the 4 communities spent an average of 8 days per moose harvested. This average reflected the high number of days hunting reported by Anvik hunters (20 days per moose harvested). In the 2003-2004 survey year, this average dropped to 6 days per moose harvested, generally reflecting a decrease in hunter days reported by Anvik hunters to 7 days per moose harvested, placing Anvik hunters within range of the hunters in the other three communities. Reasons for the level of hunter-effort reported by Anvik hunters in 2002-2003 are unclear. Survey methods, protocol, and personnel remained the same, though it does indicate the need for multiple years of data in order to accommodate year-to-year variability. Hunters in the GASH area expect that per capita rates will decrease and hunter-effort will increase in the 2004-2005 survey year because of low moose abundance, increasing hunter pressure, and extremely lower water levels in the fall hunting season (2004) combined with warm temperatures through the fall season.

While bulls make up the large majority of the moose harvest in both survey years, the percentage of cow moose harvested in 2002-2003 was approximately 8% while in 2003-2004, the percentage of cows in the total harvest was estimated at 12%. While 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, there remains a federal winter season on federal lands.

Caribou harvests for the two survey years are also summarized in Table 20. Caribou harvests in the GASH area vary widely depending on the movement of the Mulchatna Caribou Herd, primarily far to the south of 21E villages in GMU 19A. This caribou distribution pattern makes them generally unavailable to hunters in the GASH villages.

Similarly, black bears and brown bears are not taken in large numbers by hunters residing in the lower-middle Yukon area. Bears are not generally hunted and are mostly taken opportunistically. Finally, wolf harvests appear to have increased slightly between the two survey years. Each tribal council maintains an incentive program designed to encourage and support village-level trapping and harvest of wolves as an informal predator control program and economic supplement to many community households.

**Table 20. Comparison of Big Game Harvests Between 2002-2003 and 2003-2004 Survey Years**

Species	Grayling		Anvik		Shageluk		Holy Cross		Total	
	<u>2002-2003</u>	<u>2003-2004</u>								
<b>Moose</b>	33	36	21	16	31	28	48	38	<b>133</b>	<b>118</b>
<b>Caribou</b>	0	2	0	0	0	0	2	0	<b>2</b>	<b>2</b>
<b>Black Bear</b>	9	4	0	0	0	1	0	0	<b>0</b>	<b>5</b>
<b>Brown Bear</b>	0	1	0	0	0	0	0	0	<b>0</b>	<b>1</b>
<b>Wolf</b>	15	7	14	9	0	13	10	23	<b>39</b>	<b>52</b>

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**Table 21. Per Capita Rates of Moose Harvests since 1990**

Community	Per capita rates		
	<u>1990</u>	<u>2002-2003</u>	<u>2003-2004</u>
<b>Grayling</b>	0.37	0.2	0.2
<b>Anvik</b>	0.46	0.2	0.1
<b>Shageluk</b>	0.16	0.2	0.2
<b>Holy Cross</b>	0.4	0.3	0.2

## REGULATORY CONTEXT

In January 2005, ADF&G convened the first GMU 21E Moose Management Working Group meeting in Grayling. The Working Group consists of individuals representing the main user groups who harvest moose in GMU 21E, including village residents, the Western Interior and Yukon-Kuskokwim Regional Advisory Councils, hunting guides and transporters, several members of the local GASH Fish and Game Advisory Committee, non-local resident hunters, and a representative of the Lower Yukon Advisory Committee. The Working Group is advised by ADF&G Division of Wildlife Conservation and Subsistence Division staff, as well as federal representatives from the United States Fish and Wildlife Service, Office of Subsistence Management (USFWS, OSM), the Bureau of Land Management (BLM), and the Innoko National Wildlife Refuge. Tanana Chiefs Conference (TCC) and the Association of Village Council Presidents (AVCP) also participate as time allows. These individuals are brought together 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 have raised concerns about a lack of local control, an increase in non-local hunters, increased predator populations of bears and wolves, and a declining moose population.

As part of this effort, the group discussed regulatory actions currently in place that affect the harvest of moose in GMU 21E. The 2002-2003 harvest survey (Brown, Walker, and Vanek 2004) outlined the primary regulatory concerns for 21E including: (1.) the 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 GMU 21E, a move strongly opposed by the WIRAC that represents the GASH area; and (3.) the closure of non-resident moose hunting in GMU 19A as a result of the regulation actions recommended by the Central Kuskokwim Moose Working Group (see Brown, Walker, and Vanek 2004 for a fuller 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 (January in Grayling and April in Shageluk) about increasing regulatory restrictions on moose hunting in the middle Yukon-Koyukuk region and other areas that may be redirecting non-local hunters to the GASH area.

The Working Group will meet at least two more times during the 2005 calendar year. These meetings will take place in Holy Cross and Anvik to allow for participation of local residents from each community. The group will likely formulate recommendations for the Board of Game meeting in March 2006 to be held in Fairbanks and the Spring 2006 Federal Subsistence Board Meeting.

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**APPENDIX A. Survey Form**

**2003 - 2004 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	M	LOCATION (UCU)	S or F	M or F	2004								2005			UNK	
					APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB		MAR
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							

**2003-2004 Large Mammal Survey (cont.)**

**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 or 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)? **YES NO**  
*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. Survey Comments

Community	HHID	Comments
Anvik	17	TOO MANY PREDATORS, BEARS & WOLVES.
Grayling	1	NO MOOSE
	2	HARD TO FIND MOOSE AROUND GRAYLING.
	5	NO MOOSE, GAS TOO HIGH.
	6	NO MOOSE AROUND GRAYLING, MOOSE COUNT NOT CORRECT.
	7	NO MOOSE AROUND GRAYLING, FAMILY HUNGRY EAT MOOSE FROM OTHERS' GENEROSITY
	8	NO MOOSE
	9	VERY BIG DECLINE IN MOOSE POPULATION. NO MOOSE IN AREA. BIG DECLINE IN WATER FOWL, MORE WOLVES IN THE AREA. MORE LOCAL CONTROL IN BIG GAME HUNTING.
	11	VERY HUNGRY, LUCK, FEW MOOSE AROUND
	12	DON'T HUNT BUT OTHERS HUNT FOR ME.
	13	HUNT FOR OTHERS, NEED MORE MOOSE IN THE AREA.
	14	NO MOOSE
	15	VERY LUCKY TO HAVE MOOSE MEAT. CAN'T LIVE OFF THE STORE. COSTS TOO MUCH, WALK OUT WITH LITTLE BAG
	16	LUCK IS VERY IMPORTANT. AND USING ALL OF THE MEAT.
	17	HUNGRY
	18	BOAT DRIVER, LUCK, PEOPLE GIVE ME MEAT. HAVN'T SHOT A MOOSE IN 2-3 YEARS.
	19	WOULD LIKE MORE MOOSE.
	20	LUCKY TO SEE ONE MOOSE AND GET IT.
	21	SCARED NO MOOSE IN THE FUTURE.
	22	ELDERLY COUPLE, LUCK, OTHERS GIVE US MOOSE MEAT, TOO MANY WOLVES KILL MOOSE FOR NOTHING.
	25	NO MOOSE
	26	HARD TO KILL MOOSE, NONE IN THE AREA.
	27	NO MOOSE
	28	MOOSE IS BETTER THAN EATING OFF THE STORE.
	29	TOO MANY WOLVES.
	30	NEW TO ALASKA, LUCKY LOCAL HUNTER GIVE ME MOOSE MEAT, ENJOY IT VERY MUCH.

	<p>31 32 33 34  36 37 38  39 40 45 49 50 51  52  53</p>	<p>BIG FAMILY, EAT LOTS OF MOOSE MEAT, ONLY ONE HUNTER IN FAMILY, BUT KIND OF YOUNG. NO MOOSE NO MOOSE IN THE AREA, TOO ANY OUTSIDE HUNTERS. NO MOOSE NO DARN MOOSE, HUNT BUT NEVER SEE ANYTHING. MUST SHOOT BEARS AND WOLVES. TOO MANY WOLVES AND BEARS AROUND. TOO MANY WOLVES, NO MOOSE. NO MOOSE IN THE FALL SEASON, EASIER IN THE FEB. HUNT BECAUSE YOU CAN TRACK THEM. NO MOOSE NO MOOSE ONLY HUNT MOOSE TO EAT, TOO MANY HEAD HUNTERS. NO MOOSE AROUND THE AREA. NO MOOSE NEED MORE MOOSE AROUND GRAYLING, TOO MANY WOLVES AND BEARS PLUS OUTSIDE HUNTERS. DON'T LIKE WOLF HUNTING, SEE IT AS A MEANS OF PROVIDING SPORT HUNTERS INSTEAD OF SUBSISTENCE USERS. WOMEN IN OUR TRIBE DON'T EAT BEAR MEAT.</p>
Holy Cross	<p>7  9 16  17 19 23  38 40 41  45 46 51 61 62 63</p>	<p>SHARED 1/2 MOOSE WITH BROTHER. THIS RESIDENT WAS GIVEN MOOSE BUT TRAVELED AWAY AND WHILE SHE WAS OUT OF TOWN HER MOOSE MEAT THAT WAS GIVEN TO HER WAS STOLEN. MOOSE WAS GIVEN BY SON-IN-LAW. MOOSE GIVEN TO PERSON BY ANOTHER FAMILY MEMBER - CAUGHT AT RABBIT ISLAND. GAVE MOOSE TO BROTHER. YOU WERE GIVEN MOOSE BY RELATIVES. HEAD OF HOUSEHOLD WAS ABSENT DURING SURVEY - UNKNOWN SEX OF WOLVES. A RELATIVE HUNTED AND GAVE 1 MOOSE FOR FAMILY. HOUSEHOLD WAS GIVEN MOOSE. THE WHOLE MOOSE WAS GIVEN TO THE HOLY CROSS TRIBAL COOK BROTHER GOT MOOSE AND 1/2 WAS GIVEN TO HOUSEHOLD. GIVEN MOOSE BY FAMILY. GIVEN RELATIVES/FRIENDS LAST YEAR. RELATIVES GAVE HOUSEHOLD MOOSE. GIVEN MOOSE BY RELATIVES.</p>

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Shageluk

**No Comments Provided**